PAPERS

READ AT THE

Royal Institute of British Architects.

SESSION 1872-73.

USUI CIVIUM, DECORI URBIUM.

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Royal Institute of British Architects.

SESSION 1872-73.

At the Opening Meeting of the Institute, held on Monday, the 4th November, 1872, THOMAS H. WYATT, President, in the Chair.

PRESENTATION OF THE PORTRAITS OF PROFESSOR DONALDSON AND MR. BERESFORD-HOPE, M.P., PAST-PRESIDENTS.

THE preliminary business of the meeting having been concluded—

The PRESIDENT rose and said, we have an interesting event to celebrate this evening. We have to receive from those members, who have subscribed for them, the portraits of two of our Past-Presidents, viz. Professor Donaldson and Mr. Beresford-Hope, and I will now ask Professor Kerr, who during Mr. Nelson's absence, has assisted in collecting the subscriptions, to say a few words on the subject.

Professor KERR:—I feel it to be a very honourable position to be allowed to represent the subscribers on this occasion, in presenting to the Institute, on their behalf, the portraits now before you. Mr. Nelson, who was appointed to the office of treasurer, on leaving town, was good enough to permit me to assist him; and as he is not here to-night, on that account I take the position which ought to be his. The portraits you have now placed in your custody complete the list of Past-Presidents up to the present time. With regard to the gentlemen represented by these individual pictures it is almost unnecessary for me to speak in this assembly. I am sorry that Professor Donaldson could not, as he was pleased to put it, face the occasion of the presentation of his portrait: and we must all sympathise with him, because his connection with the Institute has been so long and intimate that we can well understand the reception he would have met with might have put him a little out of countenance. The portrait of Professor Donaldson is considered, generally, extremely pleasing, and speaking for myself, I think it is. With regard to his own merits I would desire to say a word. Professor Donaldson is acknowledged, more than any other, as the founder of this Institute; he is recognized abroad, more than any other man, as the representative of our profession in foreign countries; and he has always represented the English profession with the highest regard to its integrity, to its connection with art and science, and to every sentiment honourable to this country. A man who is a Chevalier of the Order of Leopold, and a Member of the Institute of France, cannot be considered second to any in his profession; and it is a great honour to the profession, and to this Institute, that of late years he has received these high distinctions in foreign countries. Mr. Beresford Hope is present, or in his absence I might have said what might be considered out of place now; yet I am sure you would be unwilling that I should pass over the high claims which he has upon us, as the leader of the amateurs of the present day. He has always displayed an extreme interest in, and kindly sympathy for our profession, and always defends us when opportunity occurs. We are subjected from time to time to a little adverse criticism: I believe we have never met with it from Mr. Beresford-Hope. We are obliged for such kindness, as, in his position, he is able and willing to show to the profession; and I am sure we all hope he will long continue to be connected with us as he has hitherto

been. I will now say a word with regard to the portrait of our present President. I believe we are not to be permitted to enjoy the privilege of presenting that portrait—not that we should do otherwise with regard to the next Past-President than we have done with regard to his predecessors; but one member of the Institute has taken upon himself to state that he stands in peculiar relations towards the President, of such a kind as to warrant and justify his asking us to do what we certainly could not otherwise permit—viz. to allow him to present this portrait to the Institute himself. But for the particular relations which exist between those two gentlemen, honourable to them both in a way that we can scarcely pretend to appreciate, the Council could not have entertained the proposition; but it is to be understood that it is out of the highest possible regard to those gentlemen that we allow that particular form of transaction to take place. How many more Past-Presidents and portraits we may have depends upon destiny; but we hope that future generations of architects may regard these portraits which I now present, with the same kindness and sympathy with which I am sure all of you now regard them.

The PRESIDENT.—My duty now is simply to accept, on your behalf, gratefully and with much pleasure, the portraits presented by Professor Kerr. I need not say how gratifying it is to us to have a complete series of these portraits. We have some already on the walls. We have that of the first honorary President, Earl De Grey, who in that capacity was most effective, and it is gratifying to find in the same category the portrait of Mr. Beresford-Hope, who is not less zealous and elevated to our profession than was his lordship. We have also the portrait of the first professional President, Mr. Cockerell, and that of his successor, Professor Donaldson, who is so honoured by the profession in this country, and also abroad, and from whom we have such constant proofs of his zeal and devotion to our art. We may hope, when our numbers are increased, that our rooms may be more extended. With regard to the prospective portrait of myself, I have some delicacy in referring to it. I have received so much forbearance and patience at your hands that, I confess, I have laid to heart the expression with which I undertook this office, viz. that you will take the will for the deed; and should it be your desire to have my portrait, happily, you will not have occasion to go round with the hat, inasmuch as a near and valued relative, without the least communication with me, has expressed his wish to present the Institute with my portrait. Having kindly accepted that offer, I have nothing further to say, but simply anticipate the gratification I shall have to express. On behalf of the Institute, I now beg to convey to the subscribers the thanks with which we receive their very handsome present on this occasion.

The PRESIDENT having referred to the recent decease of M. Leon Vaudoyer, read the following

BIOGRAPHICAL NOTICE OF M. LEON VAUDOYER,

HONORARY AND CORRESPONDING MEMBER OF THE INSTITUTE,

BY PROFESSOR DONALDSON, Past President.

OUR necrological notices of departed colleagues offer a very striking incident in the decease of M. Leon Vaudoyer, who, as a member of a committee of the Ecole des Beaux Arts at Paris, was appointed to examine the drawings sent in by a young architect for his diploma. He was carefully studying their merits with his colleagues, when suddenly he stopped, uttered a deep sigh and fell down, struck by a fatal apoplectic attack, in the 69th year of his age. His father was one of our earliest corresponding members, an active member of the Institute of France, joint editor in 1811 with

Detournelle of the interesting work entitled, "Grand Prix d'Architecture," containing the projects of the young pupils of the academy, who had been sent to Rome. He died in 1846 at the advanced age of 90 years, and the catalogue of our library contains the list of numerous works, which we owe to the active interest he took in our success. His son pursued his studies in the schools with considerable ardour, and after four contests obtained in 1826 the Grand Prix, and went to Rome. He sent home admirable illustrations of the Basilica of Antoninus and of the Temple of the Sun, the colossal fragmental remains of which exist in the Colonna Gardens, as well as of other classical edifices. By his restoration of the double Temple of Venus and Rome with its glorious surroundings, near the Arch of Titus, he concluded in 1831 a highly creditable career in the city of the Cæsars.

Just before his departure for Italy in 1826 he had successfully engaged in a competition for the monument of General Foy; an admirable composition, which distinguishes itself among the many beautiful sepulchral erections which render the cemetière de l'Est and that of Pere la Chaise striking instances of the refined taste with which the French record the virtues and services of their departed great men, and which have no rivals in Europe. On his return he established a school of instruction for pupils in the art; and here, by his sound judgment and perfect knowledge of architecture, he gathered around him a circle of ardent minds, eager to listen to his counsels, and to imbibe the principles which his matured studies enabled him to impart; and many of them carried off the medals from the Central School of Arts and the "Grand Prix de Rome." In 1839 he was appointed to arrange the extensive buildings of the Abbey of St. Martin aux Champs for the purpose of a "Conservatoire des Arts et Metiers," in which difficult task he combined the practical man with the devoted archæologist, converting the vast refectory, with its exquisite reading pulpit, into a library, and restoring the twelfth century apsis of the church to its ancient arrangement. The group of ample dependences of the ancient monastic establishment, containing amphitheatres, lecture rooms, drawing schools, laboratories, &c. under his able treatment, now forms a noble museum of ancient and modern inventions, and is one of the most useful institutions of the French capital.

It would be tedious to enumerate all the productions, whether of the pen or pencil, of his active mind; but we must notice the instructive and graphic history of the Renaissance period in France of the sixteenth century, suggested by the study of the houses in Orleans, which city contains some of the most elegant examples of this most refined period of architecture in France. The history appeared in a series of articles from 1849 to 1853 in the Magazin Pittoresque, illustrated by very spirited sketches and details.

But the most important production of the genius of Leon Vaudoyer is the Cathedral of Marseilles, of which he was appointed architect in 1860. It has been the aim of the French Government of late years to erect churches upon a colossal scale without regard to expense. The places of worship in the principal cities are not so numerous as in ours, but the rapid succession of services only necessitates a smaller number. The Cathedral of Marseilles is of enormous proportions. Founded upon a rising ground near the harbour, it seems the presiding religious genius of the place, under whose influence the sailor finds safety and repose. Although educated in the severest school of our art, Leon Vaudoyer on many occasions exhibited a free and independent spirit in his designs; and in this conception, throwing off the trammels of Greek, or Roman or Mediæval art, he with a bold daring sought his inspiration in the Byzantine type of Constantinople, Athens and Jerusalem; and by his frequent domes and his courses of alternate coloured stones, both outside and in, he studied to convey the type of the free commercial spirit of the port, which received the mercantile marine from all the maritime coasts of the Mediterranean, whether Spanish, Arab, Egyptian, Turkish, Greek or Italian. The outer walls are constructed, the domes are turned, the roofs are covered in and the scaffold still

remains; but the spirit, which designed and so far carried out the gigantic work, is passed away; and he, alas, was not spared to see the completion of his vast project! But if his genial spirit were permitted communion with the earth it might receive not only consolation but satisfaction in knowing, that what remains to be done, whether outside or in, giving the final touch to the creation of his latest fondest hopes, will be nobly and, we feel assured, conscientiously perfected with the utmost devotion and respect for the memory of his beloved master, by his favourite pupil M. Espérandieu, our honorary and corresponding member. In the Church of the Eglise de Notre Dame-de-la-garde and in the grand museum at Marseilles this distinguished architect has proved himself worthy of wearing the mantle of his master, and of carrying out the important and delicate task confided to his talents and discretion.

Large sized medals of the Conservatoire des Arts et Metiers and of the Marseilles Cathedral have been struck and are now exhibited, to give you an idea of those great works of our lamented brother. He was a Member of the Legion of Honor, and in 1868 succeeded his relative and master M. Le Bas at the Institute of France. He has left a widow and a son by his first marriage.

OPENING ADDRESS BY THE PRESIDENT.

Gentlemen,—It is not my fault that I have again to appear before you with something approaching to the formal address which it seems an essential part of the President's duty to lay before you on our opening night. Since you did me the great honor of placing me in this chair, it has been my fate to have to address you officially more frequently than my predecessors, (I wish I could have done so with their power and influence,) and it would, I think, have been well to resume our ordinary meetings with a mere reference to the last Report of the Council and to the published abstract of our proceedings at the Ordinary and other General Meetings of last Session: but such an arrangement not being *en règle*, I must ask your forbearance once more whilst I dwell shortly on the present condition of our Institute, and on the principal events that have occurred since our last opening meeting which may be supposed to have a professional interest.

Our numbers at starting last year were:—

Fellows	...	...	...	276
Associates	...	...	...	243
Students	...	...	...	21

We have now:—

Fellows	...	...	...	281
Associates	...	...	...	256 (of whom 3 were Students)
Students	...	...	...	24

Amongst our Honorary and Corresponding Members we have this year elected,—

Monsieur Esperandieu, of Marseilles

Herr Arnold Guldenpfennig, of Paderborn in Westphalia

Il Cavaliere Enrico Alvino, of Naples

Il Cavaliere Antonio Cipolla, Government Architect,
Il Cavaliere Pietro Rosa, Architect, } Rome *

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* You will, perhaps, remember that at our opening meeting last year I read a letter from our friend Professor Donaldson, in which he spoke most favourably of the works and labours of the two last named gentlemen, and especially in connection with the interesting excavations undertaken by the Government in Rome, and I am glad to think we have acted on his recommendation in electing them Honorary and Corresponding Members of our Institute.

names which, I believe, will do no discredit to the distinguished list in which they are now enrolled. Of the works of Mons. Esperandieu, of Marseilles, I can from personal observation speak with much admiration.

I ventured last year to urge on our Associates who are eligible for promotion that they should join the class of Fellows, and on the younger Members of our profession that they should join our body as Associates. The result has not been in this respect quite so satisfactory as I had anticipated. Of the 7 new Fellows, 3 only had previously been Associates; and of the 15 Associates elected, 3 only had previously been Students of the Institute. After deducting the losses in our numbers by death, we start this Session with a gain of 24 in all classes.

The special opportunities now available to the Architectural Student for education in *every* branch of his profession at one or other of the classes open to him, are certainly not less than they were when I alluded to them last year. I wish I could report to you that they were as generally and heartily utilized as the well-wisher to his profession could desire: such, I fear it must be confessed, is hardly the case. I cannot, however, hear of any positive falling off in the numbers attending the various schools or classes. But if our enthusiasm in the study of our profession is not as great as it might be, I am sure all here will regret to learn that in Paris, where architecture used to be so popular and so successful a study, this year it is singularly unfortunate or singularly unpopular; for, at the recent distribution of the prizes at the Ecole des Beaux Arts, although there were eight first-class, seven second-class, and six third-class prizes distributed for painting, sculpture, and engraving, not a single award was made to any architectural student. I should not have been surprised if all the arts had suffered from the depression of France, but why architecture alone should be thus unfortunate I am unable to guess, seeing that with renewed vitality and prosperity there must be such ample field for the labours of the architect. Can it be attributable to a general want of confidence in the future political condition of poor France?

I had understood that when the Royal Academy took the wise and generous step of instituting a special class for the study of Architecture, and placing it under the charge of Mr. Phené Spiers, it was proposed that this gentlemen should make a special report upon the system of architectural education adopted in France, and that at least the best portions of that system might be engrafted upon the one adopted at the Academy; but up to this time I have not heard of any further action in the matter. The Council of the Royal Academy having once taken the initiative in this (to our profession) interesting and important matter, will surely not let it lack their further care and energy.

The establishment of the Art Classes in the rooms of the "Architectural Museum" in 1869 was an experiment which could not fail to be an interesting one to this Institute, as it was to the Royal Academy, the Architectural Association, and to all architects interested in the artistic developement of their profession; and this interest has been practically proved on the part of the Institute by our having made a donation out of their funds of £25. to the Museum, £50. in 1870 to these "Art Classes," and a similar amount last year. It was originally believed that these Classes would after a time become self-supporting, and certainly it was clearly understood that the donations generously given by the Institute were not to be considered as annual grants. The heavy and unexpected cost of permanent works upon the building (£156.) is hardly a fair charge to be put upon these Classes. It has, however, crippled the financial position of the scheme, and the result of three Sessions' working is a deficit of £80. 17s. 3d. In an appeal which has been made to the Institute on this subject, it states that, "the Committee have felt that as long as the Institute continued to appoint representatives, "its pecuniary assistance (on which the Classes mainly relied) would not be withheld, and without the "active co-operation of the Institute the whole scheme must fall through." Certainly the pecuniary

assistance of the Institute has not been grudgingly given; but its funds will not admit of similar future liberality. If the appointment of representatives is to constitute a moral responsibility on the part of those exercising the franchise, it must equally fall on the shoulders of the two other bodies nominating representatives.

A capitation grant has been spoken of; and if it is satisfactorily proved that these Classes cannot be made self-supporting, and that the system of teaching is really judicious, I can think of no fairer way to meet the difficulty than for the three bodies sending representatives to determine upon such a sum in the shape of a capitation grant as will meet the deficit, and to divide that grant amongst them. I venture to offer this as an individual suggestion, without in any way committing our Council to its approval.

The Professional Examination for young Architects is a subject which, as you are aware, has long engaged the attention of the Council and a special Committee of the Institute. It is useless to conceal the fact that, in spite of the time and trouble which had previously been given to the matter, the scheme as at first started proved a failure. A few earnest Students, indeed, availed themselves of the opportunity thus afforded of testing their knowledge and ability, and were content with the satisfaction of seeing their names enrolled in the scanty List of Candidates who had won their spurs in the respective classes of Proficiency and Distinction; but it soon became evident that Students required something more than this privilege to induce them to come forward for a merely nominal honour. A prejudice had previously existed against anything like a Professional Diploma; but like all prejudices having little, if any, foundation in justice, it yielded by degrees to a more generous conviction. By a resolution passed in this room, the recommendation of the Examination Committee that a Certificate of merit should be issued to successful Candidates was approved and adopted. Since this was done the same Committee have set themselves to re-model the rules of the examination, and to simplify their application, so as to meet the convenience of Students and to afford some more positive recognition of merit to those whose exertions in the field of technical education have been crowned with success.

The Examination will henceforth be conducted in two divisions, viz., the Artistic and the Scientific Sections, and Candidates will be at liberty to come up for one or both Sections at a time in a given year. It is proposed that a Candidate who has passed in both divisions shall have the privilege of a free Studentship of the Institute for four years, and on becoming a Member shall be entitled to the designation of "Graduate of the Royal Institute of British Architects." This, Gentlemen, is an honour which in course of time may reflect as much credit on our corporate body as on the individual Members who have thus deserved it; and I trust that those gentlemen who have already gained for themselves a professional position, independent of all titles, will look kindly on a scheme of which the main object is to encourage the rising generation of architects, to elevate our profession, and to add to the confidence which we desire the public to have in the education, the ability and the integrity of its Members.

I venture to think that the architectural student (no less than the student in every other profession) will do well to lay to heart some of the wise and practical words of counsel recently uttered by Lord Salisbury in his interesting address on the occasion of distributing the prizes of the Oxford University examination in the Manchester Centre.

"Depend upon it," he says, "every *honest* labor to which a man may be called is perfectly "consistent with his dignity as a man, and he is not only not less fit, but more fit to perform that "avocation if he comes to it with a mind and brain properly prepared;" and he adds, "ambition is

" the very life-blood of any acting and moving community; by all means let men (and women) " struggle to the utmost to rise as high as they can; let them get up the ladder as high and as fast " as they can, but *don't let them abandon the lower round until they are quite sure they have a firm " hand on the upper.*"

Comparing the general Expenditure and Receipts of 1870 and 1871, we have the following results:—

1870.

Dr.				Cr.			
Subscriptions	£1289	8	0	Current Expenses	£1148	6	9
Dividends	206	12	7	Furniture and Repairs	14	8	4
Donations	189	10	6	Prizes awarded	107	9	0
Architectural Examinations: Sale of Rules, Candidates' Fees, &c.	32	10	0	Architectural Examination: Fees of Examiners and Moderators and Printers' Account	111	8	8
Sale of Papers	9	2	4	Conversazione	123	6	2
Composition Fee	42	0	0	Purchase of Books	80	0	2
*Sale of Stock for re-Investment	214	5	3	Donation to Art Classes	50	0	0
Petty Receipts	0	19	3				
	£1984	7	11		£1634	19	1

Amount invested, £412. 18s. 0d.

1871.

Subscriptions	£1295	14	0	Current Expenses	£1236	7	8½
Dividends	211	11	4	Furniture and Repairs	64	11	0
Donations	180	12	0	Prizes awarded	82	0	0
Architectural Examination: Sale of Rules, Canditates' Fees, &c.	18	6	6½	Architectural Examination: Fees of Examiners and Moderators and Printers' Account	49	6	8
Sale of Papers	23	8	0½	Conversazione	117	2	0
Composition Fees	81	18	0	Purchase of Books	96	7	6
Petty Receipts	1	6	3	Conference (part expenditure)	31	9	5
				Donation to Art Classes	53	3	0
				Legal Expenses	29	17	0
	£1812	16	2		£1760	4	3½

Amount invested, £55. 13s. 0d.

Without a more minute reference to the audited Accounts which have been issued to the Members, this general statement may be somewhat confusing, the exceptional receipts and disbursements varying considerably each year. The receipts from Subscriptions, Dividends and Donations are strangely close; in 1870 they amounted to £1685. 11s. 1d., in 1871 to £1687. 17s. 4d., the average being £1686. 14s. 0d. The expenditure varies more considerably, but the average of the two years shows how much prudence is required in the appropriation of our funds; and I beg Members

* This item cannot, of course, be considered a receipt, and is merely entered on the debit side for the sake of accuracy and to explain the amount invested.

to bear in mind what the Council truly said in their last Report on this question: "Although the "financial condition of the Institute continues to be satisfactory, the Council feel that there is a limit "to its resources, and that while a fair proportion of its income is devoted to the encouragement "of professional study and other general objects, it would be unreasonable to expect that expenses "incurred for objects of a still wider range should be borne exclusively by a private Society. For "instance, the cost of the General Conference last year was £132. 12s. 7d."

Gentlemen, since this time last year the obituary of *our own* Members contains the names of

Mr. HENRY ASHTON, Fellow.
Mr. JAMES SPENCER-BELL, Fellow.
Mr. W. J. BOOTH, Fellow.
Mr. FREDERICK MARRABLE, Fellow.
Mr. EDWARD CHARLES HAKEWILL, Fellow.
Mr. W. POWELL, Associate.
Mr. H. J. WILLIAMS, Associate.
Mr. A. BAILEY DENTON, Associate.

Within the last few days, one who was for many years a Member, Mr. THOMAS ALLOM.

1. Mr. ASHTON was born in London in 1801. He was articled to Sir Robert Smirke, R.A., and on leaving his office went into that of Sir Jeffry Wyatville, R.A., who was then engaged on the important works at Windsor Castle, with whom he remained up to their completion, and to the death of Sir Jeffry. Mr. Ashton was subsequently employed by Her Majesty to erect the Royal Mews at Windsor and the Kennels at Frogmore. Amongst the public works for which he competed were, the Houses of Parliament, the Nelson Monument, the new National Gallery, and the Great Exhibition of 1851. Though unsuccessful in these competitions, Mr. Ashton's designs were marked by considerable originality and taste, and great power of execution, for he was an elegant and artistic draughtsman. He was employed by the late King of Holland to make a design for a summer palace at the Hague, and for many years had extensive practice on the private mansions of some of the nobility and gentry of our own country, in many of which his works show evidence of considerable professional skill and fertility of invention. The buildings which he erected for the "Westminster Improvement Commission" in Victoria Street, and that neighbourhood, were amongst the first which offered to the inhabitants of this metropolis the advantages of extensive suites of apartments disposed *de plain pied* like the Continental and Scotch flats, which have this additional advantage, that they enable the architect to deal with larger masses of building in one frontage than he possibly can with the usual contracted breadth of modern houses, driving him to inordinate and inconvenient height to obtain the necessary accommodation for a family. His numerous private friends were well acquainted with his painter-like illustrations of his foreign travels, but beyond that there was the charm of a polished intellect, pungent wit and a well stored mind. He died on the 18th of March last, after a long and trying confinement to his room from partial paralysis.

2. Mr. JAMES SPENCER-BELL. I am unable to obtain particulars as to Mr. Bell's professional life. He was, fortunately for his own ease, in a position requiring little labour on his part, but he was attached to the profession he nominally followed, and for some time shewed his interest in it by acting as Honorary Secretary to this Institute. He was a pupil of Mr. Railton's, but did not attempt to practice after the age of thirty. Mr. Bell travelled much, and was indefatigable with his pencil. He represented the borough of Guildford for some time in Parliament. He took an active part in the Committees of the House of Commons, and was a diligent worker in several societies of a benevolent

and religious character. He was in declining health for some time prior to his death, which occurred in February last at the age of 52.

3. Mr. WILLIAM JOSEPH BOOTH was one of the earliest Fellows of the Institute, his name appearing in the first published list of the Members. He followed his professional studies in the office of his father, and imbibed a decided taste for Greek architecture, then almost the only, certainly the favorite style of the English school. He travelled in Italy and Greece, and at Athens had many casts made from the finest monuments of that city. On retiring from the profession he presented these casts to the Institute. Mr. Booth had a very refined appreciation of art in all its branches, and made a valuable collection of books and prints. The works he executed were chiefly for his own Company, with whose committee he periodically visited their large property in the North of Ireland, where he designed many churches, schools and farms. He left London to reside at Torquay, where he died in the early part of the present year. His widow, conscious of the interest he felt in the Institute, presented several of his architectural books to the library. He was a man of modest retiring habits, a devoted lover of his art, and of a benevolent generous disposition.

4. Mr. FREDERICK MARRABLE was the eldest son of Sir Thomas Marrable, late Secretary to the Board of Green Cloth. He was a pupil of Mr. Blore's, and was for several years successfully engaged in his professional career. He was the architect of the churches of St. Mary Magdalen at St. Leonards, St. Peter's Church at Deptford, the Garrick Club and adjoining buildings, the offices of the Metropolitan Board of Works in Spring Gardens, the Stockwell Fever Hospital, Archbishop Tenison's School in Leicester Square, and various works for private clients. Mr. Marrable was elected to the office of Architect to the Metropolitan Board of Works, on the formation of that body in 1856, an appointment which he held till 1862, when he resigned office. The strong testimonials which he received from the Chairman on that occasion showed how fully his services were appreciated by the Board. The current of Mr. Marrable's professional life was, however, to a considerable extent changed by his connection with the Metropolitan Board of Works. In this position his practical knowledge and well known integrity and independence, were frequently brought to bear in a quasi judicial position in a manner which did him great credit. The turn thus given to his mind, and the experience which he thus gained in dealing with large questions of property, found subsequent development in various arbitrations of importance, and in dealing with the purchase and sale of property. In such practice the latter portion of his professional life was principally passed, and in it he attained an eminence well earned by the union of practical skill and unswerving uprightness. Without for an instant wishing to revive the painful controversy that took place on the question of the Holborn Viaduct, I think it will be acknowledged that Mr. Marrable's original design for that work (as shown by the photographs now on the table), evinced a very considerable amount of architectural skill and picturesque treatment. Mr. Marrable held the appointment of Surveyor to the Royal Hospitals of Bethlehem and Bridewell up to the time of his very sudden death, which took place on the 22nd June last, to the great regret of a large number of friends.

5. Mr. EDWARD CHARLES HAKEWILL, Fellow, who died last month, was a pupil of the late Mr. Hardwick, R.A. He was an early member of this Institute, and took much interest in it, though for several years his residence in the country prevented his attending our meetings. One of Mr. Hakewill's earliest works was the church at South Hackney; and his latest works, the churches of Wickham Market, Sibton, Stonham, Asfall and Grandisburgh. He succeeded Mr. Goldicutt as one of the Metropolitan District Surveyors, an appointment which he held until 1867, when he settled in Suffolk. His work was of the most careful and conscientious kind, and he will long be remembered as an honorable and generous man, much regretted by his friends and valued by his clients.

6. Mr. WILLIAM POWELL, an Associate, who died of consumption, in the spring of this year, at the age of 32, was a pupil of Mr. Whichcord's, and a member of an old Kentish family residing at Lenham. He was an excellent musician, and otherwise accomplished as an artist. In his very short independent professional career, Mr. Powell was the architect of the Schools and Literary Institution at Lenham, and of some villas at Forest Hill and Sydenham. Mr. Powell is spoken of by those who knew him well, as an amiable and honorable man, and one whose early death cut short a very promising future.

7. Mr. H. J. WILLIAMS, an Associate of the Institute, was the son of Mr. Herbert Williams, a Fellow of the Institute, and Surveyor to the Drapers' Company. His death occurred at an early age from an unfortunate accident on the ice. He was associated with his father, and took a considerable share in designing and carrying out the new Drapers' Hall. He also had the credit of re-decorating the Church of St. Michael, Cornhill, which was originally restored and decorated some years since by Sir Gilbert Scott. Our Associate was also a Student of the Royal Academy. He was much esteemed by all with whom he was brought in contact, and his career opened with considerable promise.

8. Mr. ARTHUR BAILEY DENTON, who died on the third of October last, at the early age of twenty-eight, was an Associate of the Institute and a pupil of our Fellow Mr. Blomfield. He was an intelligent and industrious pupil, with considerable habits of business. Mr. Blomfield speaks of him as one for whom he had a great regard, and who would he thinks have done very creditably in his profession, and made a valuable member of the Institute. He superintended the working out of all the architectural drawings and details in his father's book on "the Homesteads of England," and he took the architectural department in his father's office.

Within the last few days, there has occurred the death of one whose name was well known in this room, and in every Society where architecture and art were familiar subjects. Mr. THOMAS ALLOM was a very early Member of this Institute and a pupil of Mr. Francis Goodwin, the architect; his death occurred on the twenty-first of last month from heart disease, at the age of sixty-eight. Mr. Allom's architectural works have been so recently and so fully described in the architectural publications, that I shall content myself with alluding to his artistic powers, to his great facility for illustrating architectural works, and to the kindness and readiness with which he was prone to aid other architects with his pencil and his advice. There are probably several in this room who have sought that aid and felt its power, and certainly there cannot be many who have not witnessed his artistic treatment of architectural subjects. I have borrowed two or three of those studies, that our memory may be refreshed as to Mr. Allom's skill, and I venture to suggest that we might make a most interesting exhibition below stairs if we got together several of his architectural drawings, many of which are no doubt in the possession of members of this Institute. His family would, I trust, aid such an exhibition out of the large collection they possess of his original sketches. Many of us who are now without any of his works would, I think, gladly possess some record of his powers as an artist.

I have thus, Gentlemen, given such general information as I possess concerning the professional lives of those of our own members in all classes who have passed away from us since our last opening Meeting.

I was somewhat severely taken to task a year or two ago, for not including in the obituary I laid before you, the names of *all* architects who had died during the past year, and I was accused of exclusiveness or apathy. Gentlemen, I shall again lay myself open to this charge, and confine my remarks as to the lives of those members of our profession who were members of this Institute. The sad list is quite long enough as it is, and the lives and works of other architects not belonging to us, find abundant opportunities of having full description and (when deserved) due honour in the

architectural publications of the day. But as an exception proves a rule, so I think there may be cases in which a departure from that rule is permissible, and such a case I believe will be the mention of Mr. Wightwick's name. He was probably more generally known as the author of several works on professional subjects than as a practising architect; and he was thus far specially connected with our Institute, that on two separate occasions he presented books and drawings to our library, and competed for and carried off the Silver Medal of the Institute, for an Essay on "the Architecture and Genius of Sir Christopher Wren."

Mr. GEORGE WIGHTWICK, for many years lived at Plymouth. His early career was briefly described by himself in a short poetical effusion, entitled "On my retirement after Fifty Years' Voyaging over the Waters of the World,"

> "An orphaned infancy, an anxious youth,
> A struggling manhood with its loss and gain—"

Mr. Wightwick was born in Flintshire in 1802; was articled in 1817 to Mr. Edward Lapidge, architect, of London. On the expiration of his articles he spent some time in Italy, and on his return went into the office of Sir John Soane, when he published his first work "Select Views of the Roman Antiquities." He subsequently settled at Plymouth, where (to use his own words) he had "a considerable and ever increasing practice." His principal works were the Orphan Asylums at Plymouth and Devonport, the South Devon and Plymouth Hospital, additions to the Cornwall Lunatic Asylum, important additions to Theguma Castle and to Thegurham House, and several of the principal terraces and street houses in Plymouth. Mr. Wightwick was the author of several works connected with architecture, such as "The Palace of Architecture," "Hints to Young Architects," &c. He retired from practice, and settled at Portishead in Somersetshire in 1855. Mr. Wightwick was deservedly a great favourite with the Literary and Artistic Society of Plymouth. As a student of dramatic literature few would excel him in the rich fund of knowledge with which he illustrated his Shakespearian readings. He gave to the Institute during his life a large number of Illustrations, which he had prepared for the numerous lectures on Architecture he gave from time to time; and in his will bequeathed to us copies of his literary works, and a considerable number of the drawings he made during his residence abroad.

Our losses in the class of Honorary and Corresponding Members, have been the following:—

CARLO BONUCCI, of Naples, Ex-Director of the Excavations at Pompeii;
IL PROFESSORE BESIA, of Milan;
HERR JOSEPH KRANNER, of Prague and Vienna;
LEON VAUDOYER, of Paris.

and I shall request our worthy Honorary Secretary for Foreign Correspondence on some future occasion to make some remarks as to their professional career.

The Council (or rather the Sub-Committee appointed to deal with the subject) have experienced the usual difficulty and anxiety in securing papers for the Ordinary General Meetings, and I am again urged to impress upon members the great importance of this branch of our work. They have, however, been fortunate enough to secure some very interesting contributions during the past Session, amongst which may be specially mentioned, 20th November, 1871, a paper by Mr. H. W. Brewer "On the Revival of Gothic Architecture in Germany and Holland;" 4th December, 1871, "On the Bridges of London," by Mr. H. Carr, C.E.; 22nd January, 1872, "On the Construction of the Albert Hall," by Major-General Scott, C.B.; 22nd April, 1872, "On the Necessity and Method of Testing Building Materials," by Captain Seddon, R.E. These papers were full of interesting information, and led to extended and instructive discussion.

Gentlemen,—This time last year I ventured to remind those present of the great claims which the

"Architectural Benevolent Institution" has upon our profession, and how indifferently I thought the Institute, as well as the profession generally, responded to that responsibility. The result of that appeal or reminder has not, I fear, been as useful as I had hoped and expected; and I learn from the indefatigable Secretary of that charity, that "up to the present time the Society has had little further accession of funds, either in the shape of donations or subscriptions, traceable to the appeal I ventured to make last year." He adds, "I may say, with much sorrow and regret, that whilst we have had many applications for aid from men well known to us in our own day, yet by far the larger proportion of the applications are from the widows and orphans of those who had struggled through many difficulties to make way in their honourable calling." Gentlemen, this sad fact should appeal to our sympathies and to our responsibilities more powerfully than any fresh words I can use, and I will but wish you to bear them constantly in mind, and to impress them on those who have hitherto been indifferent to this admirable charity.

It can hardly be necessary that I should enter into particulars as to the result of the Second Conference, which was held this summer, immediately after the termination of our last Session. Many of you attended the meetings, and all have had an opportunity of learning the nature of its proceedings. I said last year that they would necessarily have to be of "a drier and more business-like character" than those of the first Conference in 1870; but if such were their peculiarity, I believe, that the results will not prove less useful to the profession. Some important points of professional practice were carefully and calmly discussed, and at any rate we arrived at a definite scale of Professional Charges, which we believe will be found only fairly remunerative to the profession and just to the public; and we have laid down some useful suggestions for the guidance of those engaged in architectural competitions. I wish I could call them positive conditions on which alone Architects would compete. The third subject which engaged our attention, viz., "the Employment of Surveyors in taking out Quantities," was found, owing to various local customs, and a considerable divergence of opinion, not so easy to be dealt with in a conclusive manner, and it still remains an open question. I ventured to say last year, at the beginning of our Conference, that it was a point "happily involving no question of professional honour or etiquette, so that each Architect might remain at liberty to adopt that course which under the special circumstances of his own case, he might think most conducive to the interests of his clients." Though this may be the case, I cannot help feeling that in the interests of the client specially, it is very desirable to have some definite rule laid down for uniformity of practice, and as there is now to be an interval of another year before a fresh Conference is held, I hope that meanwhile some practical and experienced mind will find a solution to this problem.

It will, I think, be acknowledged that our last Conference had lost none of the interest amongst our Provincial brethren which the first one undoubtedly created; their attendance was not less in point of numbers, the value of their practical suggestions was as marked as in our former meeting, and if we may judge from their attendance and cordiality at our dinner, the social advantage of such gatherings was not less positive.

Gentlemen,—Last year I was able, through my brother's kindness, to give you some particulars of the interesting works going on in Germany, Austria and Belgium; to that list I have now little to add. The award of the first prize for the Houses of Parliament in Berlin is in itself a very important act. However little satisfactory to the disappointed candidates, and to many others, that award may be, it is no doubt an important step towards the realization of a great European work. In Vienna the erection of the Austrian International Exhibition cannot fail to be full of interest as a matter of constructional science and artistic treatment. Under the former head, the authorities have sought the aid

of our countryman Mr. Scott Russell, whose experience and fertility of invention in such matters are well known, and for the taste and elegance which will be brought to bear upon its decoration and its accessories, we need have little misgiving. We have seen on more than one occasion how readily and artistically the Viennese can deal with such matters.

In Holland the completion of the fine church of St. Catherine at Eindhoven by our honorary and corresponding member M. Cuypers of Amsterdam deserves special mention.

In France, borne down as she now is by the weight of her terrific debt, and still more, I fear, by the incubus of utter uncertainty as to her political future and the antagonism of parties, it was not to be expected that there should be much architectural progress; but I think we must all be pained and surprised at the apathy or failure of the students in architecture to which I have already alluded. Europe can ill afford to lose France as one of her leading spirits in the pursuit of art under any one of its civilizing forms, and I am sure that all here will join with me in wishing her a speedy resurrection from her many troubles. The Americans, free from such drawbacks, seem to be exhibiting their usual energy in numerous public and private buildings, where expenditure seems boundless, and where the scale on which their buildings are erected seems to bewilder. Imagine in one town three new hotels building at the same time for 830 rooms, 475 and 275 respectively. In their town of Chicago alone more than 1000 buildings of the first class have been erected since the great fire, valued at 40,000,000 dollars. Great as have been the precautions against a recurrence of such a calamity as visited their city but lately, little or no control has been exercised over the architect's designs, and as an evening contemporary no doubt truly says: "The amusing confusion of orders and schools in the new Chicago is startling. "It was inevitable, and does not prevent the revival of the city being even more startling than its "original growth."

In our own country I think the architect has little to complain of, as far as the demand for his services is concerned. There has seldom been a time in which the national prosperity of a country has shown itself more fully developed in the erection of costly private dwellings for her citizens, in handsome and capacious public buildings for her municipal and county requirements, banks and insurance offices for her commercial pursuits; in the care and restoration of her glorious old cathedrals, in the erection of almost numberless churches and places of worship for every sect and calling; hospitals and asylums and homes for the afflicted in body, or mind or estate; and, though last not least, in the erection of schools without number.

It would be, probably, difficult to ascertain what proportion of these works has been entrusted to the architect on the faith of his own special qualifications, and how many have been the result of competitions. I am inclined to believe it would be found that the former cases predominate. That this should be so is not, I think, so surprising, seeing how unsatisfactory almost all the results of modern competitions appear to be to the competitors, if not to the public. Certainly we have not yet succeeded in England in arriving at the form of tribunal, whose decision shall inspire confidence, and the office of the present referee is about as disagreeable and thankless as can well be imagined. How far the "General Regulations for the Conduct of Architectural Competitions," which were approved and adopted at the General Conference of Architects in June last, may, if generally acted on and honestly carried out, remedy this unsatisfactory state of things, remains to be seen; certainly it will not, unless they are resolutely insisted upon by all architects entering on the competition. We have now before our eyes a most interesting and important competition still undecided, I allude to that for the Edinburgh Cathedral. One of our members (Mr. Ewan Christian) has, I understand, been called in to report and advise on this subject, and if abundant knowledge and experience, and the most unquestioned integrity can ensure a satisfactory and equitable decision, then I think the distinguished competitors who are

engaged on this "concours," should wait with confidence, and accept his award without murmuring (at least to the minimum extent of which human nature is capable). Since I addressed you last year we have seen in the metropolis the rapid advancement or completion of several important public works, such as the Albert Memorial, the Chapter House at Westminster, the group of buildings for the learned Societies in Piccadilly, and the adjacent works for the Royal Academy, the new Post Office, and the Guildhall Library in the City. In addition to these there are still in progress other important works, some in their infancy, such as the Law Courts, the Natural History Museum at South Kensington, &c. and others in a more advanced state, such as the Home and Colonial Offices in Whitehall.

I purposely avoid dwelling on the numerous important works now in progress, or lately completed in the provinces and in the sister kingdoms. They are from week to week so well illustrated and so abundantly described in the architectural publications of the day, that any fresh recurrence to them would be unnecessary and tedious. Their name is "legion," and many of them do great credit to the advanced architectural taste or knowledge of the day.

Last year I indulged in some mild criticisms on the architecture of some of the public buildings in progress, or undergoing the ordeal of public criticism. I thought I had done so carefully, and without the possibility of giving offence, but as I subsequently found that an interpretation was put upon my opinion which I had not intended, that an importance was attached to it from my official position which it would not otherwise have been entitled to, and last, though not least, that it was unwelcome to one, for whom personally I have much regard, and for whose ability and power I have every admiration, I have determined to avoid a recurrence of such a contretemps, and *from this chair* to express no opinion on the architectural merits of the works I allude to. I retain, of course, my individual privilege of criticism, and of that which is so dear to an Englishman, the right to growl and grumble. I trust I may ever exercise that right with moderation and care, and with a due regard to the feelings of others, to the difficulties and drawbacks they have had to contend with (of which the critic frequently knows nothing and cares even less). Gentlemen, I wish that in our profession there was, as a general rule, somewhat more consideration for the sensitive feelings of others: less of the self-sufficient criticisms we have so frequently and so satirically thrown about on the works of others. I believe in no other profession is such license taken, and on all hands I hear this custom condemned by the public.

What with an unusually long Obituary, and a certain amount of *preaching*, my address has up to this time, I fear, been of a very lugubrious character! The few remaining remarks I have to offer will be of a more cheerful and congratulatory nature. All here will, I feel convinced, be glad to think that another member of our profession has received such honour at the hands of his Sovereign as is sometimes accorded to English Architects. Nor is it less gratifying to us to feel that with the honour, Sir Gilbert Scott has received the still greater boon of restoration to health. His many friends will desire that he should not trespass too much on that restoration, but that as he deals with the numberless Cathedrals placed under his care, tenderly and conscientiously; so should he deal with his own health, that he may be spared many years to enjoy his honours.

It will be remembered that much interest was created last autumn by a letter which appeared in the *Times*, from Mr. C. Tyrwhitt Drake, describing the ruins of Baalbek as "fast perishing from neglect and wanton depredation." I was requested, as your President, to put myself in communication with Lord Granville, the Secretary of State for Foreign Affairs, with a view to see if some steps could not be taken to check such desecration. Nothing could be more courteous, or shew greater interest in the matter than the action taken by Lord Granville and by Lord Enfield. The result has not been less satisfactory, for Lord Granville has forwarded to us a communication received by the Foreign Office to the effect that "the Turkish Government would itself take measures for the preservation of the ruins of Baalbek."

Not less important, or less interesting to the Members of this Institute, was the continuation of a grant from Government for the Excavations at Ephesus, which had been conducted with such perseverance and signal success by our countryman, Mr. Wood, for a period of 13 years, and which promised "to restore to the world one of the most renowned edifices of ancient times, the Temple "of Diana of the Ephesians." This interest found vent in the presentation of a Memorial from the President and Council of the Royal Institute of British Architects to Mr. Gladstone as first Lord of the Treasury. On the 24th July last I had the honour to receive the following letter:—

DOWNING STREET, 24*th July*, 1872.

SIR,—Mr. Gladstone desires me to acknowledge the receipt of the Memorial from the President and Council of the Royal Institute of British Architects on the subject of the excavations now proceeding at Ephesus. I am directed to call your attention to the Supplementary Estimates for Civil Services which have been presented to the House of Commons, in which the amount of £ 3000. appears for the excavation of the Temple of Diana at Ephesus, being a moiety of the sum of £ 6000. required to complete that work; and I am to express Mr. Gladstone's hope that the decision which has been arrived at by Her Majesty's Government may be satisfactory to those on whose behalf you have presented this Memorial.

I have the honor to remain

Your obedient Servant,

T. H. WYATT, ESQ. W. B. GURDON.

Gentlemen, the Memorial we presented stated truly that this Temple (lost to the world for more than 1600 years) had always excited deep interest amongst historians, students of classic art, and writers on Biblical Archæology, and that to architects it had been a subject not only of interest but of some perplexity, arising from statements of certain peculiarities in its design specially unique, and which hitherto had been difficult of elucidation. It was not to be doubted that so accomplished and so devoted a student of classic art and classic lore as Mr. Gladstone would share in the general desire to see this mystery unravelled and these treasures collected in our own glorious department of Grecian antiquities in the British Museum. As it has been well put elsewhere, "England is once more "to make up by the spirit of enterprise (of which she has abundance) for the love of knowledge (of "which she has not so much); English spades are, as heretofore, to clear the way for German "spectacles; nor is the spade, as was for a moment threatened, to be thrown aside in mistake after "the first shovelfuls."

I will not suppose that the precious fragments now in Great Russell Street have not been visited by all present. If, however, there are any here who have not yet seen them, let them lose no time; they will be abundantly repaid, whether they go to study history or art. It has been truly said that "their "historical value cannot be over rated; their artistic value is considerably greater than has at "present been recognised; and they belong to a school of design which is full of genius as well as "of skill and training." I hold that it is an honor to have aided, in however small a degree, in the furtherance of this precious work, and I can fearlessly ask the approval of the Members of this Institute for the action taken by their Council in the matters of Baalbek and Ephesus.

Since the foregoing was written, I have been informed by one well qualified to speak on such a subject, and whom you have honoured by the award of the Queen's Gold Medal, that amongst the recent additions to our knowledge of ancient architectural art, one of the most important has been the discovery of a Sassanian palace in the desert behind the Dead Sea by the Rev. Mr. Tristram in the spring of the present year.

This palace, which dates from the first year of the seventh century, is the only specimen of the decorative style of that age which is known to exist, and supplies, in part at least, the missing link that was wanted to connect the styles of the west with those of India, and enable us to understand much in the Saracenic architecture of Persia and India which has hitherto been wrapt in mystery. The details of the building which are of extreme beauty and delicacy will probably soon be published by the discoverer, and will no doubt prove a most interesting addition to our knowledge of the thousand and one styles in which mankind has expressed the idea of beauty and fitness in our noble art. At some later period in the Session I have reason to hope that Mr. Fergusson (who is my informant) will be able to give us some further information on this interesting discovery and show us some photographs of its details.

Mr. A. J. B. Beresford-Hope, M.P., said,—I feel much honoured and gratified in rising to convey to you, Sir, the feeling of the Institute on the very admirable and most practical address which you have given us. Having had myself, on two occasions, to perform a similar duty, I know how anxious the task is of, first, considering what topics to bring before such a body as this, and then how to arrange them, so as at once to answer to one's own conscience with a sense of truth, and at the same time agreeably to those who are to hear them; and I must say, looking back on the papers with which I have troubled the Institute, I envy the facility with which you have been able to compress, within so small a compass, so many points of interest, and skilfully to avoid matters on which a little temporary *eclât* might be gained, but which would do no good, if they put us by the ears, when we should be one body, pulling together. For of a truth the world has not done justice to the profession of architecture. The world is ill-natured enough in some respects; it is good-natured in some respects, but ill-natured in others. It is jealous and fussy in matters of art, and goes in for payment for results, but never considers the difficulties by which those results may be obtained. It is the old story which you have often heard in this room, which all those who have had to deal with public opinion must have felt. It is therefore absolutely necessary that we should hold together by the common bond of respect for the dignity of the profession—respect for the honour of the profession viewed on its business side —respect for the grandeur of the mission of architecture, viewed as an art. We may do that, and yet have strong and conscientious convictions. We may fight out in this room, *sans peur et sans reproche*, the battle of the pointed arch, the pediment, or the rounded arch. These are matters on which we all have convictions, and having convictions it is right to stand up for them. It is wrong to be chary in mere ideas, but while we fight the battles of the styles, *à outrance*, let it be fought as knights of feeling and of chivalry, and let not differences of individual opinion prevent us standing shoulder to shoulder in the battle which we have to fight against the jealousy, suspicion, stinginess and vanity which underlie the discouragements we so often meet with in high places. Depend upon it great buildings will live when the memory of First Commissioners will have passed away like dead leaves which are swept away by our "market gardeners." One point which you have raised concerns me personally. You spoke of the Architectural Art Classes, and you pointed out how necessary it is to keep them up; and no doubt it is true that the three Societies which are responsible for these art classes should put their shoulders to the wheel to maintain them. Having myself been at the head of one of these societies, and admitting as I do fully the truth of what you have said, I would add I wish our architectural museum had reached that condition as to receipts and expenditure which you tell us the Institute has attained and which we, who are interested in the establishment of these Art Classes should consider as the apex of prosperity. In the Architectural Museum we have done something I hope. We have not had to build the museum without seeing that the bolts of the doors were

pretty strong against the wolf we have heard howling round it. Therefore while we do what we can, you must look upon us as a society which has done a great deal. We have not had that amount of support from the public which we thought we had a right to expect, considering the unsparing energy which Sir Gilbert Scott and Mr. Joseph Clarke the Honorary Secretary have displayed. I know personally the way in which the latter gentleman has devoted himself, with the conviction of the utility and importance of that institution. I look upon it that the Museum is a great help to the art classes, and if it does not do all we wish it is not the will that fails, but the material means. I now beg leave to propose—and I have no doubt it will be received with unanimous acclamation—the best thanks of the Institute for your most able and most interesting address.

Mr. J. JENNINGS, Fellow, after a few complimentary remarks seconded the vote of thanks, which was carried by acclamation.

The PRESIDENT said,—I am afraid I cannot hope to imitate that knight, *sans peur et sans réproche*, of whom my friend Mr. Hope has spoken. I have refrained from touching upon the wars of the styles and controversial subjects of the day, feeling that I could do no good by speaking of them; though I agree with Mr. Hope that we all have our own views, and ought not to be afraid to express them; still I think questions of that kind are sometimes calculated to throw the apple of discord amongst us, and it is as well to avoid them. Among the most difficult subjects your President has to deal with is the obituary of our deceased friends and colleagues in this Institute; and while bearing in mind the maxim, "*de mortuis nil nisi bonum*," which we all value, one cannot help feeling that this sentiment may sometimes be pushed to extremes. I have myself endeavoured, in the brief notices I have given of our deceased friends, to steer a middle course, and I trust I have paid proper respect to their memory without wearying you by needless eulogy in speaking of their merits and careers through life.

In conclusion, I will only add that I accepted office as your President with an earnest desire to discharge my duties to the utmost of my ability, and it is my hope that I may continue to do so until the expiration of my term of office without forfeiting your esteem and regard. I beg cordially to thank you for the kindness and attention with which you have received the remarks which I have had the pleasure to address to you this evening.

The meeting then adjourned.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, the 18th of November, 1872, the following Paper was read, Professor KERR, Fellow, in the Chair:—

ON PROFESSIONAL "ESPRIT DE CORPS,"

By T. ROGER SMITH, Fellow.

WE have all discovered, I hope, as practical business men that we cannot afford to confine our attention exclusively to positive matters, whether technical, artistic or professional. It occasionally becomes necessary, if we desire to understand our position and our prospects aright, to give attention to the motive forces by which our collective action is shaped and impelled, and to attempt to gauge the depth of the intangible moral agencies at work in the great world, and in that professional microcosm the welfare of which is of so much importance to us all.

We fully recognize the importance of mastering all the material and artistic elements with which our art and our practice have to deal, and of regulating and considering all those steps of professional conduct upon which the success of our undertakings so largely depends. But there exists a something of greater moment to us than rules of practice and scales of fees, or than any individual detail of study; an actuating principle so intangible and so unobtrusive that we run some risk of forgetting its importance and of neglecting or underrating its claims upon our notice and our care.

If we set a justly high value on reliable rules and maxims of procedure, at what rate should we prize an animating spirit, such as shall substitute for a formal conformity to strict rules a voluntary and hearty adherence to a line of action? The spirit is better than the letter. The living soul is worth more than the dead trunk and limbs; and if we combine all the architects of England into one organized and compact professional body, the task will prove fruitless unless that body be animated by an active and a healthy spirit—in fact, a Professional *Esprit de Corps*.

That wonderful similitude under which men intimately associated together and inspired by a common enthusiasm or a common affection are likened to a human body has grown, like many other Scriptural ideas, so familiar to us that it has almost lost its force. When we say a body of men, we almost forget what we mean. The military services have appropriated the phrase with the intention to carry out, as far as discipline and careful forethought can do, all that the emblem implies. The corps of engineers, a corps of artillery, and so forth, each means an organized body of men linked together by strong ties, and into whom it has been sought to breathe a spirit of devotedness to their duty and comradeship towards one another. I need not tell you how successfully the perfect organisation of military service has in many instances been made vital, so to speak, by the glow of a fervent soldier's spirit. An intensely strong bond of union has grown up in the different branches of the army and the navy, manifesting itself in a jealous loyalty to the traditions of the service, an enthusiastic devotion to it, a high sense of honour as growing out of it, and a generous good will towards every member of it. This is what is meant by *Esprit de Corps*. The greatest commanders have been those who have roused and

cherished such a spirit the most. The most successful fleets and armies have been those in which it has been the ruling passion.

And now I am to invite you to consider with me for a few moments the importance to ourselves of our possessing so much of this temper of mind as is appropriate to the circumstances of our professional life, in the hope that we may come to recognize Esprit de Corps as one of the things needful to us, and its cultivation as one of the most practical objects which this Institute and the kindred societies throughout Great Britain can keep in view. It is indeed almost the sole object of the present paper to direct attention to the subject. It will, of course, be expedient to say something as to the conditions essential to the growth of Esprit de Corps, the existence of it in other professions, the means by which its increase can be stimulated, and the good which we may hope to gain from it; but none of these considerations is in my view at all so essential as the mere recognition of the subject. If professional Esprit de Corps can only become to some slight additional extent admitted as one of our stock ideas to be from time to time considered, discussed, and kept in view, the object proposed will be fully answered. It is not, let me add, a feeling that professional Esprit de Corps is altogether wanting in our body which has provoked me to raise the subject; I admit with pride and pleasure that a wide, a healthy, and, I hope, a growing spirit of brotherly friendliness and helpfulness exists in the profession, and that a large amount of zeal for the craft and honest pride in our work is to be found among us, and especially among those frequenting this room; but the promotion of this temper of mind seems not to be sufficiently recognised as an object to be kept in view; we shut our eyes to its great power as a motive force; we fail to provide for and encourage it as we ought and might; and, as a consequence, it languishes where it might flourish, and is imperfect when it could easily be complete.

Two things seem to be necessary to originate Esprit de Corps, though once originated there are a thousand which may promote or retard its healthy development. (1). Men must be bound together in some way. (2). The tie that binds them must be one which they can honour or love.

You, of course, get no Esprit de Corps among men who are in no way bound together by any tie. It is absent from among the passengers of a ship, though it may exist in the crew. There is none of it among the travellers by a train, but it may be very strong in its hold on the guards and porters of the railway, or on the engineering staff. There is no Esprit de Corps in the inhabitants of a village; organize the villagers into a regiment, give them a colonel of whom they can be proud, drill them, and march them to the wars, and you will soon begin to find Esprit de Corps at work.

Again, not only must there be a tie, but the tie must be one in which men can take a pride, or towards which they can feel an affection. No man who hates or despises the tie which binds him to his comrades has a spark of Esprit de Corps. It is quite dead in the soldier or the sailor who has no heart for his calling, and it can be crushed out, even when it exists, by making the service unbearably irksome or disgraceful to the men. It does not need that I should go back many years in the history of recent wars to illustrate this. We have only to contrast the intense devotion of the soldiers of the first Napoleon to their military duties with the bearing of those of the same race and nation, under Bazaine at Metz, to understand the difference between a commander who is admired and loved and one who is not in its influence on the temper of mind of his army.

This temper of mind, as you see it in a high-spirited soldier or sailor, is a very noble thing. The ruling passion of such a man is zeal for the service—one of his most marked characteristics is a frank cordiality towards his comrades. No sacrifice is too great, no exertion too arduous for him to make, if duty or the good of the regiment calls for it, and every fellow soldier or sailor is felt to have a certain claim to good will on account of his being in the same service—a good will which exists notwithstanding a vast amount of professional jealousy and a most keen rivalry in the race for promotion. A man may

have no personal liking for a brother officer—nay, may resent bitterly his having been promoted over his head; but he would be none the less sensitive to any attack upon his comrade's honour as a soldier, and ready to resent it; while the greatest outrage which either could endure would be some stigma unjustly cast upon the regiment or the corps.

It is now necessary to enquire how far, as a matter of fact, professional life in other walks than our own has given rise to an Esprit de Corps at all resembling that by which the soldier and the sailor, are so fully animated. It is hardly necessary to say much as to the advantage which the members of any profession derive from the existence of such a temper of mind; but whatever need be said on that subject will, perhaps, be most appropriately introduced as we glance rapidly at one or two different departments of professional life; putting aside the somewhat exceptional professions of diplomacy, Parliamentary and political life, and the Civil Service of the Crown, and confining ourselves to the case of those which somewhat resemble our own,—law, medicine, church, art, literature and engineering. Each of these can contribute something of use to our enquiry; and commercial life if we had the time and opportunity to examine it, might yield some amusing contrasts by way of practical commentaries on the negative side of the question.

Taken all in all the Bar is the foremost profession in England. The highest official position which a subject can hold is its great prize, and the lesser prizes with all the fame, fortune and social status belonging to them, are numerous and brilliant. There is much, too, in the intellectual nature of a large part of the work which has to be done to induce a barrister, who has any success, to take an interest and a pleasure in his work. Barristers form a very definite body, strongly detached from other professions. They do the most conspicuous part of their work in one another's presence, and as the bulk of them are university men, and many of them public school men, they have the advantage of early association to a considerable extent. Here then the two conditions supposed by us to be favourable to the growth of Esprit de Corps seem fulfilled to a remarkable degree; and supplemented by favouring circumstances. As a fact we find professional feeling at the Bar to be conspicuously energetic and healthy, perhaps more so than in any other calling.

There is no barrister who does not feel that his profession is an honour to him, and there is hardly one who could be induced by any temptation to do an unprofessional thing; while any man guilty of a dereliction from his duty as a member of the bar, would be immediately and unsparingly expelled from it. I do not believe that barristers are much different in their nature from other men, but, thanks to Esprit de Corps, they act much better than most others, for it is notorious that among them when a thing is recognized as one which ought not to be done, IT IS NOT DONE. I quite admit that the discipline exercised by the Inns of Court is the primary agent in maintaining this high standard of professional propriety, but nothing except a vigorous Esprit de Corps, and a highly pitched enthusiasm for the profession itself, could possibly cause that discipline to be endured.

Among men who are constantly engaged in keen conflict, who feel that the road to wealth and distinction lies opened for him who can oftenest snatch a victory from his opponent, it is indeed remarkable that a higher tone of professional etiquette should exist than anywhere else; and this, in spite of certain temptations which the profession of advocacy may be fairly assumed to present towards a more or less lax tone of morals. The man who as a matter of business will do his best for an atrocious swindler or forger, and will save him, if he can, from the condign punishment which he knows him to deserve, may yet be safely trusted to refrain from misleading a dangerous rival, or attempting to interfere with his professional connection. A strict code of forensic honour, to a large extent, an unwritten code, governs each member of the bar. He well knows that against unfairness of a certain sort he is perfectly safe, and that he is bound in honour to be himself equally fair to his brethren.

To commit what would be understood as an unprofessional act is a thing not to be thought of. How great the advantages are which this high professional tone procures for the bar of England, and indirectly for all their clients, we can each one of us appreciate, and we need hardly seek any better illustration of the nature and value of professional Esprit de Corps.

Perhaps it may be instructive next to glance for a moment at the tone of the other half of the legal world. The honour of a very large proportion of solicitors is beyond dispute, their courage, skill and fidelity are of the highest service to their clients, and the most important interests are constantly and safely entrusted to their care. Yet I believe very few solicitors feel anything like an enthusiasm for their profession, and surely they all must be quite aware that it is unpopular with the outside public. Notwithstanding that their work throws them a great deal together, and that they have the great advantage of being admitted to practice solely by an examination, circumstances which make them a well defined body, with many inducements to act together, Esprit de Corps retains a very far weaker hold upon them than upon barristers; and this must be attributed mainly to the want in their case of a professional tie in which they take a pride, or for which they can feel an enthusiasm.

The case of the Church is somewhat peculiar, and so different in many of its particulars from a practice like our own, that I may, perhaps, be excused any long enquiry into the sentiments the clergy entertain for their cloth. It may, however, be taken for granted that the result, if the investigation were impartially made, would be to shew that genuine Esprit de Corps is weak among the clergy, notwithstanding their early association at the universities, and the reason may be sought in the absence of any strong tie among them, a defect occasioned mainly by their scattered and isolated positions in parochial life. They have a profession of which a man may well be proud if he worthily fills his place in it; but they all work and live too much apart from one another to form anything like a compact body.

Medical practice might hardly have been expected, seeing that the greater number of practitioners are quite as scattered and isolated as the clergy, to develope any strong Esprit de Corps; yet, such a spirit has grown up and flourishes vigorously; and, probably, in no other profession is professional etiquette more cherished. The principal reason is not far to seek, and it may be of some importance to us to note it. No medical man is ever left to contend single-handed with a great emergency if there is a brother practitioner of any eminence within call. It is the system of consultations—a system which might with advantage be imported into our own practice—which has chiefly kept up a very useful Esprit de Corps among the members of the medical profession. The country doctor may,—if fortune only sends some formidable ailment to the squire of his village,—be in consultation with Paget or Gull to-morrow, and the whole of the doctors of any district are in the habit of pocketing their rivalry and meeting one another from time to time over formidable cases, and doing the best they can for each other's patients. This acts in two ways, it tends to make members of the medical fraternity know and help one another, and so incorporates them together; and it connects humble practitioners with the foremost men of the day, a connection which affords good ground for their taking a pride in a profession which indeed, in many ways, is calculated to win the affections of those who pursue it. The benefits which the medical man reaps from his Esprit de Corps are manifold. He can, as I have remarked, unhesitatingly fortify himself in any case of danger and difficulty by the assistance of any brother practitioner within reach, safe in the knowledge that no attempt will be made to discredit or displace him. As he always visits his ailing brother doctor without fees, he in turn receives medical help free when he requires it; and he will abstain from action in the absence of a colleague, even at a time when every moment is precious, sooner than do what may appear to overstep the limits of his duty, in a case of which he has not the responsible charge.

The practice of various branches of the fine arts has developed some amount of the kind of spirit I am referring to. Actors and musicians are very much thrown together, they form a distinct body of men, who constantly work in concert, and who have a great enthusiasm for their professions; and they possess as a rule plenty of Esprit de Corps, although marred sometimes by strong personal rivalry. Painters are little thrown together in the pursuit of their profession, though they are all fond and proud of it, and there is, I think, less of professional spirit among them. Sculptors seem to be very deficient in Esprit de Corps, and this may perhaps be traced to the facts that they happen to work in a very isolated way, and that however eminent individuals may be, the position of their art, as a whole, in public esteem at the present day, can hardly be regarded by them as a thing to be proud of.

Letters are, as a rule, pursued by isolated men working in their own studies, and though literature is an acknowledged profession, or rather group of professions, it is not easy to define the extent to which Esprit de Corps prevails among literary men. They have not so much an enthusiasm for literary work as for the various subjects and aims towards the study of which their writings are a means; and though they are, many of them, thrown much together, that occurs chiefly in connection with their special studies. Journalists occupy a rather different position; but as a whole the literary world in this country is too ill compacted, too little homogeneous for Esprit de Corps to flourish among its members. In France, where the profession of literature is more definitely recognized, and where it enjoys higher social distinction, there is a strong Esprit de Corps among men of letters.

Civil engineering is an occupation in more than one respect closely akin to our own. In the case of this profession,though the individual has much to be proud of in his calling, and has a good deal to throw him into contact with his fellow engineers, there exists the drawback that everything is extremely new, the organization, as we see it, having sprung into existence within a lifetime. Here also the interests of individuals are often very conflicting, and their stakes very large; while anything like professional usage has hardly had time to grow up, and has had some special obstacles to contend with. Taking these things into account, the amount of Esprit de Corps among civil engineers may be fairly admitted to be considerable, and very usefully manifested, and will, I believe, be felt to be decidedly in advance of what exists among ourselves. Several circumstances contribute obviously to this result. Civil engineers are more thrown together, and better organized than we; their profession has reached a high social status, and the public and other works entrusted to it are of Imperial importance and magnitude, so that a civil engineer has great cause to take a pride in it. The circumstances of a large work, such as a railway, require not merely large staffs of clerks in the head engineer's office, but the engagement of a considerable number of younger men as resident engineers and sub-engineers, and in this way the members of the profession are thrown together into groups. They have one immense accidental advantage over us, in being nine-tenths of them fixed within a stone's throw of Great George Street when they are in London, a circumstance in itself sufficient to promote Esprit de Corps to no small extent, and one which has led to the organization of an Institution which forms a more central rallying point than our Institute has been or can easily become. Their society is more powerful in various ways them than ours: the leading men devote time to its management, and attend its discussions with a regularity remarkable, when we consider the money value of their time; and if I am not misinformed, its control over the proprieties of professional life is vigorously exercised. All these things tend very much towards the compact organization of the engineers into a definite body, animated with high professional feeling.

In connection with this mention of the Institution of Civil Engineers, it may be of some interest to note how widely these different callings, to which we have made allusion, vary in the mode in which

they are governed or brought together. The engineers and solicitors each have a vigorous central society. The barristers have their different Inns of Court, and are also very much directed by expressions of opinion from the Bench. The medical profession have their College of Physicians and of Surgeons. In the church Convocation has little real influence, the government of matters being really personal and in the hands of the bishops. Artists have the Royal Academy, but are not cordial towards it. In the civil and military services of the country, the direction of affairs is personal, and in the hands of the head of each department or the commanding officer, as the case may be. There does not therefore seem to be any rule as to what form of organization best promotes Esprit de Corps, only it is to be noted that the professions where public spirit is most manifest, seem on the whole to have the most vigorous central ruling power, whether personal or a society, and to be defined by the most strongly marked and most strictly kept boundaries.

In each case that has come before us, there exist for the members of the profession alluded to, definite professional publications, and it may perhaps be pardoned to one who has sometimes tried the pen himself, if I dwell for a moment on this as a conspicuous element in the diffusion and formation of any professional public opinion. It is very difficult to say how much or how little any individual letter or article, published by the press, has to do with the formation of the general opinion of the mass of readers; but one thing at least may be advanced, without doubt, namely, that whatever of weight or of reason there may be in the thing said, the newspaper at least secures it a fair hearing; while certainly when anything of real importance has to be brought before any section of the public or the general public, there is no other means of doing it so extensively or so readily. Were any token of the influence of the professional press required, it might, I think, be found in the ostentatious way in which people, who set up for taking an independent course, from time to time declare that they are not influenced by it, and even go to the extent of writing in one journal to inform the public that they rarely, if ever, read another. Now, I believe, that this is an influence too powerful and too important to be safely neglected, and I am convinced that the men who are entitled to be listened to, would do well to occupy this field more frequently than they do. A letter or a signed article from the pen of one of those members of any profession who has made his name known, is read with attention by the whole of his colleagues, and may produce a permanent and sensible change in professional public opinion on a disputed point. Such a communication, if directed to obtain a definite and attainable reform, would be the most powerful auxiliary possible towards securing such a reform.

We have hitherto examined Esprit de Corps, so to speak, from the outside, we have seen a very few of the advantages which it procures to the individual members of the professions where it prevails, and if I do not refer to those advantages more in detail, it is because they are obvious, and well known to you all. There are, however, corresponding advantages to the public, and here, I think, comes in the leading distinction between genuine Esprit de Corps and its spurious counterfeit, Trades Unionism; the one is honourable to those who possess it, and advantageous to their clients and themselves alike, the other seems to consider notions of honour superfluous, and only aims at being of advantage to one side.

The professional man has been described as a tradesman selling his own time and skill, but the comparison is not just, because his relation to his client is not that of selling some ware to him, but of doing some act for him. He represents his client. We for example do not simply sell a building to a client, if he wants to buy he goes to the auction mart: he comes to us to take charge of such ideas as he has, and take cognizance of such requirements as must be met, to mature them, work them out, carry them into execution, and represent him in the business by doing for him what he cannot do for himself, for lack of the required architectural knowledge and skill; it is the same, *mutatis mutandis*, with solicitors and counsel, or with medical men. Now it is of infinite importance to the individual, that the person who

represents him—his vicarious self so to speak—should represent him in the best possible way, and the man who pays a high fee to a distinguished barrister, does it with the desire that he may make his temporary appearance before the court in the character of a person of complete knowledge of the law and high intelligence. It is also of importance that to this should be added a character for high honour; and professional Esprit de Corps secures that the client shall be temporarily clothed with such a reputation. The parties to a suit may bear, each of them, a very indifferent character, but it smooths the transaction of the business to an untold extent, if the judge knows that each is represented by counsel who will not overstep the bounds of legal propriety. So in our own profession, a client employing one of ourselves, has in professional Esprit de Corps a safeguard on the one hand that his interests will be attended to, and his work well done and fairly charged for; and on the other hand, that he will have the advantage in negotiations, such for example as arise about party walls, rights of light, &c., that however indifferent his own personal character may be among his neighbours, the matter will be argued as one in which right will be done, because it is in the hands of a respectable professional man. The employment of men having a high standard of professional honour, prevents many base things being done, and Esprit de Corps so becomes a public advantage. Were our judges corruptible, or our counsel base, what untold injustice would be perpetrated which is now left unattempted, or defeated utterly. Were there no high tone of feeling among our medical men, how much of cruel neglect, of infanticide and of other sorts of murder would be quietly accomplished; and were there no professional honour among architects, how many a bad brick and rotten stick would find its way into works where, if professional superintendence was paid for on the one hand, professional blindness would be handsomely feed on the other!

Trades unionism has been mentioned, and it is in this direction that the danger of all combinations of persons engaged in business lies. I should not like to say that every organization, which has profit for its sole aim, must be wholly bad, or that every one which professes to secure honourable ends is entirely good, but in each case the presumption lies in that direction. This subject, however, I will not pursue, or it would take us over too much ground. It would, however, unquestionably be instructive, did time permit, to devote a little attention to what professional Esprit de Corps is *not*, as well as to what it is. We are, I hope, at least agreed that it is not a combination for the purpose of securing unfair remuneration for the members of the profession, or for hampering any one in his legitimate competition in the race of life, for screening any member from the effects of his own wilful misconduct, or in any other way for exalting selfishness above honour and justice;—in one word it is not a trades union.

And now we come to the most interesting point of the whole enquiry. Turning to our own profession, we are now to enquire how we stand in relation to this very important subject. Let me ask (and in putting the question I am happy to admit that in not a few instances the answer would be what we should wish) does "Esprit de Corps" do for us anything like what it does for the soldier, the lawyer, and the doctor? and if so fine a profession as ours fails in some respects to command the social position which is generally accorded to the members of others which I have named, is not our own deficiency in "Esprit de Corps" at the root of much of that failure? For after all we *are* somewhat deficient in this temper of mind, and we do need to cultivate it. Whenever we meet an architect is it a matter of course that he is a man with the interests of our profession at heart, and bearing goodwill to all its members, our respectable selves included? In any case of difference, disagreement, or dispute are we quite certain that no member of our own body can ever be found to uphold against us that which he knows in his heart is unprofessional and unfair? In any emergency or difficulty should we be wise, would it be safe for us to call in, without a thought about anything beyond his practical experience, any architect who could be named as skilful? Should we be quite secure that our brother Architect could not in the nature of things make an attempt to dislodge us,—would not

listen to overtures which have for their object to substitute him for ourselves? Do we all expect that in a competition of architects all the perspectives will be fair, and all the estimates honest, that no one will divulge his own motto, or tout for influence, or disparage the drawings of his rivals? Nay, let me come nearer the root of the matter, and ask whether we ourselves feel that beyond our duty to our clients, there is a wider duty which loyalty to our calling and our brethren imposes on us? Are we even more anxious for the sake of the profession than for that of the individual employer, that every step in our professional career shall be above suspicion and beyond reproach?

I have already indicated by implication what I should suppose your reply to these questions would be if you made one. I fear we should all of us admit that if things are not as bad as they might be, they are yet far enough from being all that they ought to be among us. When a true and noble Esprit de Corps has taken full possession of our body; when each practitioner has a proper professional temper and a fitting professional pride, rules for the regulation of practice and the guidance of competitions will almost make themselves. A successful competitor will then receive the congratulations and support of those professional brethren, who in less happy days would, perhaps, have written damaging letters to the "Times." When that time has fully come, we shall cease to hear complaints such as from time to time reach this Institute. We shall then probably also lose the edifying spectacle of a battle of styles and views, and an advocacy of the architect-working-man, such as fill the journals with articles which have, for the general public, little interest beyond that which household strife always arouses in the bystander.

We meet to-day, if we have any object beyond that of spending a pleasant evening and enjoying an interchange of opinion, to strive to raise the general standard of our profession, and to secure that the conduct of each member of it towards the others shall be equitable and fair. This can be better done by fostering a proper spirit than by attempting to lay down hard and fast lines and guides within which we are all expected to run. Not that our rules may be superfluous or arbitrary, but they will only work well when men observe them spontaneously and cordially. Let us then see how we are off for professional Esprit de Corps.

Architects are in the nature of things so circumstanced as to be deprived of several of the accidental advantages which have been noted as tending to promote professional feelings in other callings. We are unhappily but few of us university men: if any of us have come from the same public school, it is a mere chance; we have no Haileybury, or Woolwich, or Sandhurst; we walk no hospitals, we draw in no Atélier, and we pass no examination to admit us to practice; nor are we trained in colleges: with the exception of those who attend the lectures at King's College or London University, or the classes at the Architectural Association, there are few chances of studying together for us while we are learning our duties. We are generally brought up in offices where one or two, or some other small number of pupils, associate with a somewhat larger number of clerks. This method has some great advantages; but the promotion of a large-minded Esprit de Corps is not one of them. We are not much better off when we begin to practice: there is little to throw us together, much to keep us apart. A brother architect in the same neighbourhood, or with the same connection, especially in a country town, may be a dangerous rival; at any rate there is a strong temptation to wish him out of the way, and dislike him accordingly, with no circumstances to lead us to overcome it. Then comes the jostling in the race of life, competitions where all but one must be disappointed, and where the successful man will have to run the gauntlet of all those who have failed. Nor do we, like the medical men, often consult one another or work together: the association of a local architect with a leading one (like the resident and the engineer in chief of a railway) is a thing never so much as thought of. We do not even so uniformly admire the same things or work in the same taste as to be quite free from the

temptation to disparage one another's performances. These are some of the unfavourable circumstances in our case, and they result in its being impossible for us to be considered a compact well-defined body of men, a misfortune which is very considerably aggravated by the fact that there is no kind of fence round our practice; any builder, decorator, or auctioneer may call himself Architect, if so it pleases him; and though the nucleus of the profession may be very clearly seen, and indeed may be considered as present in this room, its edges are extraordinarily ragged and indefinite.

Notwithstanding such drawbacks as these, there are, however, many circumstances which would render it not unreasonable to expect some Esprit de Corps among us. First and foremost is the fact that although the boundaries of the profession are ill defined, the actual practice of an architect competent to carry on his business with success is a very definite and distinct matter, requires considerable technical knowledge, long experience, and a peculiar association of artistic, mechanical and business powers, not easily broken in to run in harness together; and thus it comes to pass that an average Architect is really very much educated by his work into a member of a special class, having a wide space between him and any other people with whom he mixes. We are, I believe, more closely assimilated than we seem and, like elements which have a chemical affinity for one another, we only require to be properly brought together, and we unite readily enough. If, as it appears, the link which connects us together, though not very apparent is very real, there is no doubt that in its nature it is one calculated to stimulate Esprit de Corps. Our profession is interesting enough to rouse a real liking in the minds of most men, in some a passionate attachment. It is one of which any man may be justly proud. There is something to kindle enthusiam in the thought of being, in however modest a degree, made one of the community to which belonged those illustrious men who from the east to the west have covered the earth's surface with the only tangible landmarks that a nation's progress can leave behind it. If the great designers, known or unknown, of the noble buildings of the past form a distinguished ancestry of artists with whom it is an honour to be connected, there is in addition much that is delightful both in the study and the exercise of the art. In no profession is there employment for a larger range of powers and faculties, in none is there so enduring a record of faithful well executed work; and no profession has so little to do with the griefs and miseries of men's lives. I am not of course blind to many drawbacks which exist, nor insensible to the want of fortune to which the Architect must submit, or to the annoyances and vexations that beset his practice; but I think, even when difficulties are at their worst, very few of us would be willing to change places with a lawyer, or a doctor, or a statesman, if he could. There is then in the nature of the profession itself a strong basis for Esprit de Corps to rest upon. As a matter of fact, there is also a very great tendency in Architects to fraternize with one another when circumstances bring them together. No doubt it is more or less so with men of other professions; but of our own it is easier to speak from experience, and my own experience has always been that whenever I found an Architect I found a man who was very ready to become a friend the moment we had established the existence of the professional tie between us.

Much as we decry them, we might have a means of strengthening this friendly feeling instead of weakening it in our competitions. These, rightly managed, would do something to draw us together, paradoxical though it may appear to say so. Men who, like barristers, are constantly in the habit of measuring their strength against each other in open fight are much more likely, if the fighting be only fair, to conceive a respect for each other than men who never meet in any way. Once make competitions fair and you would render competitors friendly.

Perhaps, however, the main source of a healthy Esprit de Corps, has lain (as certainly the only chance of giving to it the stimulus and the direction which it requires will lie), in the existence of organizations like this Institute, the Architectural Association and the various local societies. And

among other chief reasons for this being the case is the fact that these societies afford a channel for the exercise of that personal influence which seems to have more power than any thing else to rouse enthusiasm. Since we have had a professional President here we have gained immensely in Esprit de Corps; and I firmly believe that what has been gained in this way has been secured, not by the influence of an impersonal entity, consisting of a council and a charter, a subscription list and a library, but by the personal leadership exercised by a Cockerell, a Tite, a Donaldson or a Wyatt. Long may the traditions thus happily inaugurated continue to act with constantly accumulating power on the body at large.

We meet in this room, as the students meet in the room down stairs, on a common footing, and for common objects, and what we do here renders us more jealous of the honour of the profession, more determined to support one another, and more ready to co-operate for common purposes than we could possibly be otherwise.

A most important and gratifying proof of the genuineness of our Esprit de Corps is encountered by every one of us who is engaged in practice in London, as often as he comes into contact with a brother practitioner belonging to this Institute on matters which involve personal negotiation. You meet, perhaps, on a matter in which the interests you represent and those which your colleague represents are at variance; yet the result will be (at least, my experience has been so without one exception) that you are met in a spirit of friendly fairness which renders the dispassionate discussion of the business easy and possible. If a solution can be arrived at, it is found; and whether it be or no, the negociation is conducted as between men who understand each other's circumstances, can enter into each other's difficulties, and are honestly desirous, so far as may be possible without sacrificing a client's interests, to be of assistance to a professional brother. But though so much has been accomplished among the members of this Institute, there remains, even here, more to be attained; while among those members of our widely scattered body who do not belong to us, or who seldom mix with us, there is great need of the promotion of Esprit de Corps. It is, of course, impossible to say that this or that definite thing ought to be done; but it is easy to see that an increase in that spirit will follow every accession of dignity, honour, or importance which the profession receives, or the diminution of any draw-back or defect in consequence of which it may be disparaged; and notably will correspond to every extension of the link which binds practising Architects together. One or two speculations as to what may be practicable in these directions may, perhaps, appropriately close our enquiries.

Every accession of dignity or of importance in public estimation to our profession will, as I have said, increase Esprit de Corps, and on this account, as on many others, it behoves us jealously to watch how we stand with the public, and to secure for the profession all the honour and credit which are its due. Now, without entering at any length upon this subject, I am inclined to doubt whether there is as much harmony between public feeling as regards matters architectural and our own as there ought to be. I cannot help the notion that we and the public are somehow a little out of tune. Could we establish a better concord it would help us. I think, as one simple instance of what I mean, that, building as we mostly do for business men, we are habitually too lax in the business part of our undertakings. We look upon extras, for example, as an evitable attendant upon building contracts. Were sufficient forethought exercised, and were we firm enough in requiring liberal preliminary estimates to be passed, and sufficiently large money provisions to be introduced, extras might disappear almost entirely from our practice. It would require a certain amount of energy and determined will, but the result, if it became general, would be to raise the value of Architects a hundredfold in the eyes of the commercial world.

Again, men run about with sketches and designs, making themselves and their work cheap, not to mention the mass of competition labour foolishly thrown away. All this discredits the value of an Archi-

tect's services. Can we do nothing to stop this? Mr. Briefless does not go round Bedford Row touting for briefs. He might very likely get some if he did, but it would be unprofessional. Can we do nothing on our parts to keep up the public sense that our work is the work of educated, intellectual men, and is not to be had cheap—or for nothing—by enlisting professional Esprit de Corps on our side? Again, there can be no doubt that we do our professional standing a great deal of harm by disparaging one another. There can be no objection to strong things being now and then said in friendly ears; but to blurt them out before the public, when they really only represent half-truths, and the speakers really do not mean them to be taken for what they will be supposed to mean by the hearers, is suicidal, and very different from that healthy discerning criticism which is useful to art. Lastly, might we not really as a profession take some opportunity of expressing appreciation of great and difficult works when they have been successfully accomplished? We shew a good many tokens of respect to the men whose careers and executed works demand our recognition; could we not now and then in some way shew our appreciation of an individual great building, even if it was only by hanging up the drawings of it in this room, and so shewing that we take an interest in the undertakings of our colleagues. No civil engineer in charge of an undertaking of importance is willing to give an account of it to the press till he has done so at his Institution. How far this unfortunately is from being the custom among us is abundantly proved by your having to listen to a discussion of an abstract subject at the very beginning of the session, instead of papers on the important public buildings, cathedral restorations, and other large undertakings of last year, of which, most unfortunately, no particulars have been, or probably will be, furnished to this Institute. Let it be a matter of course to bring forward every really good building in this room, and you will create a kind of honourable distinction for good architecture, which will help in no small degree to advance what we desire to promote.

There are, however, some abuses which must be done away with, and some defects which must be remedied, ere Esprit de Corps becomes pure and powerful even where it exists.

To begin at the beginning of all practitioners; the man who has a proper enthusiasm for his profession will be very careful what pupils he takes. There is some probability in the case of each pupil that he may become a practising Architect; in every such case there is the intention that he shall be so. Every man who is asked to take a pupil ought to put this question to himself, "Is this boy, with the education, and the capacity and the surroundings that I find him now to have, likely to prove after a certain number of years a cultivated upright gentleman, with a sound knowledge of his profession, and fit to do it credit by his practice and his character?" In very many cases, an enquiry of this kind, honestly conducted, ought to lead a man to decline an offered pupil, and till we are every one of us prepared to do this and let the premiums go, whenever it is clear to us that the youth is not likely to do well, we cannot be said to have a healthy Esprit de Corps. A further step will be gained when it is a matter of honour with those who are really courted, who have, to use a homely figure, the key of the professional front door in their keeping, to permit only the entrance of men of good general cultivation. There is no reason why Architecture should not have a very large proportion of university men among its practitioners. As a matter of fact you may count the B.A.'s and M.A.'s on your fingers. And I do not think it too much to ask of those who can obtain high premiums and are able to pick and choose, that they should stand out for a University education in their intending pupils.

Again, when the pupil is accepted, it is sometimes forgotten that he is a future colleague, and is to be fitted honourably to pursue our profession; and that it is not enough, with this aim in view, to make him trace and copy the specifications. A healthy Esprit de Corps will lead a man to feel that he has a duty to perform to the profession, as well as to the pupil, in this matter. It would also tend

to raise the tone of scholarship were the present unfairly short term of pupilage lengthened. When men were apprenticed for seven years there was more useful knowledge communicated to them than now when they go for three or even two. I would suggest that four years ought to be the shortest term of pupilage, and that five years would be a more suitable time; and were this reform carried out we should in five or six years see a marked improvement in the young men advancing towards the threshold of responsible practice.

Again, it seems pretty obvious that we shall not be quite as we ought to be till we have put some sort of fence round ourselves, and made a gate which no one can pass who has not a competent amount of elementary knowledge; and till we have established a tribunal with power to turn out any one who disgracefully misconducts his professional practice. This I find a peculiarity of all the professions where the Esprit de Corps is strong; and nothing is more natural than that it should be so. If the title "Architect" is to become a kind of passport to a man from one end of England to the other, as that of Barrister now is, there ought at least to be the certainty that an Architect's attainments and his character are known not to disgrace that title; a matter quite distinct from placing any limit to originality or even eccentricity of design, or from interfering with the student's licence to restrict himself to one style if he desires to do so.

Lastly, when Esprit de Corps has sufficient power to be a real force in our profession, those things which it is understood men ought not to do *will not be done*, and such a body as this Institute will not for a moment permit them to be attempted. I hope I am not using too much plainness of speech when I say that this is not so now. It is generally believed, for example, that persons practising as Architects, some of whom might possibly not be found to be beyond the reach of this Institute, are in the habit of receiving payments in respect of works from the persons towards whom they ought to hold a perfectly independent position; yet probably it would be thought rather unfortunate if a well authenticated case of this kind was brought forward to be adjudicated upon here. If Esprit de Corps were strong among us, such a malversation would be very rare, and when it was heard of would be hunted down and traced out, and the offenders exposed with zeal, every man feeling that till this were effectually done he, and the profession he belongs to, was sustaining damage and disgrace. In short, the feeling of its being necessary to keep up the honour of the profession whenever this or any other misconduct tended to tarnish it would be keener than it now is. Men would, I think, even carry such a feeling into their artistic work, and would make it an additional motive for abstaining from the use of base materials and bad construction, and perhaps even from a style of architecture which they were pledged to oppose, doing these things for the honour of the profession as well as for their own credit. We should then be spared some at least of the sweeping condemnatory remarks which Architects of one school have been known to permit themselves to make upon the works of another; and we should possibly even have in some rare instances the phenomenon of an Architect admitting that there might be some merit in an architectural work which he did not quite understand, and which he felt unable himself personally to admire.

Here, where, thanks to the wise provision of those who founded this Institute, we are to a large extent sure, that each member is a worthy brother practitioner, there exists, as I have tried to shew, a very fair amount of Esprit de Corps, and as a result remarkable good-will prevails between the members. Why, then, cannot the whole profession be like one large Institute? Nay, why could not the scheme of the Institute be so enlarged that it should be to our profession what the Colleges of Surgeons and Physicians are to the medical, or the Inns of Court to the legal? If any actual step is to be taken, any one thing to be done in order to bring about an increase in Esprit de Corps, it is here I believe that the work must be performed; and it would be a lasting honour to this

Institute, and an incalculable benefit to us all, if the recent Conference were to prove the germ of some simple but comprehensive scheme for affiliating every Architect who is competent and carries on his practice respectably to this body, giving him a title and a position worth holding, and which it should be for him a misfortune and a disgrace to lose. The time may be distant when this shall be realized, or it may be nearer than we think. One thing is, however, certain, every step which can be taken to promote the general advance of the profession if it be but well judged, will benefit each individual member; and every proposal tending in that direction deserves to receive the best help which each of us can afford. It was not, however, I beg to repeat, in order to suggest any one or other definite act that this subject was brought forward. It was with the simple view of bespeaking for professional Esprit de Corps a place, such as the importance of its claims seems to demand, among the subjects which shall be here cherished and kept constantly in view. Let us be alive to the nature of the spirit animating us, as well as to the shape of our acts. It is well to stimulate research; it is well to originate combinations; it is well to concert action; in short, it is well to do the best we can to build ourselves up into a homogeneous, a shapely, a well-organized body. But let us remember that a body needs to live. An organized body without a spirit has nothing before it but speedy decay. Whatever else, therefore, is forgotten or remembered, let us not forget, I beseech you, "*l'Esprit du Corps.*"

The CHAIRMAN. I am sure we must all have been extremely pleased to hear our friend's paper read. Every one who knows him knows that such a subject is particularly safe in his hands. His kindness of heart, his gentlemanly feeling, his superior education, and his standing in the profession, are all in favour of his speaking on such a subject as this with perfect satisfaction. That it is a difficult one to treat all will admit, but it is one which I think ought to be discussed out of courtesy to the lecturer, if on no other ground. There are distinguished men here who have much to say, and if they will let us hear a little of that great deal I am sure it would afford us much pleasure.

Sir M. DIGBY WYATT, Fellow, said: It appears to me that the moral of much that Mr. Roger Smith has so well said, may be summed up in the words of the old song—

> "'Tis good to be merry and wise;
> 'Tis good to be *honest* and *true*:"

because I believe honesty and truth, and wisdom (if not merriment), should lie at the bottom of all wholesome, useful and proper Esprit de Corps. When one looks back to the origin of such a feeling one recognises that it sprang out of the chivalrous times when "brothers in arms" were bound to assure themselves how each would act to his fellow under every contingency. Such assurance gave to knights-errant common principles out of which grew the code of honour by which alone the Crusaders and the bands of mercenaries of the middle ages were kept together. So it was that even up to the present time military men have acquired that entire confidence in one another's comportment in danger and difficulty, in prosperity as in adversity, which has been named Esprit de Corps in that profession. Such necessities caused and account for that extreme development of the principle amongst soldiers which Mr. Roger Smith has so justly attributed to that class. Of course we have not the same sort of perils to go through; but certainly the first thing we have to remember to do, in order to inspire a healthy feeling of confidence between man and man, and between Architect and Architect, is to do to others under every circumstance as we would that they should do unto us. In the second place, we have to take care that our own consciences are clean and clear before the world—before those with whom we may not be brought into immediate contact, as well as before those who may be our *confrères*. Before we ever give way to the temptation to tarnish the escutcheons of others, I think the great thing is to see that our own consciences are free from, and above, reproach in all we do, and that our own

example may be such that it may produce in other men who possess the same faculties and tendencies a strong bond of union. It is only when men are animated by purposes beyond exclusive consideration for themselves that they can be supposed or expected to form a union in its strongest, best and most palpable shape. If, therefore, we determine as honest men to keep our own conscience clear, and do to others as we would that they should do to us, the truest and best form of Esprit de Corps will be initiated amongst us all. We have all a common bond of fellowship in the interests and associations of our art. If we who follow the study of architecture give to every man the credit which persistent and honest study and practice may deserve, then we shall certainly increase our respect for one another, and the world's respect for us; then we shall encourage the public to recognise merit where it may exist; and then only shall we form the concrete body, such as Mr. Roger Smith wishes us to become. I was much struck with the point which that gentleman has so well put, viz., that we must draw a judicious distinction between that Esprit de Corps to which he has alluded, and the spirit of conspiracy for purposes of greed which the Press has occasionally, and I believe most unjustly, attributed to us as a body, and which to the very partial extent to which any such tendency may have exceptionally prevailed, has laid us open I am afraid to the charge of endeavouring to enrol ourselves as members of a trades union. I think no idea of Esprit de Corps or mutual union should ever make it appear to be necessary that an honest man should restrain his indignation at what he knows to be dishonesty or gross selfishness in any shape; whether that dishonesty, or even resemblance of dishonesty, may attach to a professional brother or not. That is why I was so pleased to hear Mr. Roger Smith suggest the recognition in our body of such penalties upon all ill-doing, as we may be enable to enact and enforce. I only wish we could expel a "black sheep," whenever we could find one. Happily, I think, we have kept the gate to any such well closed; but one is sometimes annoyed to think that there is little or no action which can be taken effectually against them, should any creep in, and also by the fact that we are not able to say under such circumstances openly, that "that man is not a member of our profession." At the time when I was honorary secretary of this Institute, I received letters occasionally from tradesmen, offering pecuniary considerations if use should be made of their wares. A correspondence was entered into with several of them, and inquiries made "why they sent out such letters?" The reply was, that they sent to me as they had done to other architects, some of whom accepted the terms offered; but on my asking their names, I never could obtain any answer. Could I have got any reliable evidence on the subject, I would have taken care that no feeling of Esprit de Corps should have shielded the delinquent from public and professional denunciation. No doubt we ought to come more together than we do, and learn to be more charitable to each other than we sometimes are. One cannot help saying that in the architectural press there is a great deal of good honest and just writing; and such is the rule, but, by way of exception, one sees now and then, however, "*cum longo intervallo*," attempts to run a knife into the back of a man a little too much indulged in: sometimes, but very rarely, and in a mild form, excepting when "sensation" is aimed at, it may be in a quasi-editorial form, and sometimes in the shape of a little personal anonymous attack, which is essentially opposed to the movement which Mr. Roger Smith would so willingly inaugurate. Before concluding, I must beg to propose a vote of thanks to him for his very admirable paper, and for the service I think his just views and agreeable exposition of them may render to our body corporate.

Mr. JOHN P. SEDDON, Fellow: I rise with pleasure to second the vote of thanks to our friend for the admirable paper he has read, which gave me the greatest gratification. One point which impressed me very much was that in which reference was made to what is done in the medical profession, from which I think a good hint might be taken by ourselves,—I mean in the way of consultations of architects upon certain points, because, necessarily, our profession is divided into several different branches. It is

so vast and wide in the subjects it includes, that some men are more intimately acquainted with certain branches than others; and I think it would be much to our mutual advantage if we could consult each other upon such subjects as we may not ourselves be particularly *au fait* at. With regard to the remarks about criticism, I think it is a pity that the public are not more acquainted with architecture, and able to criticise architectural works themselves, and that architects are at all called upon to criticise the works of their brother architects; but the latter being the case, in consequence of the former not being the case, it seems to me it is necessary that those upon whom the unwelcome task falls should never forget that, though the professional *Esprit de Corps* should be great, yet we have that still greater one of feeling and love for our art. In the interests of that we must speak out what we think, without fear or favor. Another point mentioned in the paper is one which I have long advocated as a most desirable thing, viz., that in this Institute the great majority of papers brought forward by members should be descriptions of their own works. It would be most desirable that before descriptions and views of a building appear in the newspapers, they should be first presented here, with all the working drawings. We should then learn a great deal, and be able to criticise them in a friendly spirit, much to our mutual advantage.

Mr. T. C. CLARKE, Fellow: I beg to add my thanks to Mr. Roger Smith for his excellent paper, and to say that I was struck with one particular passage with regard to the business relations of architects and their clients, because I think it is a point very often overlooked, and the want of good method tends to lower the profession in the eyes of the general public. I take it we are too loose in the way in which we represent to our clients the outlay on buildings; and I think nothing would tend to bring the profession into greater respect than to be more careful in the way in which we conduct the expenditure on a client's building. I always look upon it as a great moral fault in a man to represent that a building will cost a certain amount, and for it to result in a much larger expenditure; and I have always held that opinion, and acted upon it. I went down to the country some time ago to see a client about some additions to his house. It was a matter of some thousands. He said that a friend of his had been told by his architect that his house would cost £ 10,000., and it ultimately cost £ 20,000; and he inquired whether the estimate I should give him would be of a similar character. I answered, with some warmth, that I trusted he would not for a moment entertain such an idea. It is one of those things which we must regard more than any other as tending to bring back our profession to the position which it ought to occupy. I join Mr. Roger Smith, too, very much on the question relating to pupils. We cannot shut our eyes to the fact that men have taken pupils without regard to the special capacity or fitness of the youth. That is one of the points in which I have seen disappointment in early life to many young men, who find themselves unfitted for the profession they have entered, and who were clearly never intended for it by nature, special capacity, or by early education. The paper is full of suggestions, and there is nothing I more cordially desire than that we should do all we can here and elsewhere to improve the status of our profession. I do think difficulty arises sometimes from a want of knowledge of men and things, in which architects are perhaps deficient. Architects shut themselves up in their studies, and lack that general knowledge in dealing with men which other professions, particularly that of the Bar, find so much to their advantage. I beg cordially to endorse the vote of thanks to Mr. Roger Smith, and I wish time admitted of our discussing more fully a paper so full of suggestions, and so replete with the pure and earnest spirit which we know him to possess, and by which alone his paper was dictated.

Mr. JENNINGS said: It is impossible, at so late an hour, to say much on the subject of this able paper; but I would make one suggestion in connection with it, which appears to me to be really the great difficulty with regard to Esprit de Corps in our profession, that is, we do not know who are

really members of it. If we had some defined line, as all other professions have, we should not be under this difficulty. In the course of last week a man got into the witness box, whom I have known as a respectable builder for twenty or thirty years, who has now in a great measure retired from business; and when asked what he was, replied, "an architect." It is impossible, if such persons call themselves architects without any fixed line, to have fellow feeling with all who call themselves architects. With reference to our not associating more together in professional matters, I have thought there might be meetings of consultation on professional matters at certain periods, when some architects might attend in rotation, and any others might attend, and give and receive such information as was in their power to one another. I think something of this kind is quite possible in connection with architecture, as it is adapted now in a branch of the profession. I have myself known men who have been unwilling to give information, and I have heard one say, "Oh, that is a professional secret." I have heard another say he should get all the business he could, without respect to anyone else: he was for free trade in architecture. In these and various things in the management of our profession we must look to the Institute chiefly to find the means of improvement.

Mr. C. F. HAYWARD, Fellow, said: Our presence here shows that we have at least a little Esprit de Corps or we should hardly have come out this inclement evening. It is not in any ordinary sense that I would apply the words we frequently use in returning thanks for "valuable and interesting" papers. These expressions have a special meaning in this case, and we must all feel greatly indebted to Mr. Roger Smith for introducing this subject. I think one of the most valuable points taken up was that to which Sir Digby Wyatt alluded, viz. the distinction between trades unionism and this "Esprit de Corps." It is particularly valuable at the present time, when every attempt of architects to hang together for any purpose, however honourable and just, is stigmatized in the public press as a Trade Union, and by that is in fact implied pure selfishness. But even called by that name I should at least hope that it is a proper form of trade unionism, if what is proposed for the benefit of the profession should be also for the benefit of the public; and I hold that there is nothing we have combined to do, or propose to do for Architecture as a profession, but has been also for the benefit of those who employ us as professional men. You will apprehend what I am referring to with regard to that particular subject.

Esprit de Corps, as a phrase, is connected with military service; I think the Esprit de Corps, which we hold to be so opposite to trade unionism, is rather that of volunteers than of the army generally, because we are associated entirely as volunteers, and all the influence we exercise over each other to do any good, must arise out of this volunteer spirit. For I do not hold with those who wish to make our profession a close one in the sense of that of Law and Physic. I do not wish to see our profession hedged in by the same legal fences as those are; but I regard our profession as a most liberal one, and the exercise of it should not be hampered in such a way as to make it necessary for every member of it to have a diploma, and be accredited in the same way as members of those professions before mentioned. Still we may hope to have one of these days if not a highly educated body of university men, at any rate one composed of those who have passed through a certain general curriculum, together with a thorough education in the technicalities of the profession. That we certainly do look forward to, as that depends entirely upon ourselves, and it is a thing to be hoped for if the examinations we have endeavoured to establish are revived and wisely carried out. And herein is a basis surely for a more extended Esprit de Corps. Mr. Roger Smith particularly stated, and it deserves to be stated over and over again, that the result of a proper Esprit de Corps may be simply taken to be, that when a thing is recognized as one that ought to be done it *is* done, and when it is regarded as one that ought not to be done it is *not* done. It is often forgotten that rules when made ought to be carried out, and this has a more especial bearing on the subject of competition referred to in the paper under discussion. Some of us talk about

what ought to be done and what ought not to be done in competitions, and yet the very same persons are apt, directly they have an opportunity of joining in one, to throw aside in a moment all ideas of Esprit de Corps with respect to it. There have been examples of this recently, and examples, too, I am happy to say, the other way. There was one competition this year which afforded great opportunity for the exercise of Esprit de Corps. There were several points with regard to that competition which were objectionable, and at least half a dozen members of the profession refused to work under such terms; but there was a fixed number of competitors required to be made up, and enough were found to join without scruple, though knowing that others had declined, and the number was made up without trouble. Even when the subject was brought before those who were to compete, and there was an excellent opportunity of putting their own ideas before the originators of the competition, they one and all, or most of them, declined to take any step whatever. Here was a larger want of Esprit de Corps than I could have imagined to have existed; and this was at a time when a committee of this Institute was sitting to determine, and I believe had determined the proper terms on which members should join in a limited competition, and even some members of the committee competed who were framing these rules. I refer to this now, not as a matter of blame, but as pointing out where, to my mind, a want of Esprit de Corps exists. There has been another instance of competition since, in which a certain amount of Esprit de Corps was exhibited. There was a desire on the part of a certain committee to have a limited competition of, say, half a dozen designs, for a building which was to cost a large sum; but it was proposed that no one should be remunerated in any way, because it was connected with a charitable institution. Many of the persons applied to declined to compete on those terms. A copy of the regulations passed by the Conference at this Institute (before they were published generally) was forwarded to this committee, showing that it was only just that competitors in a limited competition should each be paid a honorarium. The result was, there was no competition, the invitations issued were withdrawn, and the committee elected their own architect. That was an exceedingly good example of the value of the work of Esprit de Corps, and one which is very far from being a small matter. Mr. Roger Smith says, once make competitions fair, and you make them friendly. That is what we want to establish, friendliness between competitors, and a willingness on other occasions to communicate our ideas to each other. With regard to one subject which seems to have run through various minds, viz., the idea of the interchange of recognized professional advice between each other, it has often been mentioned before in this room, especially, I recollect, by Mr. Truefitt. Supposing an architect wants a special opinion upon any special subject, such as iron construction, and wish to assure himself as to his designs and calculations, if he could send them, as a brief to a barrister, or 'a case' to counsel, endorsed with the amount of fee, to some professional brother able and willing to give a definite opinion, I think it would be a valuable practice, and one which might be recognised and more generally adopted than it is.

The CHAIRMAN: In putting formally the vote of thanks to Mr. Roger Smith, I will only say two words. The first is, the longer we live the more we see that a man cannot live with a bad name in his profession; and, secondly, that integrity towards each other is the first principle we should recognise and practice.

The motion having been passed by acclamation,

Mr. ROGER SMITH said: I beg to convey my special thanks to the gentlemen who have come through this unpleasant weather for the sake of being here, and for the kind way in which the familiar topics I have treated of have been received and discussed. For my own part I would say I should be very glad if the system of consultation were carried out. I am open myself to receive any number of five guinea fees; and I did what Mr. Hayward has suggested only last week, with regard to some iron girders.

The discussion having been thus brought to a close, the meeting adjourned.

In the early part of the evening the following communication was read by the Hon. Secretary for Foreign Correspondence:—

ON THE VENTILATION OF HOSPITALS.

Translation of part of Letter from M. Pauli, *of Ghent, Architect.*

The renewal of air in public buildings, and notably in hospitals, may be effected in two ways. Either the vitiated air is extracted and the pure air is drawn in, or the pure air is injected and the foul air expelled. The first system is known under the name of ventilation by aspiration or inhaustion, the second is designated as ventilation by pressure or impulsion.

The system of ventilation by aspiration presents these drawbacks. The vitiated air, being withdrawn by the ascensional power of hot air in the extracting shafts, is naturally replaced, not only by pure air, which penetrates into the room by the openings intended for that purpose, but also by that which finds entrance by other apertures, such as doors and windows. Indeed, every time that a door is opened the air rushes in and produces draughts which become extremely disagreeable, especially if the adjoining apartments are at a lower temperature than the room in which the ventilation is working. In support of this remark I would cite the experiments made at the Hôpital Lariboisière, at Paris, by a special commission. Those experiments established that under the best circumstances the pure air entering from the apertures of the heating apparatus amounted to 35 métres cubes for each bed per hour, while the volume of vitiated air drawn, and in fact issuing from the wards, amounted to 82 métres cubes in the same time. The difference, say 47 métres cubes, came from air flowing through the accidental openings of the ward. And it should be observed that this air, in addition to the inconvenience of cooling the wards in winter, presents that of imperfect ventilation, because it is delivered almost immediately after entering into the extracting apertures (or flues) which it finds nearest at hand.

Advantages of the system of Ventilation by pressure, or by impulsion of pure air.

The inconveniences above noted would disappear if the ventilation were effected by pressure or impulsion of pure air. By this system a ventilator inspires the air on the one hand and expels it on the other in a wide conduit which debouches by branches into the ward to be ventilated. During the winter this air is warmed by contact with the pipes of hot water disposed in the conduit. The vitiated air is naturally expelled by the forced introduction of the pure air. It escapes by openings pierced at the level of the ceiling, and is subsequently carried into a common discharge shaft. By this system all the air put in motion by the ventilator must necessarily act as ventilation, however great may be the atmospheric variations. This system has besides the advantage of preventing draughts by forcing the air to issue out by every sort of opening instead of causing it to enter in, as is always the case when the ventilation is effected by the extraction of the vitiated air.

Different modes of Warming of Large Spaces. Advantage of the Hot-water System.

It is now generally agreed that the system of warming by hot-water offer the best results. Warming by smoke-generating stoves is open to the following objections: 1. That it can only be effectually applied in spaces of small extent. 2. That it gives out an unwholesome air on account of the contact of the air with heated metallic surfaces at a high temperature, by which the organic matter

floating in the air is carbonised. 3. That it very often mixes smoke with the air, in consequence of the difficulty of making the joints of the warming apparatus perfectly sound. 4. Finally, that it causes danger of fire.

Warming by steam offers other inconveniences which cause it to be rejected. 1. It necessitates an apparatus which becomes dangerous if it is not managed by an experienced person, who does not leave it. 2. The steam pipes are difficult to keep closely caulked, and the least escape of steam gives to the air a very disagreeable odour. 3. It requires a constant fire, for if the boiler ceases to furnish steam, the warming immediately ceases.

Warming by hot-water with apparatuses, the price of which does not exceed that of steam apparatuses, offers the following advantages: 1. That it carries the heat to great distances. 2. That it is effected by apparatuses which cannot explode. 3. That it warms the air only to a temperature of 40° or 50°. 4. That it continues to work for several hours after the fire has ceased to be fed. It is for all these reasons that heating by hot-water has been used for the Civil Hospital at Ghent.

General arrangement of the Civil Hospital at Ghent.

The Civil Hospital is arranged to accommodate 650 patients of the two sexes, disposed in the following manner: 500 patients in the New Hospital, indicated on the plan by a black tint; and 150 in the wards of the Old Hospital, shown by a grey tint.

The wards are disposed in isolated blocks, and have but one floor raised upon a basement. This arrangement seemed to me more favourable to salubrity than several successive floors. It is true that it gives great extension to the building, which seems to render the service more difficult. But this difficulty is not so great as might be supposed. For if, on the one hand, the distances are greater, on the other hand, staircases are avoided.

General disposition of Ventilating Apparatus.

The boilers, the steam engine (12 horse power) and the centrifugal ventilator are placed at the points marked 35, 36, 37, on the ground plan. The ventilator draws the air from the great central garden and drives it into an underground conduit placed under the gallery No. 41, from which it is delivered into the wards by branches. The volume of air introduced into the wards, &c. has been estimated at 80 metres cubes per hour for each bed, say a minimum of 52,000 metres cube per hour.

This air is warmed in winter to a mean temperature of 17° centrigrade before being delivered into the wards. This is effected by hot water pipes within the air conduits. In summer the air is drawn from a shady spot, so as to keep the temperature of the interior as low as possible. The air gratings are placed near the ceiling (*sic*),* and have a free section, such that the air passes in at the rate of one metre in a second. The vitiated air escapes by numerous apertures at the level of the floor (*sic*),* and is thence carried by flues into a common extracting shaft. The surface of the gratings of issue is so proportioned that the rate of issue does not exceed from 50 to 60 centimetres per second. The warming and ventilating apparatus thus described have been working for about three years to the satisfaction of the medical staff and the administration. Numerous experiments made with a view of ascertaining the quantity of air admitted into the wards prove that ventilation by pressure is not only the most effectual method, but that it produces its effect well at long distances, if the sectional area of the conduits is carefully adjusted. The whole of this hospital, except the residences, is ventilated in this way. Each ward receives a fixed quantity of air at whatever distance it may be situated. Thus

* These are clearly clerical errors, the reverse being no doubt the fact.

the air is driven into the most remote wards at a distance of more than 260 metres, without any diminution of its volume being discoverable. It was objected by several persons that the introduction of so large a quantity of air could not be effected without producing draughts dangerous to the patients.

This objection was not admissible, for the air enters the wards by a number of orifices at a very slow rate, and having an upward direction. In order to prove this by secular demonstration I made the following experiment.

After having hermetically closed all the openings of one of the wards, I burned a quantity of tobacco, which produced a smoke so thick that the windows on each side of the room were scarcely visible. The openings were then unclosed, and the ventilator put in motion. Shortly afterwards two perfectly distinctly marked zones were visible, the one transparent of pure air, the other opaque and of smoke. The latter visibly diminished as the ventilator worked, and finally disappeared completely in twenty-five minutes.

This experiment proved to a certainty to all who were present that the renewal of the air was effected with regularity and without producing eddies. The ventilator works generally in summer and winter from five in the morning till eight in the evening, and it is only in exceptional cases that it is kept going at night. The quantity of coal consumed by the engine may be estimated at an average of twenty-five kilogrammes per hour. The warming by water for all the wards, vestibule and dependencies is effected by ten furnaces, which consume an united average of 200 kilogrammes of coal per hour during the six months of winter. As I have observed, the system of warming and ventilation has completely succeeded, and although the first cost was considerable, the administration of the civil hospitals of Ghent would not hesitate for an instant to adopt it again.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, the 2nd of December, 1872, the following Paper was read:—JOHN GIBSON, Vice-President, in the Chair.

ON THE VALUATION OF HOUSE PROPERTY IN LONDON.

By EDWARD I'ANSON, F.R.G.S., Fellow.

THE foundation of the value of real property, as indeed of all national wealth, consists of land, and therefore, in valuing house property, the first and essential consideration is to ascertain the value of the land upon which a house or other building stands. The value of the construction raised upon the land, will be pretty much the same, whether it is situate in Belgravia or Whitechapel, although, as I shall have occasion to remark, this principle is subject to some modification.

With reference however to the land, it is evident that its value may vary very materially; the lines of great thoroughfares, for instance, will always be sought after for business purposes—corner plots have an exceptional value in these localities—proximity to great commercial centres enhances value, frontage upon a river or canal confers certain advantages, as also for residential purposes, an outlook upon our parks. In fact, so multifarious are the circumstances which affect the cost of land, that its fluctuations extend from £1. to £40. a foot within the limits of the City of London, while within the Metropolitan area its value varies in the ratio of 1 to 1600, or from 6d. to £40. a foot. It will be seen from these facts that a considerable amount of special knowledge is necessary in order to arrive at the value of land in London, and when arrived at this value is by no means a stationary one. For instance, in the case of residential property, of which only a small portion has been covered (as is the case in the neighbourhood of Earl's Court, Brompton, portions of Battersea and the neighbourhood of Ealing), the value of the uncovered land is sensibly affected by the class of house that is being built in the immediate vicinity, the rents which have been obtained from houses already erected, the character of the roads and approaches, the development of the railway system, and other circumstances, by means of which the uncovered ground is brought into more or less proximity with adjoining covered ground and inhabited districts.

The value of land in such cases as these must always, to a certain extent, be of a speculative nature, and the ascertainment requires great discernment and an accurate knowledge of the locality. The late Mr. Thomas Cubitt, a cautious, shrewd, and successful speculator in undeveloped building sites, is reported to have remarked that people were generally right, except that they omitted the all-important point of not having sufficiently considered the element of *time* in such transactions, for where rent has to be paid or capital invested, the rent paid or the loss of interest most materially affects the profit of any building scheme.

All these considerations must be borne in mind by the valuer of building land, but my more special concern is with covered land, and more particularly with land in the City of London. Now, in the City, the value of land not only varies as regards locality, in the most striking manner, within very narrow limits, but it also varies with time. Within the limits of the City proper, its

value ranges as has been already stated, between £1. and £40., and has also increased within the last forty years at least threefold, and in some instances even more. This increase in value, although subject to some fluctuations, dependent upon the prosperity or depression of commerce, has upon the whole, been constantly maintained, so that it has grown to be a proverb, that you must make a profit upon building in the City. There is, I need scarcely remark, a limit to this, as here again the element of time tells powerfully on the results, for when the realisation of the value or the interest thereon is deferred, the present value must be discounted, and is consequently reduced.

Some time since I had the honour of reading a paper before the Institution of Surveyors, in which I pointed out how remarkably the City is divided into distinct markets, and by the kind permission of that Society I exhibit the map which was prepared to illustrate my observations on that occasion. In the course of that paper I entered with some detail into the rise of the various markets or commercial centres in the City of London. On the present occasion I will only ask you to notice how nearly the whole of the industrial portion of London is to the eastward—of a very considerable section of it, where the legal business, not only of the Metropolis, but also, to some extent, of the whole British Empire, is transacted. In the focus of all, the City, which teems with a daily traffic of millions of people (very interesting statistical details of which were recently given by our colleague Mr. Wm. Haywood, the able engineer to the City Commissioners of Sewers), has scarcely any resident population. The families which, in my youth, lived in its narrow lanes have utterly deserted it, not because the City is unhealthy or inconvenient, but because the rooms formerly used as living rooms are more valuable as offices, and a citizen may now live in a suburban villa or even in a Belgravian or Tyburnian mansion, upon the rent he obtains for the drawing-room floor of the house wherein his ancestors lived for generations.

It is to be observed that the focus or centre of commercial activity is divided into several markets, which are distinguished on the map by different tints. Near the Royal Exchange, where it has been located for centuries, is the Money Market, the Banking Houses lying to the southward, and the Bank of England to the northward of the Exchange. The Stock Exchange is to the eastward, and interspersed among the detached portions of this market, but still in immediate contiguity of the Royal Exchange, are the Offices of the great Companies which insure against the risk of Life, Fire, and Shipping casualties; this is the very centre of commercial enterprise. The coffers of the Bank of England are here, and here daily resort the Peabodys, the Barings, the Rothschilds, the Goschens, the Huths, our merchant princes, who control the commercial business of London, and whose influence is felt not only throughout the whole of Europe, but extends to the entire civilized community of nations.

This is the most valuable part of the City, as much as £40. per superficial foot having been given for land in this situation; £30. a foot is by no means an uncommon price for land in good positions, but precious as is the commodity the extreme value obtains over a very limited area, and a very short distance from this favoured locality the value of land falls to one half or even one third of the price realised in the best portions.

In immediate contiguity to the Money Market are the counting houses of the great mercantile firms, chiefly in Broad Street, Austinfriars, and the streets adjacent. When there was no West End to London beyond Red Lion Square or Bloomsbury Square, when there was no other bridge than London Bridge, and that bridge very narrow and difficult of access, Broad Street was a favorite resort of the great merchants, who could thence readily migrate with their families periodically by the wide thoroughfare of Bishopsgate Street to their country houses, situate at Hoxton, Edmonton, Walthamstow, or Hackney, where may still be seen many fine houses of the seventeenth and eighteenth centuries. This locality

has still a special value: it is not equal to the land in the immediate neighbourhood of the Royal Exchange, indeed not by one-half; but it is, nevertheless, very valuable.

Probably one of the most ancient markets in London is the fish market at Billingsgate, more important in Catholic times, even in our own, on account of the prohibition of flesh by the Church on certain days. The stock-fishmonger was a considerable personage in mediæval times, and we find frequent mention of his calling in connection with the office of Lord Mayor and Sheriff in the municipal records. The situation of this market, which, until the introduction of railways, depended solely upon the river for its supplies, is obviously determined by the position of London Bridge, westward of which no craft of any size could pass, in consequence of the impediments presented by the low narrow arches, partly blocked up by the machinery used for pumping the water for the use of the citizens, and partly by the great starlings built round the insufficient piers of the bridge. The area of Billingsgate is confined to the market proper, and some narrow lanes which immediately adjoin it on the west, or are situated on the opposite, or north side of Lower Thames Street.

Between Billingsgate and London Bridge, which latter formed, as I have said, an impassable barrier to craft of any tonnage, was the original centre of the warehousing business for the storage of goods arriving in the port of London. Here were the legal quays, the only quays (with the exception of some privileged quays belonging to the Hanseatic League, situated to the west of London Bridge) where goods could be legally landed or warehoused. In the immediate neighbourhood, between Billingsgate and the Norman fortress of the Tower of London, was the Custom House, where the dues where assessed and levied upon all merchandize arriving by the silent highway of the Thames, then the only means for the import of foreign goods to the metropolis. These quays, although they have lost their exclusive privileges, are still the most valuable wharf property in London, and they remained the only wharves and warehouses for foreign goods until the building of the London Docks, which took place at a comparatively recent period, the architect who designed them having been associated with my late father in business, and it is not many years since he passed from among us.

What a change has taken place since then may be seen by observing on the map the vast spread of dock accommodation, extending to Horselydown on the south side, and to the Isle of Dogs on the north side of the river, the last great work of the kind being the Millwall Docks in the Isle of Dogs. The mention of this locality affords an illustration of the dormant but yet increasing value of land: the land in the Isle of Dogs remained for years entirely undeveloped, until the late Sir William Cubitt (I think) first had the courage to use it for commercial purposes, when its value rose from at the most £6. to £7. per acre as grazing land to £40. per acre; and this is not the utmost limit, for at North Woolwich the demand for manufacturing premises continues to increase the value of property in this neighbourhood.

Returning, however, to the great centres of industry, let me notice another market immediately adjoining the legal quays, namely, the Fruit Market. I suppose there is no other city in the world better supplied with those exotic fruits which our inclement climate refuses to ripen as London. Oranges, lemons, figs, nuts, pears, apples, peaches, nectarines, grapes, melons, pines and pomegranates, are readily brought from the coasts of Spain, the Azores and Canary Islands, and even from the shores of the Mediterranean and the West Indies. London is, in point of fact, the most convenient port for all perishable commodities, far better than Bristol, and is only rivalled now by Southampton; but in former times London was the only available port of anchorage, and hence the fruit market, extending from the river northward as far as the south side of Eastcheap.

What has now become the most considerable of all the commercial markets occupies the next available space near the river, a little to the east of the fruit market. This is the Colonial Market.

Now here, although the land does not command nearly the same value as is in the Money Market, probably on account of its not being so much hemmed in, and consequently more capable of expansion; the prices obtained are nevertheless considerable. The central point of this district is the London Commercial Sale Rooms, Mincing Lane, where the greater portion of the foreign and colonial produce brought into the port of London is disposed of by public auction, not only for home consumption, but also for the supply of a large part of Europe. Teas, coffee, gums, indigo, spices, dye-woods, seeds, wines, ivory, indeed almost all the natural products of the universe (with the exception of minerals) are constantly changing hands in this busy locality. In the Commercial Sale Rooms alone as many as sixty sales by auction take place daily.

There is again the Book Trade market, which is situate near the Cathedral church of St. Paul and the Canons' houses, for it was the lettered clerks, and not the unlettered princes and merchants, who fostered learning. Westward of Paternoster Row, or as it is more familiarly called "the Row" were established the first public printing offices, Printing House Square being the nearest spot, and the others extending along Fleet Street towards the west.

There are many other markets to which I can only allude in passing, viz:—the Corn Market in Mark Lane, the Wine Market, the Auction Mart for the sale of freehold and leasehold property, the Manchester trade, etc.

Outside the city boundary, and between the city and the court end of London, which was located formerly at Whitehall, is the district occupied by the Theatres. On the north, in easy communication with the midland, eastern and northern counties, was the great beast market of Smithfield, and still nearer to the centre of the city the dead meat market of Newgate; whilst stretching up to the high lands to the north-west of the city, away from any of the principal commercial centres, and in close contiguity with each other, are the great establishments of Christ's Hospital, St. Bartholomew's Hospital and the Charterhouse.

That part of London, westward and northward of the Legal district (the importance of which will be more firmly established by the new Courts of Law), is almost entirely residential property, with such retail establishments on the line of the main thoroughfares, and some of the other leading lines of communication, as are necessary for supply of the wants of a large population.

There is a distinct centre of professional men clustered on the north side of the Houses of the Legislature, chiefly consisting of those who give evidence before the Parliamentary committees, by whom the great engineering works of the country are examined in their preliminary stages.

I must now conclude this rapid sketch, but I think I have said enough to shew that the City of London is divided into districts, which are the markets for various branches of industry and commerce; and if it be necessary, as no doubt it is, for a trader to reside in the midst of the market for his speciality, you will readily understand how much the value of a site depends upon its position with reference to a market, whether in the centre, on the outskirts, or out of it altogether.

Now to apply what I have said to the immediate subject of this paper. I have endeavoured to shew that special localities are adapted to, or at all events are practically used for special purposes, and I have pointed out how considerably property differs in value within very narrow limits. Now there can be no intuitive knowledge as to whether land is worth £1. or 1s. a foot, and a knowledge of its value can only be obtained in two ways. One method is to enquire what does the land in the immediate locality let for? Old London, the London as rebuilt after the great fire of 1666 (for there are but few and isolated houses of an earlier period) is fast wearing out, and a large portion of the ground upon which it is built belonging to Charities and other corporate bodies, the letting of land is not unfrequently the subject of public competition, and as the bidding is open to all it is fair to assume

that the utmost value is usually obtained. Lettings effected in this manner consequently afford a good criterion of value.* This is one means of ascertaining the value, but it is at least prudent not to depend upon a single instance, as the land may have been let too cheaply (this is a common occurrence) or a neighbouring owner may have paid an excessive price to secure some special personal advantage. It is desirable, therefore, in estimating the letting value, to secure as many illustrations as are obtainable, and to consider and weigh the evidence thus produced.

Again, the value of land (as I have before observed) varies with time; at one time becoming stagnant, or apparently retrograding in value. Only a few years ago, prior to the memorable day in November, 1866, when the great discount house of Overend, Gurney and Co., stopped payment, what then appeared a maximum value had been reached, but immediately after that, city land could hardly be disposed of at any price. There can be no doubt that those speculators, who had invested in city land or buildings, were losers temporarily; but I felt then, and my constant advice was that the value of land had not diminished, but only depressed for a time on the sudden cessation of demand for it. Subsequent events have, in my opinion, justified the impression I then formed, for at the present moment city property is realizing the full value it had attained prior to the crisis of 1866.

Assuming, however, that the valuer is in possession of all the requisite facts as regards recent dealings with any particular plot of ground, it still requires considerable judgment to foretell what may be the realisable selling or actual value, and I believe it must always be, to a certain extent, speculative and dependent upon the skill with which the Architect adapts his building to the precise requirements of the locality.

Of this adaptation of the building to the wants of a locality the numerous city offices offer a good illustration. When I first began to build on the new London Bridge approaches, previous to 1840, city offices as now constructed were not thought of; the houses were built as shops and dwellings, or as warehouses, and it was the same in Moorgate Street. Since that time, however, a distinct type of construction has been evolved, which is now, perhaps, nearly perfect. In this development I hope and believe I have had some share; our colleagues, Messrs. Corbett and Newsom, Mr. Richard Bell, Mr. Whichcord, Mr. E. N. Clifton, Mr. Francis, Mr. Edward Ellis, Mr. Gruning, and others, have all produced practical buildings of this class, as have also Messrs. Innes in the Colonial Market, with the assistance of Mr. Crockett, and Mr. R. B. Marsh. In these buildings the greatest attention is paid to the size of the rooms, so that the greatest number may be obtained in the smallest space, and that they may be abundantly lighted: convenience of access, the position of doors, stairs, fireplaces, and water and gas supply are all carefully studied.

There is, however, another method of determining the value of land, and that is by ascertaining the letting value of the building put upon it when erected, and after deducting a certain amount for interest on the outlay to repay the builder, and allowing for all outgoings in the shape of rent, taxes, insurance, maintenance and repairs, management, loss of rent from portions of the building unlet (called "empties") the residue capitalized will represent the value of the land.

This method of calculation also requires a knowledge of many local circumstances, the rates and taxes, for example, varying in different districts, as does especially the chance of "empties." In the lowest class of property, (that which is let weekly), it is hardly safe to reckon upon a less deduction than

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* I may here mention that any one who is interested in dealing with land or house property may, by subscribing 3 guineas annually to the Estate Exchange, at the Auction Mart, Tokenhouse Yard, receive a copy of the *Estate Exchange Gazette*, and obtain information as to the results of sales by auction, a classified register of all the sales that take place in London being kept. Non-Subscribers may obtain the *Gazette* by payment of 15s. annually.

one half of the gross rent to arrive at the net rent. This is rather an extreme case, but the rate of deduction for outgoings does actually vary between one-half and one-fifth.

To illustrate this mode of calculation let us say that—

A building realizes by various lettings a gross rent of .		£1500 0 0
Say the building cost £10,000.		
Assuming the Builder's profit to be 7 per cent., that gives .	£700 0 0	
And deducting for rates, taxes, insurances, &c. one-fifth .	300 0 0	
The total deduction would be		1000 0 0
Leaving as the annual letting value of the ground . .		£500 0 0

I only offer this, (which I will call example A), as an illustration: when the buildings are very speculative and slightly built, so as not to be durable, 7 per cent. interest would not pay the builder, because to a large extent speculative buildings are erected with borrowed money, and as money is seldom obtainable for less than 5 per cent. the builder has not only to provide a sufficient margin for a profit for himself, but to set aside a yearly sum as a sinking fund to accumulate to repay the borrowed capital. Again, as before remarked, the outgoings depend very much upon the rate of taxation in the locality, some parishes being more heavily taxed than others, and on other circumstances.

This method of calculation has been to a great extent adopted in endeavouring to prove the value of land taken compulsorily for public improvements; and if the rentals, which might hereafter be obtained in new neighbourhoods, could be foretold with actual certainty, as it is comparatively easy to ascertain what deduction should be made for parliamentary and local imposts—then after making due allowance for empties and management, and a proper interest to the builder for his investing capital, the net result would be shewn in the most legitimate manner—and that would be the value of the ground.

The future rent must, however, still be to a great extent matter of opinion; as are also to some extent the questions of what is a fair profit for the builder, how long that profit will be deferred, and even what would be the actual cost of the building. If all these things were matters of mathematical certainty, here would be a certain process of solution; but even when this rational principle is agreed upon, the views of buyer and seller are influenced by their conflicting interests, and the result is that these questions are frequently decided by reference to an arbitrator or the judgment of the Sheriff's Court, where evidence of the most opposite character bewilders the jury, who have to establish the value by their verdict.

The wonder, indeed, is that juries can at all balance the various kinds of evidence adduced before them, and enforced by the speeches of eminent counsel, and that they so frequently arrive at results which are very nearly just. There can be no doubt, however, that the verdicts of juries are speculative and uncertain, erring, I think, usually in favour of the claimant. Trial by jury is, however, speedy in its action, most cases being decided in the course of a single sitting.

Reference to arbitration before a skilled referee is slower, but mistake in exaggeration is eliminated, and although excessive damages are seldom obtained, I believe that claimants are as justly compensated in this manner as it is possible for them to be.

It is pretty generally agreed that in valuing freehold house property, that is to say, a house, together with the land upon which it stands, that after finding its actual net value, that is, the value or rental at which it would let without premium for a term of twenty-one years to a tenant paying a net rent, without deduction, for land tax, insurance or any other charges or imposts, (property tax excepted), that such annual value should be capitalized upon the 5 per cent. table, which is equal to

twenty years purchase. Thus, a house or other building producing a net rental to the owner of £100. per annum is worth twenty years purchase or £2,000.

This is a generally admitted preliminary or starting point, but only a starting point, for if the building is old and likely to require rebuilding, then the value of the land must be found apart from the house, and each valued separately.

Thus, assuming the land and building together to be, as before, of the annual value of £ 100., and the annual value of the land or ground rent is one-fourth of the whole rent, or £ 25., and that the building is so far decayed as to necessitate its re-building in twenty-one years, it is evident that the calculation must be different.

You have first the annual value for twenty-one years at £ 100. a-year, and this is worth upon the 5 per cent. table 12.82 years' purchase, or . . .	£1282	0	0
To this you must add the value of the ground rent of £ 25. at the expiration of twenty-one years. Now, valuing this upon the 4 per cent. table (and this is the table usually adopted), the value of the land will be £ 25. × twenty-five years' purchase, or £ 625.. But the realization of this sum is deferred twenty-one years, and it must be discounted by that number of years, and discounting also upon the 4 per cent. table, you multiply by .438 . . . £625. × .438 = .	273	15	0
Which gives a total of . . .	£1555	15	0

This example for further reference I will call example B.

There is another way of stating the question which I will call example C, and probably the more correct way, which produces a slightly different, but more favourable result for the vendor in case of sale.

Taking the value of the land, first in fee or in perpetuity, we shall have £ 25. × twenty-five years purchase, or as we have before found . . .	£625	0	0
Then we have the assumed annual value for twenty-one years of £ 100. per annum; but as the ground rent has already during that period been accounted for, we must deduct £ 25. from £ 100., which leaves £ 75. Now this for twenty-one years, at the 5 per cent. table, is worth, as before found, 12.82 years' purchase, or .	961	8	0
	£1586	8	0

As before observed, this gives a little more than the first method of calculation, and it evidently arises from capitalizing the ground, in the last calculation for the first twenty-one years at the 5 per cent. instead of the 4 per cent. table.

The value of the old materials upon the ground in either calculation may be disregarded. Whatever their value at the end of twenty-one years, that must also be discounted, and it is considered a balance or set off against any loss of rent that may accrue at the end of twenty-one years.

Now these calculations give rise to more questions than one. Upon the first mode, example A, the principal question which presents itself is, what deduction must be made to arrive at a net rental, the rate of deduction, as I have already explained, varying considerably. On the second and third valuations, B and C, two questions at least arise, which must materially affect the result arrived at. Now the first question is, as to the number of years purchase at which the ground rent should be capitalized. I have said that the rule is twenty-five years' purchase, or the 4 per cent. table. I have, however, constantly claimed and contended for more, because ground rents are, I consider, the best secured and safest

description of security, and constantly increase in value, that is, of course, assuming that the land is let for a term of years expiring at no very remote period, such as a lease for from sixty to ninety-nine years, in which case there is always a certain value attaching to the reversion at the end of the term.

It was only the other day that certain City ground rents were sold by public auction at a price a little over twenty-five years' purchase; but for these same ground rents offers were made a few months previously at twenty-seven and five-eighths years' purchase. I had a professional interest in the matter, and advised on the offer made. I know that it was worth while for the parties who made the offer to give that price, which is, I contend, a proof of the value. The reason why the transaction was not carried through, and the ground rents were afterwards sold by auction, was, that it was one of the conditions of purchase that the title of the vendors should be approved by the Court of Chancery. I may incidentally mention that this condition often occasions a serious difficulty in the transfer of property, as the Court of Chancery, in investing trust money, requires such absolute certainty as to title, that it practically excludes many good but not absolutely unimpeachable titles, and I believe it is very much on this account that very large sums of trust money remain in the hands of the Accountant-General which might be much more profitably invested than in Consols.

The first question, then, is, upon what table should the ground rent be capitalized. My own experience is, twenty-five years' purchase is the minimum, and probably twenty-eight years' purchase is the maximum; but even this must not be considered a fixed rule, for there are certainly exceptions.

In a recent agreement for letting land, [certainly not in the best part of the City], in which I was concerned, it was a condition of the agreement that if the rent were redeemed within four years from the date of the agreement that it might be redeemed at twenty-six years' purchase, but within a limited period after that, at twenty-seven years' purchase, and the whole ground rent has actually been redeemed, partly at twenty-six years' purchase, and partly at twenty-seven years' purchase.

In one instance I offered as much as twenty-eight years' purchase for a ground rent in New Southwark Street, which offer was declined, and it actually sold by public tender for thirty and five-sixths years' purchase. This, I consider, however, an exceptional case. The average of one of these public sales of Southwark Street ground rents was twenty-seven years' purchase, and the maximum was thirty-one and sixth-sevenths years' purchase, and I have very recently offered, as before mentioned, for one of the corporations for which I am professionally concerned, twenty-seven and five-eighths years' purchase for a City Ground Rent.

The value of City ground rents has for some years declined; but still I consider a really good ground rent to be worth twenty-seven and a-half years' purchase.

There are, however, considerations affecting this value; for example, the proportion of the ground rent to the gross or rack rent. Now, as it very frequently occurs that the ground rent in the City is as much as one-half of the rack rent, it is very clear that in such a case the reversion is of comparatively small value compared to what it would be were the ground rent one-sixth or one-seventh, as it is in less valuable localities.

It sometimes happens, as already referred to, that ground rents are sold, the title to which, although good holding title, is not absolutely perfect, and that also depreciates the value.

Moreover, recent legislation has materially extended the powers of trustees, enabling them to invest in the bonds of some of the great railway companies, Government debentures and similar securities, and ground rents, are consequently less sought for. Government stocks and landed estates do not yield a return of more than 3 per cent., which represents twenty-eight years' purchase, while railway debentures and guaranteed stock yield 4 per cent. interest, equal to twenty-five years' purchase, so that ground rents, which in the early part of my professional experience used to exceed thirty years'

purchase in value, at the present time, from one or some of the causes I have mentioned, do not realize, as a rule, more than from twenty-five to twenty-seven or twenty-eight years' purchase.

Of course there are exceptional cases. Sometimes it happens that a lessee of a large estate will manage so as to have very small ground rents assessed upon some of his houses, and such ground rents I have known to realize as much as forty years' purchase. I recollect one large estate in the north-west of London where the ground rents were very frequently sold to the tenant at thirty years' purchase, plus one year's rack rent, equal probably to thirty-six or thirty-seven years' purchase.

It not unfrequently occurs that a price may be obtained for property far beyond its intrinsic or marketable value to anybody but the purchaser. For instance, where a piece of land is surrounded by the property of an adjoining owner, and the acquisition of the piece of land would enable the adjoining owner to free himself from restrictions as to light and air, or some other easement acquired over his property which prevented him utilizing it to the fullest extent. The ability to obtain a frontage upon a street, river, or canal, or the substitution of a frontage of a superior nature for that hitherto enjoyed, or similar advantages, all confer additional value. In these cases, it seems to me, that it is perfectly fair that the owner should reap the advantage due to the exceptional position of his property; but no safe rule can be laid down for the guidance of the valuer. I have a case present in my mind where a payment of from £2000. to £3000. (being nearly 25 per cent. beyond the admitted market price on both sides) was cheerfully paid for the acquisition of an exceptional site of this character, and the transaction was made with the sanction of a Government department.

Assuming, however, that we have arrived at a fair conclusion as to the table on which the purchasing of a ground rent should be valued, there is yet another question arising out of the third method of computation of the value of land let upon lease for a term, (which I have called example C), and that is upon what table should you discount the deferred value, *i. e.*, the value at the expiration of the term, and this is, as you will see, a problem not easy of solution. We will, for the sake of argument, assume that the deferred value is an absolutely fixed quantity (say £1000.), payable at the end of fifty years, and that you are to receive such a sum of money at once as will realize, by careful investment, of the interest every year, or every half-year, a capital sum of £1000. at the end of the fifty years.

You will see by the Table that very much depends upon the rate of interest you assume can be obtained for your money. If you assume you can obtain 3 per cent., and consequently discount upon the 3 per cent. table, you should have in present money . . . . £228.

Upon the $3\frac{1}{2}$ per cent. table . . . . . £179.
„ 4 „ . . . . . £140.
„ $4\frac{1}{2}$ „ . . . . . £110.
„ 5 „ . . . . . £ 87.

It is assumed that if you do not part with the property, you or your successor will, without any trouble or expenditure, receive at the end of fifty years £1000.; but in order to obtain that result you must go punctually every half year to the Bank of England, or elsewhere, to receive the interest upon your capital as it becomes due, and when you have invested that interest you must attend to receive the interest upon that interest, and so on for fifty years. Each one of these operations involves a certain amount of time, which must have some value, and the difficulty of finding an immediate and secure investment for the interest as it accrues is almost insuperable. It is to be borne in mind the table assumes that the interest is re-invested as it accrues with automatic regularity, and no allowance is made for loss by want of punctuality in receiving or investing the interest, or from investment in a bad security.

Assuming that 5 per cent. is a fair rate of interest upon which the compensation should be assessed for a reversion to £1000. at the end of fifty years, you would have, as we see by the tables, £1000 × .0872, or £87. in present money. You must now endeavour to place this money (the £87.), at interest, and it is just possible that by your solicitor's assistance, and in consideration of a fee for investigating the nature of the security, instructing a surveyor to report upon the value, perusing the abstract of title, conferring with counsel, drawing mortgage deed, etc. etc., you may find an investment for your £87. at the rate of 5 per cent. per annum. You will have paid the solicitor's and surveyor's charges, and at the end of the year you will get for the money invested 5 per cent. interest, or £4. 7s. Now what can you do with this sum of £4. 7s. You cannot get another mortgage for £4. 7s. If the sum were larger you might possibly do so, but you must incur further legal expenses and loss of interest by delay in obtaining another investment. Now this would be a constantly recurring difficulty and contrasts strongly with the former position we have assumed yourself to be in, when you would only have to wait patiently, do nothing, and at the end of fifty years you would receive your £1000.

Now suppose instead of your reversionary interest being a fixed sum of money, it were a piece of land, who can say, with the constantly decreasing value of gold, and consequent increase of the value of land, what will be the value of the piece of land at the end of fifty years? So that you not only have the risk, expense and trouble of re-investment, but you also lose the chance, indeed I may say the certainty, of town land increasing in value.

I think, therefore, you will feel you make but a poor bargain in parting with your reversionary interest at a price to pay you 5 per cent., and you will, I am sure, discover that it is excessively difficult to find a means of accumulating the interest on the present money, in order to secure the full value of the reversion; indeed, at the present time, the only means available is to invest in Foreign Government Bonds, upon which you will have to pay a commission of at least one-eighth per cent. upon every purchase. And this is not all, because in the course of fifty years (if we are to be guided by past experience) there can be no doubt that the value of securities, and Government securities of all kinds especially, will constantly increase in value; so that even assuming you are paid in the ratio of the present price of Consols, and Consols were your only means of investment, the probability is that you would suffer in the course of fifty years even by this arrangement. Now these considerations you will find have a very practical influence upon the value of real property, and I will give you a case in point, which occurred within my own knowledge. A certain nobleman was possessed of some very fine house-property, magnificent houses, palaces they might be called anywhere but in England, with unusually low ground rents, let on lease for a long term; they formed part of a large estate and were severed from it. A certain railway required the houses, and of course obtained them under its Act of Parliament, and of course the owner had to be compensated. Upon the part of the Railway Company it was contended that if such a sum were paid as would purchase similar ground rents, secured by similar property, that would be a fair measure of compensation. The difficulty in this particular case, however, was that, having reference to the class of house, the ground rent was exceptionally small, and that it was extremely difficult to find property of an exactly similar class. This rendered it almost impossible to carry out this suggestion, which was admitted by the owner's agents to be fair and reasonable.

Now, what the owner's surveyor contended for was, first, that however long the term upon which it might be let, house property never deteriorated in value in London, no matter however dilapidated it might become or however the fashion of the locality might alter, but would be just as valuable a century hence as at present, in consequence of the decrease in the value of money and other causes. I do not remember that this proposition was disputed by the Railway Company's agents.

It was also contended that the owners would prefer keeping an integral estate to being obliged to watch yearly the increment of the present money to be paid for compensation for the reversionary value, and that such an arrangement, was less favourable to him than the retention of the property as part of his estate. It was also pointed out that the rate of interest at which the deferred value was discounted was an important element in the calculation, inasmuch as the greater part of the compound interest accrues in the latter part of the term. If the calculation were made as we anticipated, the Railway Company would make it on the 4 per cent. table, or on the $2\frac{3}{4}$ per cent. table at what latter rate the claimant's surveyors valued the owner's interest, would make a difference as between 13·2 and 5·6 entirely arising out of the question as to what should be the sum of money to be paid, which accumulated at compound interest, would be sufficient to recoup the owner at the end of the number of years, when he would become entitled to the reversion. The matter was referred to the arbitration of a Barrister; I did not hear the arguments on behalf of the Railway Company, but the result was, that the sum awarded was considerably below the amount claimed, being in the proportion of 7·8 to 13·2. Notwithstanding this, I think that the claimant's view was perfectly legitimate, and the ground of claim entirely reasonable.

There often exists what is called a dormant value in property. Assuming a lessee has possession of land in the environs of London, for instance, at Clapham, upon a lease, granted eighty or ninety years ago, when Clapham was a suburban village, the rent paid would be, perhaps, at the rate of £10. per acre, but the land would now be worth say from £60. or £70. per acre, or even more, if it could be used for building purposes, but the lessee cannot so dispose of it, his interest being too short to permit him to do so. The lessor cannot deal with the land as he is not in possession, therefore the value of the land is dormant or undeveloped, as long as the original lease lasts; and, although it may be said the purchaser might compensate the lessor for his expected interest by payment of such a sum of money as being accumulated at compound interest, during the residue of the term, would equal the future value of the estate; practically, this accumulation never does take place, and a purchaser, having bought both interests, enters into immediate possession of the land and reaps a large advantage by the transaction.

As an illustration, let us suppose a case in which a lessee holds an estate of fifty acres at £10. per acre, for a residue of ten years. This, as a well secured rent, would, to the owner in fee, be worth, on the 4 per cent. table, 8·1 years purchase or £81., and the reversion to a rental of £70. per acre (the estimated value at the end of ten years), being an unrealized ground rent, is worth say twenty years purchase, and deferred ten years valued upon the 4 per cent. table, would work out thus—

$70 \times 20 \times .6756$	=	£945 16 0
10×8.1	=	£81 0 0
Total Value - -		£1026 16 0

Which is all the purchaser would pay. Now assuming it were in hand, taking the same annual value as before, namely, £70., worth as an unrealized ground rent twenty years' purchase, this would give as the value £1400., so that the purchaser who could utilize the ground at once would appear to realize £373. by this transaction, because he extinguishes the dormant value. It is true he would have to compensate the lessor for his leasehold interest of ten years, but as ten years is not a building term, the utmost profit rent the lessor could claim would be probably double the rent paid of £10. a year, or say £20., being a profit rent for ten years, but this would be capitalized at the best at the 5 per cent. table, or £10. per annum for ten years, on this table worth 7·2 years' purchase, or £72., which, deducted from the profit of £373., still leaves over £300. profit.

It is customary to value land which is unlet, but has a fair prospect of an early letting at twenty years' purchase, as an unrealized ground rent, but I have always held that whenever an agreement for letting is signed, it is a proof that the value is real and no longer speculative, and that, although the ground rent may not be secured by the erection of any building upon the land it is worth more than twenty years' purchase. When once a building is erected the land attains its full value, because the ground rent is thenceforth secured.

Time does not allow me now to do more than refer to one point I noticed at the commencement of this paper, namely, the rate of profit to be allowed to the builder:—Evidently this will vary according to the skill with which the building is designed and erected, and its perfect suitability for the locality it is placed in. Obviously an ill suited building will realize a less rent or less profit than one that is well suited to the locality, assuming both to be built on land of the same actual value. Any return beyond the current rate of interest for money (which is practically 5 per cent.) is a profit to the builder. Sometimes the profit is added to the ground rent, and what is called an improved ground rent is created which is saleable at a greater number of years purchase than a rack rent.

It would no doubt have added to the reality of this paper if I could have given the names of some of the parties concerned in the cases to which I have referred, but I have refrained from doing so, fearing lest I might in some way prejudice their interest in their property.

Mr. E. J. Smith (Vice-President Institution of Surveyors) responding to the Chairman's invitation to commence the discussion, said—As a visitor, I did not expect to speak upon the extremely interesting subject so ably put before you this evening; although, knowing that I should take an interest in it, Mr. I'Anson informed me of his intention, to read the paper, and said that you kindly received strangers. I should certainly begin by noticing how completely our friend has exhausted the subject, by his almost panoramic presentation of the situations at the centre and east of London, which have special or peculiar value; and it certainly adds to the interest of the subject, to consider that in some of these cases the localities referred to have been occupied by tradesmen in the same line of business for as much as 800 years. The fish-market for instance, is found, in its present situation, in the very earliest records of the City. It is evident that, as from time to time, the trade of the City has extended itself, the various growing occupations have settled themselves each in its own immediate neighbourhood, in order that the members of each might be able to communicate with each other. This Institute is itself a recognition that such intercommunication is indispensable. The second part of the subject, viz., that of the right principle of the division of any fee-simple value between the lessees and the lessors, as owners of the reversionary interest, is a subject which circumstances forced upon my attention more than thirty years since. At that time it was undoubtedly the custom of the profession generally to calculate the value of the reversionary interest, by taking discount on the fee-simple value, on the scale of interest indicated by the number of years purchase, at which the estate in fee-simple was estimated. Supposing a house was worth £500. per annum net, and the net rent was taken at twenty years' purchase, giving £10,000. for the fee-simple. It was, about the year 1840, the invariable custom to discount the £10,000. at 5 per cent. and give that share of the fee-simple value to the owner of the reversion. That system was challenged by the owners of large reversionary estates, by the church and corporations generally, and from that time to the present there has been a constantly increasing admission on the part of the profession, that that system was based upon a mistake. I have never heard the principle of the rate of discount being carried down to $2\frac{3}{4}$ per cent., so ably supported and defended as I have heard it this evening; and I am sure that when

you give to Mr. I'Anson's paper the consideration which it deserves, you will feel disposed to concur in the views so ably set forth, and that it will tend very much to the placing of the valuation of reversionary interests on a sounder basis than that heretofore usually accepted.

Mr. JENNINGS, Fellow.—I think there is but little to be added upon this subject, but in a few words, I can confirm Mr. I'Anson's remarks with respect to the large amount of local knowledge which one ought to possess in dealing with valuations of this kind, and that advertising for the highest rent is not an absolute test of what the value of property is. I can mention an instance in a public company, in which they did advertise, on the principle of getting the highest rent they could. They asked my opinion, and I put it at £80., and they received a tender for £150. I expected there would be tenders, but in a short time the man failed. Mr. Flight got possession: he, of course, never became personally responsible. His tenant locked up the house and left, and there was a loss of a year's rent. The real reason why the property was not so valuable was the fact that the lane got choked, and it was impossible to make the City keep it open for small houses, while there were other houses more important in the rents they paid, and the house is now let to a responsible tenant at £80. per annum. With regard to alteration in value, it has been most wonderful in the City, but it has not been invariably the case that the whole of the City property has increased in value. Not long ago I was looking over the books of an ancestor of mine respecting some property just out of High Holborn, more than two centuries ago. He bequeathed it to a public company. I looked into all the rents that were paid, and when I made arrangements for letting it for the company, after 200 years, the property was only yielding at the same rent as it did 200 years ago. It is now let on building lease at less than that rent. The constant alterations of the streets has, no doubt, been one source of alteration in the value of property. In a central situation, the lease of a house expired, which I let 21 years since at £86. per annum, and recently for £200. for 21 years. The tenant could not make it answer, but now he has a lease for sixty years at the same rent, and has rebuilt it, and it pays him very well. It depends very much upon the management of property whether it pays well or not. There is one point which has not, I think, been sufficiently referred to, and that is the value of leasehold property subject to high ground rents. It is hardly possible to enter into the details of that now, but it is clear that when the ground rent is large the value is decreased, because the "empties" involve not the mere loss of rent, but having to pay a ground rent during the time it is empty.

Mr. E. ROBERTS, Fellow, said,—No one who has any knowledge of Mr. I'Anson, of his ability, experience, and capabilities could have doubted that he would produce an excellent paper, as he has done, and that he would as nearly as possible exhaust the subject; and I rise not for the purpose of adding to his observations, for I think it almost impossible to increase the value of what he has said, but to propose that the Institute should offer its best thanks to him for the paper he has so carefully prepared. The title of the paper would have induced one to think it had reference only to the principles of valuing, but Mr. I'Anson has carried it beyond, into the principles of compensation. Of course in the reading of such a paper within the limits of one evening it is impossible thoroughly to exhaust the subject. There are other topics of valuation which could not well be brought in in one evening. The paper is a long one, but not too long to engage our attention throughout, and the subject has been dealt with in a way that every one could follow; and all can appreciate and understand it. Most of us, probably, have had more or less of practice in this particular branch of the subject, and in my own case I may say I have made some calculations with respect to the valuation of reversions, which, although no doubt Mr. I'Anson is familiar with, in the multiplicity of his topics he has not touched upon. It is with respect to the question of the division of the value of property between the owner and the occupier. As Mr. I'Anson accurately puts it, there is first the value of the land, and then that of the buildings upon it; but it is

to be observed that the two interests when in separate hands are antagonistic. If we take the ordinary assumption that the ground rent should be one-sixth of the whole rent, and assume the ordinary table on which compensations are calculated, and compare the value made of the whole and the two separate interests, it will be found that they are inconsistent; thus, assuming that freehold property in possession is worth twenty years' purchase, and take a rent of £ 60. a year as one easily divisible into sixths, then the value in possession will be £1,200.; while, if we divide the interests, it will show twenty-five years' purchase of the £ 10., and $16\frac{2}{3}$ years' purchase of the £ 50., or £1,084., or a difference of nearly £116.

Therefore, the value in the one case being £ 1,200. and in the other £1,084., the purchaser, buying the freeholder's and the occupier's interest separately, gains an advantage of £116. or thereabouts. A very useful way of dealing with a purchaser, whether you are calculating for the freeholder or the occupier, is to value at 20 years' purchase, and deduct the other interest from it; and in that case the purchaser would pay £116. more for the whole than the two separate parts. But perhaps the truth lies between the two. The ground rent should be taken at 4 per cent., and of the rent one-sixth is apparently not a fair proportion (of course in London it is considerably higher); therefore the occupier is entitled to either a share of the value of the ground rent or a smaller percentage than 6 per cent. The exact ratio to produce a sum equal to 20 years' purchase, is two-fifths for ground rent and three-fifths for building rent.

In a compensation claim I had to conduct at Brompton, the ground rent was similar to the case mentioned by Mr. I'Anson, viz. one sovereign ground rent on houses worth £ 200. a year. I produced evidence of similar ground rents having been sold for a higher sum even than Mr. I'Anson mentions—viz., 50 or 60 years' purchase, and I succeeded in getting a sum nearly equal to that. The advantage of that Mr. I'Anson has not touched upon, simply because he could not refer to every collateral subject; the acquisition of the £1. per annum at 50 or 60 years' purchase converts your interest at the 6 per cent. table into one at the 5 per cent. table; besides it gets rid of all the covenants which an occupier is under to his landlord. The gentleman who spoke last, our visitor, Mr. Smith, mentioned another subject which has been a fruitful source of discussion for some fifteen years or more, viz. the table on which reversions should be calculated. It was the custom, I know, from my own experience, always to discount on the same table as that on which you calculated the value; but it became invaded by another principle, viz., that you being entitled to so many sovereigns at the end of the outstanding term, should require a sum to be now invested at a small interest in such a way as that it would accumulate to that sum at the end of the term. Mr. Smith says that is a fair and reasonable way of calculating, but in practice I have been met by the observation that it is unfair and unreasonable. It depends upon which side the calculation is made whether it can be looked upon as fair and reasonable or not.

There is one point on which I must say I differ slightly from Mr. I'Anson. I have never found anyone who, in dividing £100. of rents into ground rent and building rent, did so by taking one-fourth for ground rent at 4 per cent., and three-fourths for building rent at 5 per cent. I have never found any to take the building rent higher than 6 per cent. He probably was referring to a very high class of property, and in that case the interest is unquestionably less. I may mention that a rather peculiar matter of business came before me some few years ago, and I think I was, on that occasion, the originator of a new mode of calculation, for damage occasioned by reason of injury in respect of light and air. I think we might assist each other by mentioning our individual experiences, more than we do. I am afraid architects are more inclined to keep their knowledge to themselves than engineers and other professions. I think we should communicate freely our experience, and that we ought not to be so reticent as we are. My new method of calculating the damage in the case I am about to speak of was this:—There was injury done to three or four houses by interference with light, and it was conceded that the injury amounted to £20. per annum in each house. They were let on

a long lease, of which about forty years were unexpired, at £40. per annum each house, and it was admitted they were worth £60. You perceive £20. of injury reduced the value of the houses to that at which they were let; therefore they were less securely let, though it was contended by the professional representatives of the defendant that the damage would not accrue to my client, the freeholder, till the forty years had expired, his estimate of the damage being put at about £220. But I estimated it in another way. I said that the value at the present moment was lessened, because the security being diminished, if the owner had to dispose of the houses they would not sell on so good terms by at least 1 per cent on the tables. The effect of that calculation was to make the damage in money about £1,070. Upon that we joined issue, and called in our late fellow, Mr. J. Shaw, who gave, within a few pounds of all I asked. That showed there was some reasonableness in the calculation, and I commend it to the consideration of my friends.

Mr. ARTHUR CATES, Associate.—I desire to express the great pleasure with which I have heard the admirable paper of Mr. I'Anson, and to second the vote of thanks which Mr. Roberts has so well proposed, and so ably supplemented by his own extensive experience. The subject which Mr. I'Anson has brought before us in so interesting and detailed a manner is of so wide a range, and has yet been dealt with so exhaustively, that it is difficult to select for remark one portion in preference to another; but the latter part of the paper, in which he treats of the manner in which reversionary interests should be valued in present money is perhaps of the greatest importance, certainly so to vendors. He has there well shown the difficulties which attend those re-investments which must be annually made in order that the full amount of capital may be secured at the end of the deferred period—or rather he shows that on the table ordinarily adopted for the calculation of the present value of such reversion, such re-investments as will secure the capital sum are not possible; and Mr. Edmund Smith has in his remarks added much to the strength of Mr. I'Anson's position. There are many elements which may come into consideration when this subject is discussed at greater length than is possible this evening, such as what is called the "market value"; but a vendor by compulsion will always appreciate the soundness of Mr. I'Anson's position. The whole of the paper hardly yields in interest to this subject, and I beg leave to again express the obligation we owe to Mr. I'Anson for the clear and lucid manner in which he has laid it before us, and to second Mr. Roberts's motion.

Mr. C. FOWLER, Fellow.—In illustration of one of the points referred to in the paper, I would allude to the importance of ascertaining the peculiar conditions of a neighbourhood and of the property in it, with respect to the value of any property we may be called upon to deal with. As an instance of this, I may mention that some years ago I was concerned with some property belonging to a corporation which was let for long terms upon moderate rack rents. My client wished to rebuild, and did rebuild, and not unnaturally expected that the rent would be at least somewhat lower than the rent hitherto paid as rack rent; but when I came to communicate with the surveyor of the corporation, he extinguished the hopes of my client on that point, as he said he should not only expect us to pay the rent that had hitherto been paid as rack rent, but if we wanted the term extended, a still higher rent would be asked. The result was that my client had to pay an additional £10. or £20. a year, besides the interest of all his outlay. That was to some extent a surprise to me, for I did not think the neighbourhood warranted such a very high price for the ground rent; but the surveyor of the corporation, no doubt, had good reasons for his view. I mention this to show the difficulties surveyors sometimes meet with in putting a value upon ground rents.

Mr. J. W. PENFOLD, Fellow, in response to a call from the Chair, said:—I can add but little to the interest of the discussion from which, and the paper, I gather it is admitted, as well in this room as outside, that there are *two* modes of valuing, one to be adopted when you want to sell a property, the other when some one else wants to buy it. Our friends Mr. E. J. Smith, Mr. I'Anson, and others,

who represent large corporations possessing valuable reversions, very properly—for themselves—adopt the higher tables of value for such interests, wisely holding on and saving, as Mr. I'Anson says, their income tax until a time when I suppose they fondly hope it will be less than it is at present, perhaps abolished. If these gentlemen, however, brought their reversions into the open market, as others are sometimes obliged to do, I fear they would not realize the large prices they can now obtain from shareholders wishing to improve the "quality" of their estate by securing the fee-simple. Mr. Roberts, as I understand his remarks, seems to suggest, that purchasing companies committed an injustice when they acquired the lease and the reversion separately, at a less price than they would have to give for the fee-simple in possession, but it must be remembered, that though several parts, when fitted together, might complete the whole, the substantial value might only arise when they were so fitted. Thus the legs and top of a table might, separately, be of little value to the owners, but the man who bought them up and made a table of them is manifestly entitled to the profit of the transaction.

Mr. C. F. HAYWARD, Fellow.—I understood Mr. I'Anson to state that the value of property in London had never decreased, whatever there may be in difference of locality and change of circumstances. If I rightly understand that, I think it is a rather broad statement, and I should be pleased if in some way Mr. I'Anson enlarged upon it. Again, there are cases where the value of land is positively destroyed by what is put upon it, so that owing to want of judgment, or other causes, it becomes of less value when covered than when unencumbered by buildings. This is important for us as constructing architects to remember, and as surveyors to consider in our valuations, for there is no table to apply to in such cases. I have myself seen so many examples of such disturbing elements in calculations of values, especially in laying out new property, that it strikes me as one of those things which ought to be noted in discussing such a paper as the present one.

The vote of thanks having been passed by acclamation,

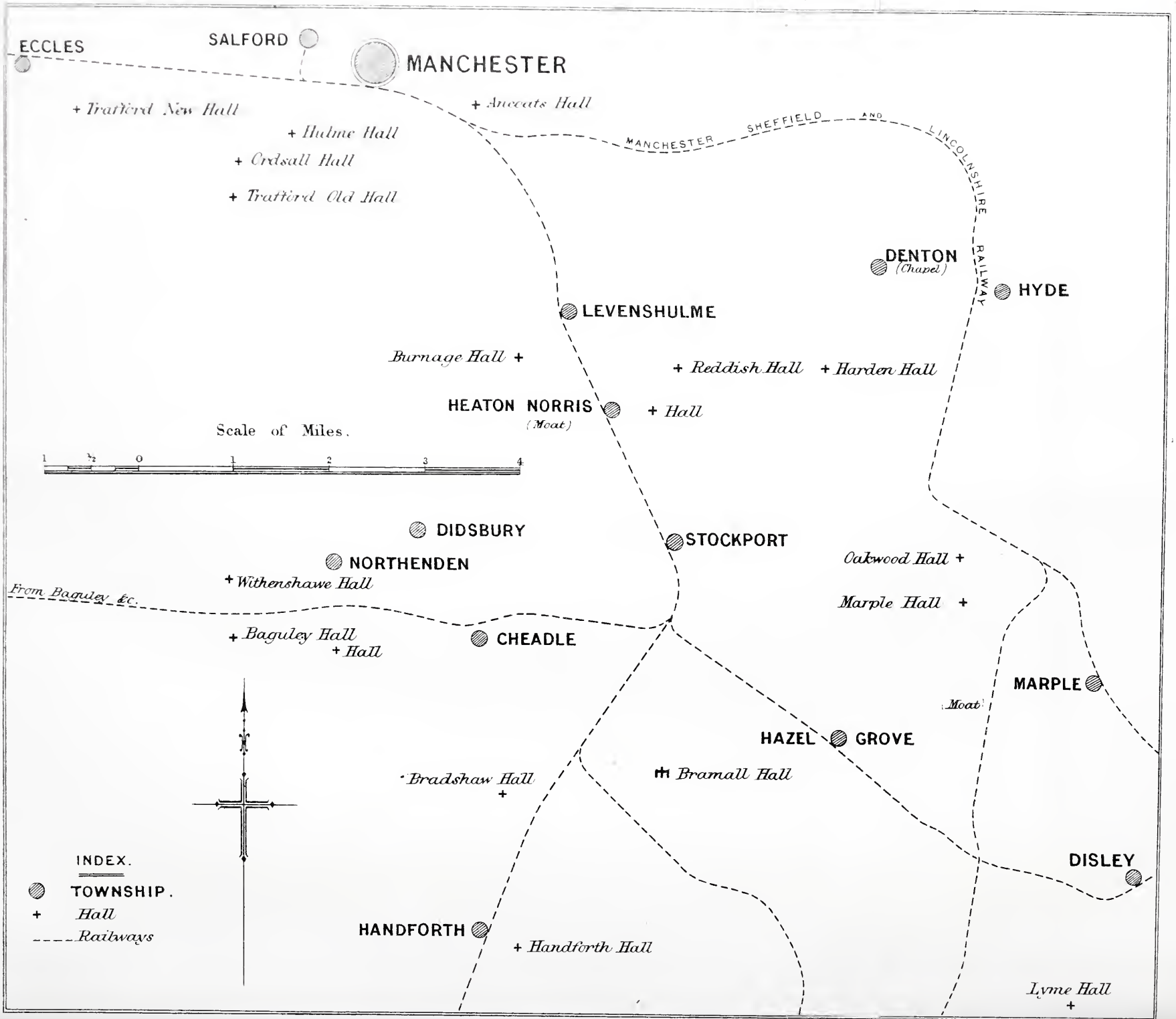
Mr. I'ANSON said:—I beg to thank you, gentlemen, for having listened so patiently to a rather long paper of a much drier kind than those usually brought forward. I also thank Mr. E. J. Smith, from whose experience and good judgment in matters of this sort I have often had reason to profit, for attending upon this occasion. My friend Mr. Roberts pointed out what seemed to him rather impracticable in my paper, viz.: the valuation of leasehold interest upon the 5 per cent. table. I do not myself, as a rule, adopt this table, but used it merely by way of illustration. I think, with Mr. Roberts, that the 6 per cent. or 7 per cent. table is the more applicable to leasehold interest. In reference to the remarks of Mr. Hayward, I would repeat that, as a general rule, the value of property in London does not decrease. In fact, the rack rent of buildings, which twenty years ago was a good guide as to what should be the ground rent on granting a building lease, is no longer a guide, for in many cases what was a rack rent twenty years ago for land with a building upon it, would now be an insufficient rent for the ground alone, which is, I think, a proof that the value of land does not decrease, but is on the contrary, increasing.

The meeting then adjourned.

ERRATUM.

In the Letter from M. Pauli, of Ghent, published in the last Sessional Paper, No. 2, the word (*sic*) and a foot-note were inserted on page 37, to explain an apparent clerical error.

From a subsequent communication it seems that the MS. was right as it stood, and the paragraph must therefore be read *without* this correction.



C H Heathcote A.R.I.B.A.

OLD HALLS IN THE NEIGHBOURHOOD OF MANCHESTER.

SKETCH MAP OF THE DISTRICT

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, the 16th of December, 1872, the following Paper was read—T. H. Wyatt, President, in the Chair :—

THE OLD HALLS IN THE NEIGHBOURHOOD OF MANCHESTER.

By Charles H. Heathcote, Associate.

I must apologize for having, since it was originally announced, changed the subject of the Paper which I have had the honour of preparing for this Institute. The reason for doing this arose from my having found, as I think you will agree with me, a more original—I will not say a more interesting—subject than "The Architecture of Chester," in "The Old Halls in the Neighbourhood of Manchester," which have not been sketched or written about to any extent. Although South Lancashire cannot compete with any other English county in the matter of ecclesiastical architecture, yet I think it can hold its own in samples of ancient domestic art. We can here boast, within a radius of a few miles, of a country abounding in such antiquities. It is my present object to bring under your notice, to the best of my several abilities, the principal of these, illustrating a few of them by means of pen-and-ink sketches. By taking a slightly larger area than the "few miles' radius," I should have to mention such as Haddon and Chatsworth—halls of the greatest possible interest, no doubt, but of which full and graphic descriptions can be obtained at any bookseller's shop. Of such I wish not to speak at present, but rather of those that have seldom been, if ever, the subjects of any publication. I shall even include one or two that have recently been pulled down to make way for modern improvements. Of the class to which, therefore, I propose directing your attention, the south and south-east of Manchester afford the more plentiful supply, and, accordingly, in that direction we will proceed at once, starting from Stockport and skirting the whole of Manchester.

Stockport, a place of importance as a military position from the time of the Romans to the Conquest, is about five miles from Manchester. Till the time of Henry the Second a castle stood on the site of the present Market Hall, and must have been a perfectly impregnable fortress before the introduction of cannon into the art of war. Under one side of this abrupt elevation is a street following the line of the old Roman road, and contains a picturesque old half-timbered house, now used as the Bank. With the exception of the principal front and what is now the bank room, the building is modern. The bank-room, with its wainscotting and chimney-piece, has somehow managed to escape. On the shields ornamenting the latter are emblazoned the arms of the Ardernes of Arden, a family which, for several centuries, made this house their occasional residence. This family were the founders of Arden (or Harden) Hall, about two miles from Stockport, and not to be confounded with a castle of the same name in South Cheshire. It is highly interesting as a fine example of the domestic architecture of the sixteenth century. The site chosen is excellent, being far enough down the hill-side to shelter it from the full force of the wind coming in that direction, and, at the same time, overlooking the fine valley of the Tame, and a good stretch of country. The moat is perfect; half of it, even now, being full of water. A visitor cannot help noticing that man, far more than time, has caused the ruin of this house. Beams have been torn ruthlessly from their hold in the walls, and the woodwork taken by the farmers for their own use. I even saw, when I lately visited this interesting ruin, a piece of a beam

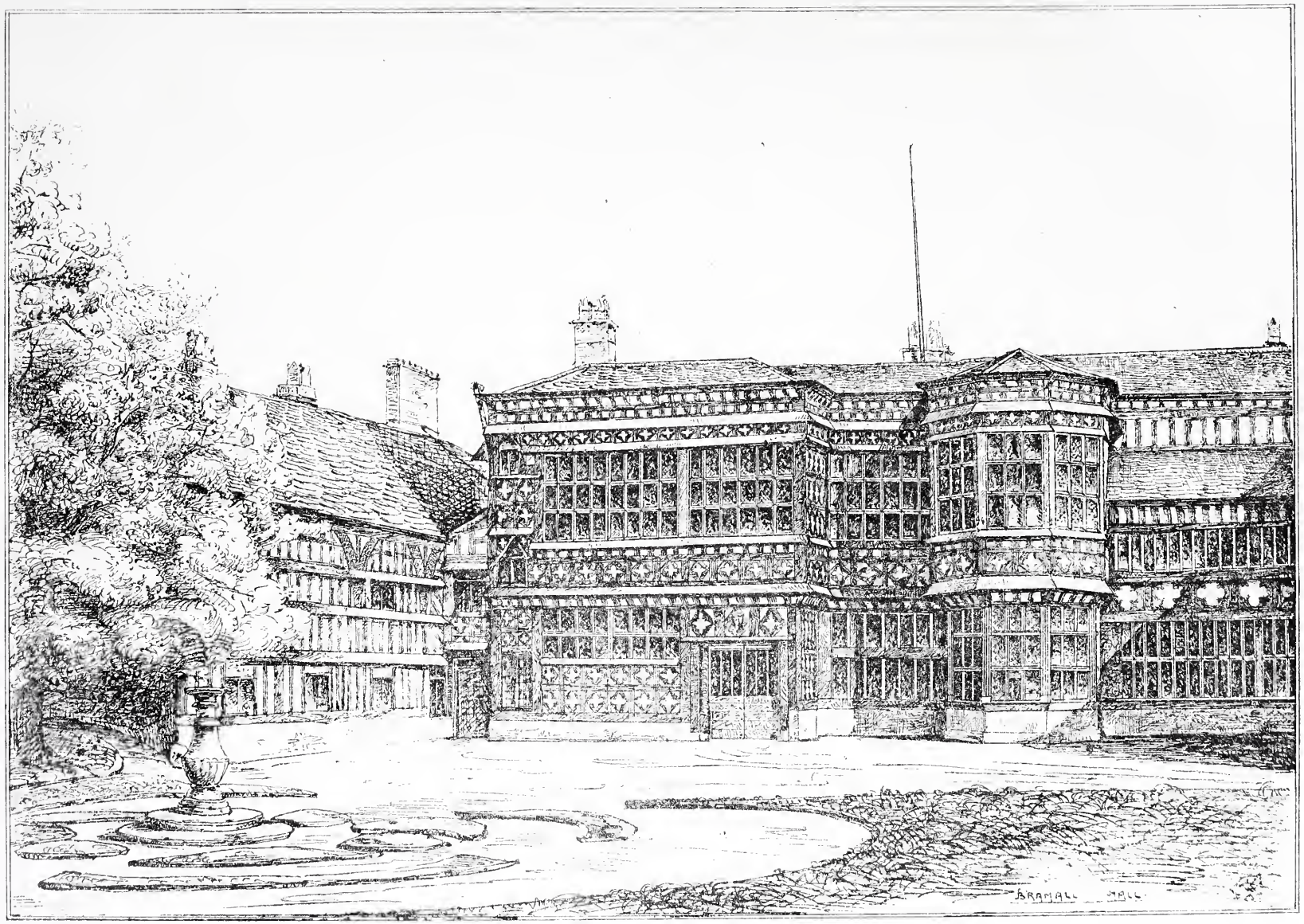
burning in the grate of the farm house adjoining! In some cases the lintels have been taken out, as if to hasten the ruin. Its original state is thus described in an old local history: "The ground plan resembles the letter T. The hall is very lofty, and is wainscotted about three yards high, the upper part being plaster; but nearly the whole surface is covered with a very unusual number of ancient family paintings, the greater part of which are going rapidly to decay. The rest of the apartments are small; some are wainscotted, and others have ceilings ornamented with pendants; and in one apartment is an ancient carved oak bedstead, probably coeval with the hall itself." Another work (Aikin's 'History of Manchester') gives quite a different account of it, in many respects, before it became the present ruin. It runs thus: "It is said to have been once occupied by John of Gaunt, but it is now no more than a farmhouse. It is surrounded by a moat, kept in good condition. The building is of a Gothic design, composed of a centre and two wings, making the figure of an H (!!) The centre part on the ground floor is all one room, very large, awkward and high. The windows are large, but give little light. The walls are wainscotted to the ceiling." The other history says three yards high, which is most certainly correct, as some of the plaster above that height is still on the walls. We all know what happens when one gets between two stools, so I think it the wiser plan to describe it as I saw it myself, and draw my own conclusions as to the original status of the place. The ground plan certainly resembles neither a T nor an H. The main entrance door is at the side, and not, as is usually the case, in the front of the tower, and was approached by a broad flight of some four or five steps. The tower made an ante room or vestibule to the large hall. I think it was a much wiser plan to place the door at the side in lieu of the front of the tower, for it prevented direct draught into the hall. Exactly opposite the doorway leading into the hall from what I am pleased to call the ante room or vestibule, is a similar doorway into the staircase tower. This winding staircase is built entirely, including the central newel post, of oak, put together with oak pins—a form of joinery we should do well to imitate now-a-days, especially for outdoor work. There have evidently been basement, ground, first and second floors. On the ground floor was the great hall, 33 feet long, in addition to the raised platform at one end of another eleven feet or so, and 24 feet wide, but yet so low as to necessitate windows at both ends and both sides. I feel convinced this was a comparatively low room, notwithstanding the extracts I read from the local histories. In a sketch of the hall exhibited this evening, I have taken especial care to obtain the right proportions in order to prove more clearly what I say. It will be seen that the room could not have been above 12 feet high in the clear; but though low, it must still have been anything but meagre in appearance. The ceiling was divided into bays by large moulded oak beams, between which the joists (13 by $3\frac{1}{2}$ oak, and double joggled $4\frac{1}{2}$ inches into the beams at each end) ran, leaving the underside of the first floor planks discernible. The main entrance door and the hall fireplace can be seen on my sketch. Part of the hall is now the dairy for one of the farmhouses, built a little later than the hall, standing within the moat. The gable ends of these houses towards the hall are half-timbered. The woodwork of all these half-timbered houses are put together with oaken pins. It is mainly, I think, for this reason that so many of these exteriors are still in such good preservation. The tower lantern is in tooled stone, whilst the remainder of the walls are built in parpoints. About three miles from Arden we have a half-timbered chapel-of-ease at Denton, with a lich-gate of the same period. The old timbers of the chapel have been boarded over, and the boards painted in imitation of the woodwork construction underneath. A new chancel, etc., have recently been added, under the superintendence of an architect, who has certainly carried the spirit of this style of building into his work.

To the east of Stockport we have *Marple Hall*, another most interesting specimen of domestic architecture. It is situate on the edge of a hill, and raises its ivy covered fronts over numerous

surrounding stables and offices. The principal front is within a square court, and was originally finished with gables, bay windows, and a tower over the entrance. This latter opens to a low hall and an ancient heavy staircase, hung round with armorial paintings, plans and family portraits, and leading to small but numerous apartments. But the extensive stables and offices are the chief attraction, I think; certainly the more picturesque. They are built of red sandstone, and having quaint gables, and a tower (containing a peculiar old clock) finished with stepped gables. These stables are now deserted. At the back of the house is a terrace, which intervenes between the mansion and the precipice, and looks on to a green sward, backed by a wood on a "rising knoll," not a quarter of a mile from the hall, but completely shutting it up in its own precincts, and making it one of the most secluded spots imaginable, especially being, as it is, so near the great centres of industry and factory chimneys. Beyond the knoll runs the river Goyt. It is a wonder that in the olden time the monks did not pitch on this spot for some grand old abbey of theirs, for here they have broad lands, a fine fishing stream, romantic scenery, and withal a grand site for a church—which four items seem to have formed the weightiest considerations in the choice of their locale. In the centre of the green sward before mentioned we have a pond with an island, containing what is there termed a "grotto." And it is well named, for it is not an ordinary summer-house, like most would-be grottoes, but is a charming retreat in a delightful spot. When the sun shines into this valley the effect must be splendid. The pathway leading from the terrace above to this grotto beats even the zig-zag at Clifton. By passing over the knoll in the front, we gain a splendid view of Oakwood Hall, situated on the summit of a hill, rising abruptly from the river Goyt. The site is grand, and the hall, when viewed from a distance, shews a mass of building well befitting such a position. But on closer inspection all ideas of architecture are found to have been thrown to the winds, leaving nothing but that which is debased. *Oakwood* and *Marple* halls are not three-quarters of a mile apart, but a detour of several miles is necessary to drive from one to the other. I have often noticed that halls which could not, or rather did not, possess *moats*, were built in what may be termed "couplets," *i.e.*, built so near to one another that in case of any sudden danger arising it would be matter of no great difficulty to acquaint your neighbour of the need of his assistance. This is the case with Marple and Oakwood, Withenshawe and Baguley, and many others I might mention. It will generally be found, I think, that such were built considerably later than those to which we find moats, say, in the reign of Elizabeth, for the country till that period was in anything but a tranquil state and necessitated the best preparation for defence that could be devised. Although towards the reign of Elizabeth tranquillity was somewhat restored, yet a want of confidence still prevailed. Thus the gentry, deeming the moat unnecessary, still wished for some semblance of security against danger, which, if not probable, was at least possible. This desideratum they found in unity, and thus we find, at this period, the greater portion of the houses built in couples for mutual protection.

Bramall Hall is situated about three miles south-west of Stockport, and when approached from that direction, presents an unusually striking appearance, exhibiting a long line of picturesque irregularity. It stands on a considerable elevation, near the bank of a rivulet, is well backed by woodlands, and is certainly the finest and most perfect example of a bonâ-fide half-timbered house near Manchester. The building originally was quadrangular in plan, but the western side of the quadrangle was removed some time since. A porch admits from the court-yard into the great hall, now called the large dining room. The great hall, 36 feet square, is a fine room, with its bay window, old fireplace, and massive timbers. The whole of the furniture is of the same period as the hall, and supports such relics of the bygone age as black-jacks, cross bows, and armour of Cromwell's soldiers. At one end was formerly a passage through the building, as in college halls, communicating from the

courtyard to the front entrance, and still retaining the wicket gate in its massive oaken doors. A small room leading out of the great hall is now the library, and, besides being wainscotted, has a fine timbered ceiling, with wooden pendants at the intersections of the moulded ribs. The windows in this room are comparatively modern. By passing through the "saloon" we reach the laundry (now the billiard room) and the chapel, both of which have heavily timbered ceilings. The doors of the billiard room deserve attention, being three and a-half inches thick, and having handsomely carved middle and bottom rails. The old benches still remain in the chapel, and exhibit some curious carving of the style of architecture prevalent at the close of the sixteenth century. It contains the family vault of the Devonports, and was, until a few months back, in use as a place of worship. A spiral staircase, composed of solid blocks of oak, leads through an ante room and the "plaster room" to the drawing room, a magnificent apartment, standing over and being the same size and plan as the great hall. It is wainscotted nearly to the ceiling, only leaving space for an ornamental plaster cornice, on which the various branches of the Devonport family have their respective arms emblazoned. The ceiling is of plaster, divided into panels by richly moulded ribs, and highly ornamented with pendants. On the mantelpiece, which ascends to the top of the room, are the arms of Elizabeth, with the old French superscription, "Vive la Royne" (*sic*). This mantelpiece is of wood, but for some reason or reasons unknown has been painted white. The other woodwork—the mullions of the windows, the oaken floor, the wainscotting, the doors with their inlaid pilasters, the fine old furniture with carvings illustrative of the chase, even Dame Dorothy's spinning wheel, date 1600—is intact and perfect. The old lead work of the windows, in designs of the circle and the quatrefoil, is untouched also. Round the apartment is hung a fine series of family portraits. On one side of the room is the large fireplace, flanked by two recesses, from one of which a window commands the approach to the hall, and on the other side, occupying the whole length, are two bay windows, with a fine central six-light. Beyond are the "plaster room," and a bed chamber with its ante room. The plaster room, so called from the materials of which the floor and ceiling are composed, is at present a "young museum." It is lit at one end by a fourteen-light window, and has a richly moulded massive tie-beam of the roof shewing in the ceiling. It is full of such recollections of the early years of the hall's history, as a drum and harness left by Cromwell's soldiers, a fine old cabinet ornamented with brass work, buff coats, imperfect suits of armour, tapestry, and a child's crib and chair bearing the initial letters W. E. D., and dated 1663. A finely carved door leads into a very small chamber, lit by a couple of two-light windows, protected by old iron stays, and called the "Paradise room," from the fact of the whole history of the "Fall of Man" being worked on the counterpane of the bed in worsted, by the afore-mentioned Dame Dorothy Devonport—a work that occupied four years of that illustrious lady's time, viz., from 1610 to 1614, as the bed quilt itself sets forth. There are several small pictures round the wainscotting, all worked in worsted. By-the-by, the iron stay bars to the windows are placed *inside* not *outside* the window, and, in consequence, are as little affected to day by evil atmospheric influences as the day they were fixed. Ormerod, in speaking of this apartment, says:—"The entire arrangement of this little room is probably unequalled as a specimen of the furniture and decorations of the time." Another bed chamber here has moulded and panelled wainscotting to the ceiling, and contains a bedstead of the year 1605, or thereabouts, which is a really handsome four-poster. The back is divided into panels, richly moulded and carved, figures being cut in some of the stiles. There is a seat, worked in with the wainscotting, all round the room, including the space under the eight-light window at the end. The wainscotted ante room to this chamber is called after Queen Anne, in consequence of the chairs, cabinets, &c., being of that period. The staircase corresponding to the spiral one on the opposite side of the building is formed of solid oak steps, but is square, with quarter spaces, and supported on four



BRAMALL HALL.

EASTERN SIDE OF QUADRANGLE.

stout newels, at the angles of which are placed wooden handles in lieu of handrails. The hall belongs to the family of the Devonports, but is at present occupied by Wakefield Christy, Esq., to whose courtesy I am indebted for the opportunity of seeing over this fine house, and for this addition to my knowledge of domestic architecture. I was unable to see over the breakfast room and banqueting hall, however, these apartments being occupied at the time of my visit. I must, therefore, take refuge in Ormerod for a description of the latter. "A wainscotted apartment in the south-east angle leads hence to the banqueting room, which occupies nearly all that remains of the first story on the south side of the quadrangle. This singularly curious room is about 42 feet by 21 feet; the floor is plaster, and the sides are timber and plaster, painted with figures and foliage in imitation of tapestry. The roof is divided lengthways into six compartments, supported by massy arched timbers, the alternate ones being supported by uprights, resting on obtuse arches of oak, sprung from pilasters. The sides of these arches are ornamented with foliage, rosettes and quatrefoils, and finished at the top with an embattled moulding. There have been originally three windows in each side divided by upright mullions only, with highly carved Gothic heads. The central window on the north side projects out into the quadrangle, resting on a bracket below, on which, among some bold carvings in oak, is the shield of the Bramall family. These windows are filled with armorial bearings in stained glass." There was formerly a gallery running round a greater portion of the building, and was only taken down to prevent the falling of its own accord, and perhaps bringing a goodly portion of the hall with it—an event it promised very speedily to accomplish, if left alone. An old gallery similar to what this was exists still at Moreton Hall, near Congleton. Ormerod dates Bramall at 1483 to 1485, but, I think, is decidedly wrong. The date 1599 is carved in the wainscotting of the plaster room, and 1592 occurs in the ornamental casing of the drawing room doors. Habershon (in his "Ancient Half-Timbered Houses of England") enters elaborately, and to my mind successfully, into his reasons for fixing the date at 1592. There are several half-timbered houses in the neighbourhood, having connection with the hall in some way or another. I send a sketch of the eastern side of the courtyard or quadrangle.

Withenshawe Hall is a half-timbered structure, which has been much altered at various periods, and has received many additions and improvements from the late proprietor. A fair proportion of the original building is still preserved, but, even with the addition of the new parts, it is still much less extensive than formerly. The house was attacked during the civil wars, but though only defended by a few gentlemen and soldiers, a long siege had to be undertaken by the Parliamentary troops in order to accomplish their object. It is situated in park-like grounds of some extent and beauty, but is not of much interest to the architectural student. About half-a-mile hence, along a winding roadway, made picturesque by many a fine old tree, we reach

Baguley Hall, or rather what *was* Baguley Hall, for now it is nothing more than a farmhouse. The original building evidently consisted of a central hall, with two wings divided into apartments, and the porch, with a room over. All that remains of the former structure are two bays of the old hall, with the original half-timbered end, and the porch. The great hall, when perfect, consisted of three bays and an extra length of six feet near the doors, the central bay being larger than the other two, and containing a four-light instead of a three-light window. It is 28 feet wide, and has an open roof, framed together out of massive oak, richly moulded. These moulds are as sharp and as clearly defined as on the day they were made. The extra length of six feet I have mentioned near the doors is partitioned off some four or five feet from either wall by an oak screen of ornamental construction, rising from the ground and carried up to the roof principal. This was to prevent, to some degree, the draught from the doors annoying the occupants of the hall. There is a door at each side, directly opposite to each other, thus making as short a passage through the house as possible.

It has been before noticed that such passages exist in nearly all old halls and colleges, and examples given, as Bramall, Arden, &c. The wings of the old half-timbered building, and the other bay of the great hall, where the raised platform once stood, at one time shewed signs of giving way, and had, therefore, to be replaced by the then owners, who, less artistic than their ancestors, used bricks in lieu of oak. The porch retains the lancet-headed door, with the wooden label mould to the doorway. The great hall, once the scene of "wassail and of rout," now serves merely as a playground for children, and as a passage from one wing of the house to the other. It contains an effigy and two coats of arms, with the original colouring on them. The date of this building I ascribe to about the year 1590.

Lyme Hall is a large and extensive building, built of dark stone, and presenting, with the exception of the eastern side, plain and almost unbroken fronts. The northern portion is that first seen on approaching the Hall, and this front, its general plainness relieved only by an ornamental entrance in a very mixed style of architecture indeed, and two slightly projecting wings, presents a peculiar contrast to its background of moorlands, and the high grounds of the park in which it is situated. This park is very extensive, and partakes greatly of the varied surface and lonely character of the neighbouring moors. The northern front is approached by a square court, enclosed with iron rails. The fronts to the east and west, like that facing the north, are built in a plain style, but the eastern front is broken by numerous projections, and opens to a terrace on which is a conservatory 120 ft. in length. The principal front of this hall faces the south, and it seems as though the other side had been rendered as plain as could be, in order to allow as much ornamentation as the means at the disposal of the architect (!!) would permit. This front is, therefore, much more decorated than the others, possessing, in the centre, a large Ionic portico. On the eastern side of the court-yard or quadrangle, is the entrance to the hall. In the front of this is the large dining-room, placed between an ante-room and (what Ormerod calls) "a singular apartment, with the arms of the first James on the chimney-piece, and a representation of a stag hunt over them in stucco, with other compartments relating to the killing of the deer, and the various incidents of the chase, ranged round the room, also executed in stucco and painted." The large drawing-room, a wainscotted apartment, possessing an ornamented plaster ceiling, and the usual accompaniment of arms over the chimney-piece, is at the north-east angle of the court-yard. Under this room we have the domestic chapel. At the corresponding angle to that in which the drawing-room is situate is the library, beyond which in the south front is the principal staircase, and an apartment wainscotted to the ceiling, containing some exquisite carvings in wood by the celebrated Gibbons. These carvings, although very fine in themselves, and no doubt the most interesting details in the whole building to any one in the slightest manner acquainted with architecture or any of her sister arts, cannot outrival the carvings by the same hand at Chatsworth Hall, where the *chef-d'œuvre* of this wonderful carver is carefully preserved. In the upper part of Lyme Hall is one of those galleries which, I have before had occasion to remark, were usual in the houses of the nobility built in the sixteenth and the early portion of the seventeenth centuries. The park was, not very long since, celebrated for a breed of cattle such as at present roam in Chillingham Park, Northumberland.

Reddish Hall, taken down in 1780, was a fine half timbered house, with an elaborate front; the panels, formed by the upright and cross-pieces of timber, were filled in with quatrefoil patterns. It was probably built about the same time as Bramall. It was in close proximity to one or two other old mansions. I simply cite this hall to further and more clearly prove what I previously remarked concerning the later half-timbered houses being built in couplets for mutual protection, and by being so, rendering the possession of a moat of no great importance. This is again the case at *Handforth*, a village some four or four and a half miles from Stockport, and containing another example of the sixteenth century hall in

the half-timbered style, but of an entirely different mode of construction to those of which we have this evening been speaking. Of this class of structure there were several methods of timber construction in use, of each of which we have, more or less, many good and perfect examples now remaining. The simplest form is that of mere uprights, sustained by cross-pieces or ties, halved or let into the uprights in such a manner as always to show the straight line of the upright, and securely fastened to same with stout oak pins. The panels thus formed were filled in with brick, which was sometimes plastered or stuccoed. The gables of this primary period were filled in, between the tie-beam and main rafters (which were always visible flush with the exterior line of the wall) with struts, footed on the tie-beam, and running at right angles to the principal rafters, thus giving, as all true art should, the *real* appearance, and not the *sham* of support and strength to the purlin ends and roof, in addition to the ornamentation of the building. As this style of building advanced, the panels in the walls were filled in with diagonal pieces, alternating from left to right, and right to left, in a sort of imitation of the strutting in the gable ends. And this was not a mere filling-in for the sake of appearance only, for it gave great extra strength and bond to the whole structure. Still later the uprights and cross-pieces were so cut as to form quatrefoil and trefoil panels. It must be noted that when this was first done the forms of the quatrefoil, trefoil or what-not were actually cut out from the solid uprights and other pieces, and it was only at a somewhat later period that the wood, forming the outline of the panel, was made by itself and let into the uprights and the other constructional timbers.

Some idea may thus be formed of the immense timbers used in the construction of these houses, and used not only to serve one purpose but many. To cite from such as we have had under our notice this evening in support of this would no doubt be a better and a wiser course than to choose for an example some other hall. At Baguley then, for instance, the oak upright, against which the heavy principal of the roof butts, and into which the gutter-bearers, window heads, sills, and all the constructional cross pieces are tenoned, is richly moulded on the inside, moulded on the sides to form the window jambs, and on the exterior (for, although it projects some nine inches into the hall, it penetrates through the wall) is cut into, to form the quatrefoil panels, with which the outside is ornamented! To go still later with this history we have upper portions of buildings corbelled out to project beyond the lower, and many other such like methods of carrying as far as possible, but in strict accordance with ideas of picturesque architecture, this style of wooden construction. But like most things, especially when connected with our art, it was carried to excess. It is thus that we have huge square projections, with heavily timbered and plastered sides, awkwardly and uncomfortably resting on or over-reaching octagonal bay windows, with delicately moulded uprights, and presenting anything but a safe construction or good outline. The decay of this special phase of art commenced, I think, about the the year 1605. To carry ourselves still further into this subject we find the general ignorance of all art, the total absence of all art—feeling or love of anything even distantly approaching to architecture, culminating in the men who could deliberately fasten laths to the old timbers, and plaster them up from the light of day. But besides these several different methods of construction we have that of making merely an outer framework of wood, formed of much stouter timbers than those used in the before-mentioned periods, and filling the entire space between, except that required for windows, with brickwork, thus doing away with all stays and intermediate cross pieces. This brickwork was coloured, and wooden braces, stays, panelling, &c. imitated on it by means of paint. I will own that a few months back if any one had sought information from me in respect to my opinions concerning this class of structure, I should have declared it "debased in every sense." That it is debased in the sense of being a sham, and not in accordance with the principles of true art, I still think, and readily admit, but of its being so in the sense of the fall or decay of this particular line taken by

architecture I do not now believe. It is some time since my belief in these houses being the productions of an age ignorant of true art feeling was first shaken. I noticed in houses, otherwise bearing signs of being erected in the middle of the sixteenth century, or even earlier, this "sham" woodwork. Wishing, naturally, to sift the matter to the bottom, and find out for a certainty the period to which this painting and exterior decoration belonged, I looked for information in one or two of the few books we have on the half-timbered houses of this country, but in vain. I was then, of course, thrown back on the only remedy I had, which was to wait until, in my "architectural wanderings," I came across a building containing in itself these three particulars, viz.: the wooden casing, the exterior "sham" wooden construction, and lastly, but really the most important of the three, the date of the building affixed, and thus proving to what exact age—whether in the birth or in the decay of this section of Gothic architecture, we are to affix this style of decoration. The building containing the desideratum of these three particulars I find at Handforth. On the door lintel, which is carved and moulded in accordance with the latest Tudor architecture, is cut the following inscription: "This house was builded in the year of our lord God 1557 by Miriam Brereton Knight whom maryed Margaret daugher and heare of Willyam Handforth of Handforthe Chause and had issue 6 sonnes and 2 daughters." This, therefore, confirms me in saying that the original sham construction, shown externally by the paint, was not the offspring of debased ideas, but rather sprung from the desire to give a building a more picturesque appearance from a distance, and to mark it as one of more importance than those houses in use by the dependents on the hall, and erected in the vicinity. I am fully aware that what is known as "debased ecclesiastical architecture" was rife at the year 1557—the year in which Handforth was built—but we do not hear that domestic architecture commenced its decay at the same period. Indeed it was not so, for who would propose denouncing half-timbered halls and houses—the most picturesque in the land—as merely samples of "debased domestic art?" Who would think of applying such a term to quaint Chester, or to the buildings in Shrewsbury's steep and narrow streets? Further, and still for my examples to keep to the few halls I have described this evening, if domestic as well as ecclesiastical art was debased in 1557, how is it that we have such fine examples as Bramall building in 1592 to 1599? Some may say that very likely the exterior painting of sham construction was put on when domestic architecture *was* on the wane early in the seventeenth century. This, of course, was possible, but not at all probable, for, in addition to the painted portions seemingly working in with the other parts of the building, and of, apparently, the same date, at the decay, many houses, possessing true wooden construction, were covered up with plaster and stucco, as at Ordsall Hall, of which I shall shortly have to speak; and it is anything but likely that, whilst one set of men were carefully covering up from sight the woodwork, another set, within half-a-dozen miles, should be actuated by such different motives as to deliberately go to the extent of creating an outward appearance of that which the others were doing their best to destroy. I deduce from these points that the exterior imitation in paint of woodwork construction in these houses is no proof of their being built at a late period, or at an age of debased domestic architecture. Handforth Hall is in capital preservation, and is a good and fair specimen of that class of building of which we have just been speaking. The front is broken up by two projections, finished with beautifully proportioned gables. The main block of the structure is roofed in one good span. The ground plans of all these sixteenth century minor halls shew a marked resemblance. In by far the greater number we have one great hall, extending nearly the whole length of the building, and completely across the main portion. On either side, and sometimes at both ends, small projections occur, and in the centre another, generally made into a kind of tower, containing the main entrance and porch. Handforth possesses such; the uprights, which are of oak, and sixteen inches by twelve inches scantling, on each side of the porch, being carved

and moulded similarly to the lintel. It is worthy of note that invariably in half-timbered houses, of any pretensions, the woodwork never commences nearer than a foot to the ground, and is laid on a stone foundation.

Some time since a debating society, holding its meetings in Manchester, and having a rule that no paper read before it should be of longer duration than twenty minutes, boasted a member with the opinion that that time was amply sufficient for an essay entitled: "A history of Architecture from the earliest ages to the present time." The Chairman drily observed he thought it would prove, in the essayist's hands, a "rather exhaustive paper." My present position is somewhat analogous to the aspiring member, for as yet I have only given you descriptions, rough though they may be, of the principal old buildings to the *south* of Manchester. I think my wisest course, therefore, is to leave those that lie near Rochdale and Bolton, and to the north, as the subject of a future paper, and content myself, for the present, with taking up the few remaining in the immediate vicinity.

Within the boundaries of the city we once had many good examples of the houses of the nobility, shewing an impress of the sixteenth century. But, one by one, they are obliged to make way for the march of commerce and of trade. The oldest houses here possessed have been taken down, within the last few weeks, to afford a site for a new warehouse.

Trafford Hall, formerly enjoyed by a family of the same name, contains no special feature of interest. The greatest claim, in connection with it, to antiquity lies with the family, which traces its descent from ancestors further back than the Conquest, and which has built for itself a new and larger hall within a short distance of the old one. On the opposite side of the river Irwell, we have

Ordsall, a hall that, at one time, must have been as picturesque a half-timbered house, from certain points, as any in the neighbourhood. But it has first been spoiled, and then left to decay. The date when the building was undertaken was 1609, or thereabouts. One wing bears record to having been erected in 1639, but the other portions can easily be traced to an earlier period. The whole of the fronts have been carefully covered over with lath and plaster; the ornamental timbers serving as "studds" to which to nail the laths. Only one portion of the building is at present occupied —the other being deemed unsafe. To shew the rotten state of the building I need only observe that the floor boards, in one room, literally gave way under my guide, the present occupier, to whose courtesy I am indebted for viewing both inhabited and uninhabited parts. Some of the plaster covering at the back has fallen off (and my rule brought off some more), bringing to light trefoil and quatrefoil patterns in the woodwork construction. Projecting gable ends have been served no better than the walls, and would, no doubt, in the more substantial end of the structure, amply repay the "uncovering." I should like to know the reason of this casing, in vile plaster, of that in which even the most vulgarly trained mind would not fail to see something attractive. It could not all have arisen from a general debased taste. There must have been some ulterior object. In the present instance the old panelled wainscotting in the interior has been covered with canvas and paper, and even the oaken dado, in one of the principal rooms, has been painted and grained in imitation of the very wood of which it is made! It would have puzzled some of the architects of a century and a half back to get much lower in ideas of art. I am happy to say this is only the case in the portion of the building at present not in use. The staircase presents the most perfect detail, containing two splendidly carved and proportioned newels, with turned balusters to match. The house can boast some quaint bay windows, and a very fine open roofed chapel, with richly moulded hollow wooden piers. Tradition says the 'Guy Fawkes' plot was first mooted and conned over in this hall, but considering, as I do, that the place was not built till 1609, it naturally follows I do not, in this case, believe tradition; the plot having burst in 1605, as we all know. In the farmstead we have a fine example of an open-timbered barn of the age.

Within half a mile of Ordsall, but on the opposite bank of the stream, there once stood an old building known as *Hulme Hall*, which was taken down about fourteen years ago. I send an etching of it as it appeared thirty years since, taken from one by the late well known artist C. A. Duval, Esq. I find the following account of the place in a Magazine called "Characteristics of Manchester," published monthly in the year 1842, but which was only short-lived, it is to be regretted, through lack of support:—"That old chateau, evidently in its last stage of decrepitude, is Hulme Hall, the scene of Mr. Ainsworth's first romance, '*Sir John Chiverton.*' In the days when he and I (*i. e.* Horace Heartwell) were young, what a fine place do I remember it. Approaching it from the north, and crossing, by an old dilapidated bridge, the river Medlock, which here empties itself into the Irwell, you passed through a fine meadow with a line of tall and noble looking beech trees planted on its margin; then turning to the left, you came upon an ascending slope of rich greensward, on the extreme brow of which stood the old hall, with its white front and intersected black beams, its foundation a red sand rock, overhanging the river Irwell, with a narrow footpath only intervening between the latter and the mansion. Down to this part of the stream there was a steep winding path, thickly covered with brushwood, and a sloping ledge, called the Fisherman's rock, about which some terrible stories were told, giving probably to my old schoolfellow, Ainsworth, his first impulse towards romance." A railroad passes over the site now, a canal is made close by, and the above-mentioned greensward, beeches, meadow, and every vestige of the old building are gone. The book, from which I have just been quoting, concludes its remarks on Hulme Hall with the following sage note:—"Leather-aproned stonemasons and paper-capped carpenters, are sad destroyers of antiquity and romance." The etching I have of it gives a very fair representation of a class of building very prevalent around and in Manchester till within the last twenty-five or thirty years.

Ancoats Hall, at present a brick edifice, affording a most perfect picture of desolation, neglect and misery, was once "a very fine building of wood and plaster." It is a pity it did not remain so, for the sooner the existing place is pulled down and the land disposed of the better.

There are many other old houses and halls still existing in the suburbs and townships, but most of them have been so altered and fashioned to suit the requirements of the different ages through which they have passed, and the tastes of the personages owning them, that the main points of interest generally expected in such are here looked for in vain. Of those that still afford repayment for the trouble of research are several half-timbered houses in the immediate locale of the Cathedral; one of which is specially noticeable, having a tower in the main front, springing from between two gables. In Pool-fold there is still an old house, once the seat of a Ratcliff, in the reign of Charles the First, at which time it was surrounded by a moat, and furnished with a drawbridge. The posts and chains were taken away and the moat filled up in 1672. But the most interesting work of any antiquity, after the Cathedral, is a building situated near the centre of the city, and known as *Chetham's Library and Hospital.* It occupies one side of a large court or quadrangle, and is situate on a rock, overhanging the river Irk, near the point where it discharges its black waters into the, if possible, blacker Irwell. The college has at various times undergone alterations, but still presents such marks of antiquity and exhibits such characteristics of the architecture of collegiate halls of the age of Edward the Sixth, as to make it of great interest, supposing it not to possess its attractions as a library of extensive proportions, with reading room and every comfort, and open to any who like to enter and use it. The three other sides of the court are taken up respectively by the Grammar School, business houses, and a roadway; the latter dividing the Quadrangle from the Cathedral yard. The lower rooms of the building, and all adjoining apartments and offices, are appropriated to the use of the hospital; the upper rooms to the library, the librarian and the governor. On the ground floor, near the entrance

Photo-Lithog.ª for the R.I.B.A. by Kell Bros. London, E.C.

HULME HALL.

door, and on the right hand of the entrance corridor, is a large and lofty kitchen, open to the roof, of which, however, the heavy oak principals, the ridge and cornice are the only timbers visible, and having two ranges of windows, one on the ordinary level and the other acting as a kind of clerestory. On the left, at the end of the entrance corridor, is the ancient hall or refectory, wainscotted some three or four feet high, and possessing a fireplace of such depth that until very recently two tables were placed in it for the use of the college boys at dinner. The upper end of this room is still furnished with the raised step or platform called the "dais," set apart in the time of baronial ceremony, feasting, and conviviality, for the lord and his family, and is still covered by a wooden ribbed cove, finished with battlements. The spaces between the moulded ribs are filled in with narrow, jointed, black oaken boards. At the other end is the massive carved oak screen, dividing the hall proper from the passage which is almost invariably to be found leading straight across these apartments. A bust of Humphrey Chetham, Esq., his coat of arms in oak, and a painting on wood of the first boy admitted into the hospital, are contained in this room. At one corner of the hall is a small quaint staircase leading to the first floor, and also affording the means of access on the ground floor to the present audit room of the Governors, an apartment similar in plan to the reading room. It is wainscotted to within three feet of the ceiling with moulded oak panelling. The three feet space is filled in with ornamental (?) plaster scrolling of as weak and wiry a design as possible. The ceiling is divided into panels by means of heavy moulded oak beams, carved at the intersections into bosses, very fair examples of the style of carving prevalent near the fall of the Perpendicular period. Very good illustrations of them may be found in a work by William Whatton, Esq., on "The History of the Manchester School," in which are also given sketches of an ancient reading desk removed from the refectory, and a peculiar chair from the buttery. The fireplace in the audit room has been modernized, and, strange though it may sound, improved at the same time. The furniture chiefly dates from the "dark ages" of upholstery and cabinet work about 1842, but also embraces a fine old table and two chairs. On the latter are cut two grotesque dragons that might have been designed by an ancestor of Mr. Moyr Smith. But the most interesting and characteristic, as well as the most perfect, remains of the original building are the cloisters, which, starting from the passage traversing the end of the hall, surround a small court and enter the refectory at the side and corner of hall near the afore-mentioned small staircase. On them open the doors of store rooms, and the various domestic offices. These doors are old, studded with nails, retaining the ornamental iron surface hinge-fronts, and have stone archways to them moulded with the regular perpendicular mould, the double ogee. The library is on the first floor, and is approached by a quaint stone staircase, with moulded stone archways, and old oak rails and balustrading. The landing ceiling, as well as that of the entrance corridor, is divided into bays with moulded ribs, filled in with narrow jointed boards. At the top of stairs we have a fine specimen of the well-known furniture of the seventeenth century, in the shape of a low cabinet. The library proper is divided into compartments, originally used as small reading rooms, but now screened off, and, very properly too, entered only by the librarian in search of any particular book required. The old fashioned stools used by the first students and boys are still there, however. It has an open roof, the only timbers visible being the semi-circular principals and the moulded ridge-piece. The reading room, in connection with the library, was at one time the feoffees' room. It is square, open roofed as the other main apartments, and wainscotted with moulded black oak panelling to the cornice line. The floor boards, window-bottoms, chairs, etc., are all oak. Over the fireplace the arms of the benevolent Founder are richly carved and too richly gilded. Two old tables, one with twisted legs and rails, the other with an ornamental rail under centre, together with another splendid specimen of a richly carved cabinet, and several chairs fashionable in the reign of Charles the Second, are among the articles of furniture, and

help materially to give to this apartment a quaint, peculiar, and anything but unpleasant effect. On the cabinet is inscribed: "The gift of Humphrey Chetham, Esquire, 1655." From the side windows a good view of the Collegiate Church is obtained. On the opposite end from the entrance is a bay window, square on plan, with a richly ribbed ceiling, with bosses. One of the two-light windows contains some stained glass, bearing evidence from the incongruous manner in which the pieces are put together of having come from somewhere else, and not of having been specially manufactured for these particular lights. I can hardly quote, in reference to them, the words Mr. Joyce, in his writings on the Fairford windows, makes use of. He there states that the harmony between the sister arts of painting and architecture in Fairford Church is most admirably preserved. Chetham Hospital was founded by Humphrey Chetham, Esq., a member of a family of considerable antiquity in the county of Lancaster, and to which illustrious individual that county stands indebted for many splendid charities. He died in 1653, and was interred at a small chapel in the east end of Manchester Cathedral. It is very much to be regretted and, indeed, not very creditable to the several towns which have obtained such singular advantage from his philanthropy, that, until some six years' back a merchant of the city, formerly a student at the hospital, and more generous than his fellows, erected a memorial to his benefactor's name, there was no monumental inscription to point out where his remains had been deposited.

Manchester, and I am right, I believe, in saying the whole of the vicinity, cannot shew a single specimen of earlier architecture than the Perpendicular period. This clearly forms the reason for the field being so seldom taken up by architectural students, except may be a few residential ones, for information and research, choosing rather Lincolnshire, Warwickshire and the midland counties. As far as relates to ecclesiastical architecture, their wisdom in so doing cannot be doubted; but in regard to such domestic art as can be so well, if not better than any other, adapted to the requirements of the present age, I should certainly recommend the study of those houses of the sixteenth and early seventeenth centuries, of which Cheshire and South Lancashire afford so plentiful a supply, and not only plentiful but good. The idea that it is well suited to our wants is gaining ground; but I am sorry to be obliged to say, the proper and careful study, in order to bring into new work, the spirit, life, vigour, and art treatment which certainly appears in nine cases out of ten in the old, does not seem to have always been taken. In one case already mentioned, Denton Chapel, the old spirit has been carried out; but I could mention several houses and buildings erected recently, in the which this is, unhappily, not the case. In these structures the wood and plaster do not "fit well," or harmonize with the brick and stone work, and look seemingly out of place and uncomfortable. But the fault chiefly noticeable, and which affects the appearance of the building to a very great extent, is the attempt to *save timber*, thus introducing thin, wiry lines, and losing all the breadth and solidity of construction to which this class of work mainly owes its apparent (and real) strength and picturesque effect. It is a subject that would amply repay time spent in its study, not only by the pleasure naturally created in such an interesting pursuit, by the health gained in country searches for "old examples," but in the good one might afterwards have the opportunity to effect with the knowledge thus derived.

I had expected to have been enabled to place before you a whole series of sketches illustrative of the several works I have had the pleasure of describing, being fully aware how much more valuable drawings are in imparting true ideas of such places than almost any amount of lettered description. But we all know business must be attended to, notwithstanding the demand such a matter as an essay for our Institute makes on us. I trust, however, the few sketches I have been enabled to do will still be of some service in the particular cases to which they refer.

I purpose, in the ensuing year, with the valuable aid of my friend Mr. Sington, to publish a book on the "Antiquities of Manchester and Neighbourhood," giving full and numerous etchings of such as are in good preservation, with plans, &c., shewing the restoration of those now in ruins.

Mr. C. HADFIELD, Fellow,—I am glad to have the opportunity of adding my testimony to the merits of this interesting paper. Most of these old halls and buildings in the neighbourhood of Manchester and Stockport have afforded interest to myself for some time past, and I think they will well repay the visits of students to them. An ample field is open there for enthusiastic work and study. There are also in my own immediate neighbourhood, amidst the picturesque scenery which borders Yorkshire and Derbyshire, numbers of these old halls or mansions, of the same date, which are little known and illustrated, and many of them present valuable features and suggestions for the treatment of a domestic interior, and will reward the earnest student of the well nigh endless local traditions of our national architecture. The woodwork and furniture in some of them is frequently rich in design and of great merit.

Mr. A. WATERHOUSE, Fellow,—In proposing a vote of thanks to Mr. Heathcote for his interesting and valuable paper, I would express the regret which we must all feel that we have not the pleasure of seeing him here to-night. He might have told us something further we should like to hear about the subject of his paper, in answer to our enquiries. With respect to Ordsall Hall, and the old barn hard by, it is well known that the church which formerly stood where Machester Cathedral now stands was, up to the beginning of the sixteenth century, a timber church. Our late Fellow, Mr. Ashpitel, I believe, made some investigations in the neighbourhood, and thought he had discovered the nave of the old fourteenth century timber church in this Ordsall barn, and a part, at any rate, of the choir of the church in a barn at another old hall at Stand, to the north of the town. This Stand Hall, at that time, belonged to the Stanleys, and one of that family was then warden of the church. It is supposed that he put the no longer needed timber of the choir to the purposes of a barn at Stand, and that he gave the nave and other portions to his friends on the other side of the Irwell. These barns have all the signs of a fourteenth century building; their timbers are light and elegant, and the way in which they are framed and treated artistically is similar to that exhibited in the construction of a timber church of the same date still in tolerable preservation in Worcestershire.

The PRESIDENT,—One drawback to this paper, I think, is the absence of plans. We know how valuable they were in the case of the description of Eastbury Manor; and these structures described to-night are as worthy, perhaps, of careful plans and sections as that very interesting one. I hope Mr. Heathcote will supplement his paper with plans of some of these old halls.

Mr. JOHN P. SEDDON, Fellow,—I shall also be glad if we are to have plans with the paper, by Mr. Heathcote, when it is published, though I have not much acquaintance with the old timbered halls described in it, I have often admired those I have passed on the railway. Mr. Hadfield has, however, spoken of others on the borders of Yorkshire; and, no doubt the whole district is rich in similar works of which little is known. I have visited one or two examples in Yorkshire, in which stone construction is more largely used; they have many charming features and arrangements of great convenience, comfort, and effect, which but few modern buildings possess. One of this class is New Hall, near Elland, in the neighbourhood of Halifax, which, like others in that locality, has a fine rose window over the porch which is exceedingly bold and effective. In calling attention of students to this class of building, I would therefore direct attention to those in Yorkshire, as being really well worth their study.

Mr. WYATT PAPWORTH, Fellow,—There is one point that has not been touched upon in the

description of the buildings. It would be very desirable to know who were the designers and builders of these interesting structures. I am afraid their names cannot be discovered unless from some local archives or private documents. Many of the half-timbered town halls or market houses in Herefordshire were designed and built by John Abel, who had the title of "one of His Majesty's carpenters;" whether he had anything to do with these buildings, or whether they are earlier or later than his time I cannot say at this moment. We may beg Mr. Heathcote's attention to this point, as he may have the means of adding the information.* Sometimes there is a name over the porch, or in the great hall or some other prominent place, and generally an inscription giving the date of the building. I have much pleasure in seconding the vote of thanks to Mr. Heathcote.

The PRESIDENT,—It is stated that these timbered houses were built near each other for defence and mutual assistance. That is a new light to me. I have heard of stations, but I never heard of timbered houses for that purpose.

Mr. T. J. WILLSON, Fellow,—I wish that a more practical view of this class of houses could be obtained, for instance, by plans, so as to observe their arrangement and capabilities. A comparison of these houses with modern ones would also prove of use: simplicity and fewness of parts being contrasted with the occasional redundancy of our present structures. From my own observation a great number of these halls, as well as farm houses, are found in the outlying parts of north-east Lancashire, often situate very near to each other, and in enclosed lands close to the moor country, belonging evidently to small landed proprietors, and illustrating an important and now almost extinct rank of society. The resemblance in their architectural features, which are well chosen, is so great that the works of the seventeenth and eighteenth centuries are sometimes not to be distinguished. The subject well deserves further attention.

Mr. C. HADFIELD, Fellow,—I would suggest that some of the students of our Institute should occasionally visit these buildings in the course of their summer rambles, and make careful drawings of them: the principal apartments are often of excellent and noteworthy design. I may mention that Carlbrook Hall, two miles out of Sheffield, of which I have made a number of measured drawings, has two interesting rooms of Jacobean date; indeed, Haddon Hall itself has not a more refined or artistic specimen of a domestic interior than the ground floor room of this place. These examples will repay any one who works them out patiently and thoroughly on the spot, and much benefit may be derived from their careful study.

Mr. R. PHÈNÉ SPIERS, Associate.—May I be allowed to offer a practical suggestion, viz: that a skeleton map be published with this paper, shewing the position of the different localities with reference to Manchester; and the roads from one to another of these halls? It might incline students to make this tour if they were acquainted with the route and the distances to each place; a reference to books containing published illustrations of the halls mentioned, might be added with advantage.†

The vote of thanks was passed unanimously, after which the meeting adjourned.

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* Mr. Heathcote has unfortunately been unable to glean any additional information on this head.

† This suggestion has been adopted. See the Sketch Map facing the first page. Reference to one or more of the Halls mentioned will be found in the following works:—

J. Britton's "*Architectural Antiquities of Great Britain.*" 4o., Lond., 1807-8.
M. Habershon's "*Ancient Half Timbered Houses of England.*" 4o., Lond., 1836.
J. Nash's "*Mansions of England in the Olden Time.*" fo., Lond., 1839-49.
C. J. Richardson's "*Studies from Old English Mansions.*" fo., Lond., 1841-8.
Turner's and Parker's "*Domestic Architecture of England.*" 8o., Lond., 1851-9.

Mr. Heathcote proposes at some future time to place at the disposal of the Institute certain Plans, &c., of the Halls mentioned in his Paper. He also wishes to state that he will be happy to give any information in his power to Students who may wish to visit those examples of ancient domestic Architecture.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, the 6th of January, 1873, the following Paper was read:—JOHN GIBSON, Vice-President, in the Chair.

ON ARBITRATIONS.

By BANISTER FLETCHER, Associate.

MY excuse for bringing this subject before you is fourfold—1stly, I do not remember that there has been a paper read on this theme before in these rooms. 2ndly, Because I am bold enough to think our profession has not and does not give sufficient attention to mastering the technical difficulties connected with arbitrations. 3rdly, Because if I can succeed in warning you of some of the pitfalls into which one side or the other are most anxious we should tumble, I shall not have wasted your time. 4thly, Because I heartily desire that the legal profession should not continue to deride the awards of what they call "lay arbitrators," as they are at present so fond of doing, asserting that such awards can always be upset. I cannot hope my paper on such a matter can be otherwise than dull, and must therefore crave your indulgence.

Some, probably, will be surprised at the extent to which, by Acts of Parliament, arbitrations are sanctioned. Their range is a very wide one indeed. The enclosing of commons, the allotment of lands, the determining compensation for rights of common, the setting out public roads, the commutation of tithes, and the definition of boundaries. Further, where any lands are authorized to be taken for undertakings of a public nature, the person having the land for sale may claim to have the amount determined by this mode; as is also the compensation due by reason of interests in land being injuriously affected by the works. Again, they may apply to the compensation to be paid for land authorized to be taken under the provisions of any Act for creating markets, harbours, docks, piers, waterworks, town improvements, cemeteries, drainage works, railway companies' disputes, and to the amount of compensation due from railway companies in respect of railways authorized to be abandoned.

Surely this list is sufficiently long, and nearly every matter belongs to our profession, and can be best, therefore, determined by us; and yet members of the legal profession are usually appointed instead, as to which I will say more anon.

It is most probable that arbitrations will be more and more adopted—and this I mention as an additional reason why it should engage our attention—for as one of the leading authorities on this subject remarks:—"The value of arbitrations as the best mode of administering justice in a large class "of cases, in which neither the prospects of a Court of Common Law, nor the decrees of Chancery can "give complete relief, is now more fully than ever recognized by the legislature and the public." Further, it is in the recent Acts more often that clauses as to arbitrations are inserted. One of importance that I would mention, is the Local Government Act, 1858, by which any injury done by the local boards in constructing their works is to be so decided.

As to private disputes the range is wide enough, and may even include future differences; there is but one limitation, and that one, all will admit, is wise:—where the subject matter is clearly illegal the award cannot be sustained.

Before going into details let us for one moment consider the objections to arbitrations, and if they can be removed; because if this could be effected no doubt arbitration would become universal—at least on technical questions. The objections are—1st. The great delay. This arises from the desire to accommodate every body. 2nd. The employment of counsel. 3rd. Irregularity of procedure, in which both parties concur until one thinks he suffers and then complains. 4th. The custom of appointing three arbitrators, the result of which is it adds to the expense, adds to the difficulty of fixing meetings, and in the end is of little, if any advantage over the single arbitrator. If three arbitrators are desirable, then let them represent different professions—in our cases, two surveyors with a lawyer for umpire would, and has in my experience, worked well.

The remedies for the great and almost intolerable delay, I believe would be simply to require the matter to be conducted strictly (in the end both parties will be better pleased if this is done), and that the reference should proceed *from day to day* just as a trial does.

The first thing that an arbitrator should do is to consider what is called the *submission*, as it is the foundation of all his proceedings. It would appear that it is not necessary that this submission to arbitration should be in writing, or even verbal, it would appear to be absolutely necessary, however, that the parties intend "to be concluded by the decision of the persons called in, in order to clothe him "with the authority of an arbitrator." Where it is possible, it is certainly desirable, to have the submission in writing, and in one document signed by both parties, for if it can be shown that the parties intended to refer different matters the award will be invalid. I have in my mind a case where one party appointed arbitrator to determine a dispute respecting the construction of a lease and the damages sustained, the other in wording his appointment alluded only to the construction of the lease, and omitted any allusion to the damages; in consequence the entire award was void.

There is much technicality to be observed. For instance, where there is an arbitrator appointed on each side, no such appointment is complete until it has been notified to the other side. I would call attention to the importance of this, because if (as is very usual) the appointment is to be made by a certain day, it will be *too* late, and therefore the appointment will be void, though the arbitrator be nominated on the day, if the information of the nomination be not given until the day after. The law holds, that where an umpire is to be appointed before proceeding, until the umpire is appointed, arbitrators cannot act. It is wise, directly you are appointed and know who is appointed on the other side, to arrange an early meeting, and to give notice to each party of the day, time and place. It is well to recollect that if a party to a reference is bankrupt, the reference is at an end in most cases, if the other side choose to revoke. A lady marrying during the reference revokes the submission.* Death, in most cases, revokes the appointment. Either party may revoke the authority of the arbitrator, but only with the consent of the court. An arbitrator formerly used his own discretion as to allowing evidence to be given before him. *Now* he has none: he is bound to receive evidence if either party wishes it.

Let me next state what is understood by a reference "*on the usual terms*," as these are the terms we nearly always abide by. They are:—That the arbitrator shall decide for the plaintiff or defendant: if plaintiff, then assess the amount of the damages (which, however, cannot exceed the amount claimed). The cost of the cause follows his decision. He may award the costs of the reference in any way he pleases. He has unlimited time for making his award.† The death of either party does

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* But she and her husband are liable to an action unless they continue the reference.

† In practice, however, it is usual to fix a time, giving the power to the arbitrator to enlarge the time if he consider it necessary.

not abate his authority. He has power to amend the record. All evidence must be taken on oath. The parties must produce all documents relating to the matters in question. The parties are bound to obey his award, and not to bring any action or other legal proceedings respecting the matters referred, either against the arbitrator or each other. They consent, further, that if either of them wilfully prevent the arbitrator from making the award, he will pay such costs to the other as the court shall think fit. That if either party dispute the validity of the award, the Court may refer the matters, or any of them, back to the arbitrator to reconsider. Lastly; they consent that the order itself may be made a rule of Court.*

Surely with such ample powers the arbitrator would seem to be hedged in on every side so that no opportunity could occur to stultify his labour. Yet such is not the case. Instances are not uncommon of awards being set aside, and it is an accusation of the legal profession, that scarcely any awards, save those made by their own profession, ever stand. I would call attention to one pitfall. It would appear that it is necessary (unless there is a special clause inserted in the submission, that it shall be sufficient for the arbitrator to find in the cause generally for the defendant or plaintiff, unless either party shall request him to decide some particular issues) for the arbitrator to decide on *each* issue in the cause, to render his award binding. The other matters that may set aside our awards are —if it can be proved it has been obtained by fraud, or if it can be shewn it has been drawn up by mistake: where a third party, who, although he had agreed to join in a submission to arbitration, refuses to proceed with the reference: and lastly, proof of undue pressure.

Curious it seems that, powerful as the Courts are to upset or set aside awards, they have scarcely any power, in fact they are powerless, to amend an agreement of reference, even though it is only desired that it should be made to accord with the original intentions of the parties. I am not alluding here to clerical errors, or to an immaterial variance in an order of reference, as such matters, and such alone, they can vary. I trust I shall not weary you if I quote a case to show how cautiously all must walk who would come near the law. Fancy the extent to which the legal judicial mind can go. The case I quote, "Rawtree *v.* King," 5 Moore, 167. There, by a mistake of the Court's own officer (the associate), who drew up the order, referring all matters in difference between the parties, and not all matters in difference in the cause, they, the Court, said they could not alter the order, but that the order of reference must be treated as a mere nullity. I mention this, as I have said, to shew the caution necessary in our proceedings, so that we may secure what we fervently desire, justice to those whom we find deserve it at our hands.

Certain interests disqualify an arbitrator, but it is held that they must comprise something unknown to one of the parties; for instance, an architect, though employed by his client to superintend a builder in building a house for him, may be an arbitrator between his client and the builder, even although his remuneration be a commission on the amount of the building charges. One other matter, I think desirable to mention: those who act for the first time are so likely to be lead into expressions of feeling which, though natural, are most injudicious for this reason, that the Courts require the arbitrator to be absolutely impartial, and hold that if the arbitrator uses any expressions towards either party which indicates a strong bias or prejudice in his mind, or show that he is actuated by any hostile feeling, the award may be set aside. But such a feeling might be easily expressed with contempt when the case was seen through, and a keen clever solicitor on the wrong side would endeavour to provoke the strongest expressions, in order that he might quote them for the purpose of

* By which the parties are bound by all the provisions of the Common Law Procedure Act, 1854. This Act gives either party power to compel the other to name arbitrator, &c.

upsetting the award. And it must be remembered that this setting aside of the award may be accomplished even where there is nothing to impeach the conduct of another arbitrator, who has joined in the award.

Of course we must not have an arrangement with any of the parties to the reference, such as the purchase of their unascertained claims; and it seems advisable either to deliver a detail bill of charges before receiving payment, as if this is not done it may render our award open to be set aside; or not to receive any payment until such award is made and published.

Just a few hints before I close as to the conduct of the enquiry. The arbitrator having sworn, the witness will be, if fresh to the matter, perplexed as to what is evidence, what can be admitted, and what cannot, what questions are proper, and what are inadmissible. I will give a few leading ideas to guide. The claimant or plaintiff opens his case, and it is his duty to prove it as strictly and in the same manner before us as arbitrators as he would have to do were he conducting his case in a Court of law, unless "*by arrangement*," when many matters are taken as proved, or with very slight proof and irregular evidence admitted. Still, where the parties are what is called *hostile*, and *will admit nothing*, the law courts must be our guide, and the popular idea that strict evidence is not required must be disregarded. It must be borne in mind that the improper rejection of evidence tendered by either party will set aside an award. Further, that with what the law calls a lay arbitrator improper admission of evidence will have the same effect.*

As to the dealing with the evidence, the lawyer says we are not so well qualified to understand it as they are whose daily pursuit of their profession brings them into contact with witnesses, and enables them to be much better judges both of what is legally evidence and the effect of it when given; and I think they consider this is the strongest ground of objection to us as arbitrators. But it is not in every case that the issues raised are questions of evidence; on the contrary, in most cases, at least of those arbitrations under the Acts of Parliament I have alluded to, and which I claim for my profession, the question is a practical or scientific one, and not a legal one, and I think even the lawyers will agree that just as in many cases they may be (though I do not say they are) better able to sift evidence or legally construe a document, we certainly are better judges of the damage done to land and houses, the cost and nature of dilapidations, the value of property taken by railways, the proper compensation for rights of common, the best mode of setting out roads, the defining of boundaries, and indeed nine-tenths of the matters which Parliament, in its wisdom, has considered should be settled by arbitration.

I must apologize for this slight digression, but it became almost necessary when considering the question of evidence, and although I have taken some trouble to investigate this question, and have had some experience, the rules and technicalities by which it is surrounded render it too intricate and extensive to be more than just touched upon in this paper.

One of the most important rules is that the best evidence must be given, and until that is exhausted you cannot give what is termed secondary evidence. This rule excludes hearsay evidence, that is the witness stating what he has heard that A did or said, and nothing as said by a third party in evidence against those who are party to the arbitration, unless it was said in their presence or done with their knowledge. Again, a copy of a letter or other document cannot be read until it has been proved that the original has been lost or destroyed, but if proper steps have been taken to procure the production of the original, a copy may sometimes be used. Further, a reply to a letter is not evidence until the letter in reply to which it was written has been proved.† Handwriting

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* But if the arbitrator be of the legal profession this will not have such effect. Is this fair?

† The reading of a copy of a letter may be instanced as secondary evidence.

may be proved by comparison; that is, comparing the handwriting of one document admitted to be written by A, with that of another not so admitted. Plans should be proved by the person making them, and should be made, I may remark, from actual surveys. Deeds thirty years old need no proof of their execution, if they apparently come from a proper custodian of them; and those of less antiquity may now be proved by calling *any* witness who is acquainted with the signatures—this formerly was not so. It must be remembered that this does not apply to wills or warrants of attorney. A deed is not evidence unless it is properly stamped, so that it is necessary for us to have some slight knowledge of the Stamp Laws. Entries in books kept by a person cannot be used by him to prove his case—but his adversary may use them against him—the reason for this being obvious. There is nothing to prevent a man from making any entry which he might think convenient to assist him, as for instance, payment of money not actually made, but it is not probable he would make entries which he thought would operate against him. Again, if the entries be made without the knowledge of the other party, there are similar reasons for not allowing them to be used, as for rejecting "hear-say" evidence.

Another difficulty most frequently arising is to decide upon the form of the question to be put to a witness, it being a rule that the party calling a witness must not ask him what is termed a "leading" question (that is, a question which indicates the answer that is required) nor, unless the witness be "hostile," can the party calling him examine him, except as to such matters as are direct evidence upon the issues raised, or ask him questions tending to contradict the evidence he has given. On the other hand the adverse party can cross-examine a witness for almost any length of time (as we have seen in the famous Tichborne case), and can also examine him and call other evidence to prove that his evidence is untrue. I have far from exhausted this important branch of my subject, but time and consideration for your patience and kind attention compel me to pass on.

One other not unimportant point I would mention, that if you are trying to fix on an umpire, you must not select him by *lot* or *tossing up*. It does seem an easy way of getting rid of a difficulty, and I have had it proposed; and certainly my opponent has been astonished when I have told him that such a method is illegal. As to our fees as arbitrators, it should be borne in mind they must not be large, or we may be liable to an action to recover what may be considered excessive charges. This is the law, although we are unable legally to recover our fees as arbitrator, unless we have, what we rarely have, an express promise to pay, and then only from the person so promising. Directly our award is made, we should send notice thereof to each party, stating where the award can be obtained on payment of the fees, aud mentioning the amount. Our award must of course be made within the time to which we are limited.

Perhaps I may seem somewhat wanting in generosity, for though I have learned everything, except that acquired in my practice, from the clever though voluminous works of barristers, I am trying to urge my own profession to compete with them, and endeavour to obtain a share—only that share which I contend belongs to us—of that profitable, if arduous, work, which now falls almost entirely into their hands. Still I do feel that all reference on architectural or surveying matters should be to the architect and surveyor. The extent of such references may be gathered from the list I have given. To show the public the advantage of the adoption of this view (and this must be done if we want to produce effect), I would mention the great difficulty there is in getting three barristers to attend at the same time. None can know it better than we, who have so often attended references. First one is called out, then another, and then the arbitrator may be called away. Parenthetically I would remark that such is the delay in arbitrations, that one of the celebrated barristers (Mr. Colman) remarked, "Never go to arbitration. Fight it out; it is soon over. If you refer, it will cost you twice

as much, and take three times as long to settle." Substitute one of our profession, and he attends from the time appointed to the close. Again. You eliminate that brilliant play of fancy and finesse, which three barristers must indulge in, when instead of the third you substitute a man only anxious to get to the end of his work and to do his duty. All the subtlety of fine distinctions, the clever hair splitting deductions are lost; and though probably at the expense of a loss of a little intellectual amusement, a rapid solid result is attained. Surely this is better: it certainly accords more with our ideas of justice. One point I must touch upon. It is asked by some, why not have a lawyer or barrister at your side, during every meeting, to advise and counsel? I would remind those who recommend this, that though this would perhaps be the most perfect kind of reference, the expense must preclude the possibility of such a recommendation being adopted. The Courts would say it is virtually two men doing one man's work, and certainly it would appear to be so. It must be borne in mind that the charge we can make, and which cannot be disputed, is the aid of the law in drawing up our award. Cannot we, then, so train ourselves as to hold our own, even in such difficult positions as I have indicated—we who probably spend as much, if not more, of our lives in study than any other profession? We who have to learn *so much*, may surely learn a *little more*. The study of law is almost the best study the mind can attempt, even for those who do not belong to the legal profession. It gives, I think, a power of reasoning, which, though it may lack power of verbal expression, has yet that grandest of all powers, the power of just judgment. Pardon me if in anything I have said to-night I may have seemed to indicate that you are not much better acquainted with this subject than I am. Should this be so, my extreme earnestness that this portion of our practice should not be lost to us, must be my excuse.

Professor KERR, Fellow,—I have the pleasure to propose a vote of thanks to Mr. Fletcher for his paper; and it affords a somewhat suggestive illustration of the very large field of study which we are expected to cover when I remind you, Mr. Chairman, that in another room in this building we have just been discussing the necessity, that architects should understand the anatomy of the human frame in respect of the very bones and muscles, whilst, now that we come here, we find the necessity urged for the architect to understand law. But suppose we confine ourselves for the time being to the one subject before us, and I am sure we shall be disposed to acknowledge that Mr. Fletcher has brought forward a most interesting matter for our consideration. The question whether the artist should separate himself from the practical man, may be one of considerable importance, or it may be of no importance at all; but certainly, if the practical man were to separate himself from the practical business of building disputes, I think it would be very much to the disadvantage of our profession, and if there is one subject more than another in which an architect of any standing, in such a place as London, requires to be thoroughly practical, it is on the administration of such business, in what Mr. Fletcher calls its legal phase. When we find that lawyers are in the habit of discouraging the efforts of architects to do justice between man and man, it is only another evidence of the necessity on our part to be careful to understand the kind of business which is called law. The difference between a reference in our field of affairs to a surveyor and a reference to a lawyer is this, as it seems to me: When the point at issue is one which involves a strict inquiry into what are called points of law, then, of course, let the reference be to a lawyer; but if the issue be one which only requires intelligent decision respecting professional matters, then by all means, do not let it go to a lawyer, for if there be a possibility of the matter being mystified, if there be a possibility of a false issue being raised, if there be a possibility of both parties being artificially worn out and disgusted with the whole proceeding, the lawyers will

be sure to discover it. I have myself had a good deal to do with lawyers, and I say boldly and plainly that they know nothing whatever about our business. From the judges on the bench to the junior counsel before them, and from the most eminent barristers in the court to the solicitors' clerks, not one knows anything about building business. I remember a case once, in which a very distinguished lawyer was arbitrator, whose name would be known to many present. He was sitting on a reference upon a builder's bill, and he inquired "What is the next item?" and was told "a one-inch ledged door." "I do not find the *door* on my paper," he replied. "I find only a one-inch ledged door-*lock*." "Excuse me, Sir, there is a comma wanting;" and the subject was complacently passed over by the arbitrator rejoining, "There is no comma in my copy." I have seen other instances quite as bad as that, showing the utter incapacity of the trained legal mind with respect to the practical matters of building: and I am very much disposed to support what Mr. Fletcher says in advocating the desirableness of referring straightforwardly and simply to the practical decision of the practical architect or surveyor, whatever differences may unfortunately arise, between man and man, upon any practical questions of this kind. If there is a point of law mislaid so much the worse: but get rid of the point of law by some mutual concessions or some parliamentary decision, and then come to the real point which a practical man only can decide. The benefit of having practical architects as arbitrators on questions of building is this: The lawyer must judge, as he is pleased to say, "entirely according to the evidence." He goes into the evidence confessedly without any previous knowledge at all. I say he comes out of it without any knowledge; but at least, he says, at the outset, "I am dependent upon you, the surveyors, for all the facts, and I must give my decision according to the facts; it is for you to lay them before me in your own way: I only know the law." But in the case of the architect-arbitrator, he says virtually, "I do not want you to lay before me those 'facts' which are evidence of practice and custom. All that is familiar to me, and I can save you the trouble of giving evidence upon it. Lay before me the incidents of the dispute, and I will apply to them broadly, with all the intelligence I possess, the ordinary principles which are recognized by the business I here represent." That, I submit, as between practical men on practical matters, is a far better position for a judge to occupy than any lawyer can assume. But there is this to be said with regard to architects as arbitrators: the disfavour with which they are sometimes regarded—and indeed, by other persons than lawyers—is I think in a great measure due, not to the uncertainty of their awards, but to the circumstance that, as we all know, there is an unfortunate habit of splitting the difference. Now, of course, we understand that nothing can be more sublimely impartial than splitting the difference; and we know that the principle does lay hold of the mind in a great many other cases besides building disputes. Juries, we know, split the difference under disguise every day; but it is complained that arbitrators have sometimes a certain mode of splitting the difference openly, which is extremely exasperating to persons who feel strongly about their technical rights, and thus it is that such splitting of the difference may often, not only fail to give satisfaction to either of the litigants, but make both of them alike furious against the judge. When I speak thus of the splitting of differences, I do not speak only in jest. It is extremely difficult for an impartial arbitrator to avoid splitting the difference in most cases, for this reason:—That, without even the aid of lawyers, the litigants themselves are apt to say, each in his own secret mind, "I shall be sure to get much less than I ask," or "I shall be sure to have to pay much more than I offer to pay," and here obviously the necessity for splitting the difference has already been created by the two parties themselves, who virtually argue together that midway between their two nominal claims, there lies what they really want. On such occasions you have two extreme cases set up, wide as the poles asunder; and what can an arbitrator do but split the difference? Whatever

process he adopts, ultimately it comes to that inevitably. To ask the litigants to be perfectly frank and ingenuous is, of course, perfectly useless. When two men are unhappily engaged in a dispute, each man must be allowed, in arbitrations as in other matters, "to do the best he can for himself;" it is vain to look for an alteration of that system: but what I argue is, that while arbitrators, as we know, perhaps split the difference too often, they are generally supported in so doing by the acts of the litigants themselves, who have preliminarily and mutually, however unconsciously, placed justice midway between their two cases. Further, I would remark, that though architects' awards are, no doubt, as Mr. Fletcher tells us, very liable to be upset at law, yet it is the fact that they are upset but seldom. As far as my own experience goes, lawyers will, as a rule, advise their clients not to attempt to upset the award of a respectable architect or surveyor; and I think that is a circumstance which is highly creditable to our profession. It is therefore a matter of the greatest satisfaction to us as architects, that we are credited with the exercise of undesirably honest principles in these matters, and I think lawyers universally acknowledge this; so that, when an award is carefully made by one of our profession, lawyers advise their clients to submit to it, rather than incur the odium of attempting to supersede the action of an architect, indisputably competent and obviously honest, animated solely by a desire to act with justice to both parties. I am therefore much pleased to find that Mr. Fletcher has given such attention to this paper on so practical a branch of our business.

Mr. F. MORRIS, Fellow.—I think an architect ought to feel that he incurs a heavy responsibility when he provokes arbitration. It often happens that without duly considering the subject, without weighing all the responsibility and all the circumstances as he is bound to do in the interest of his client, the architect flies off at the first opportunity and says, "Let us refer it." I am sure Mr. Fletcher's paper and Professor Kerr's very able remarks upon it are sufficient to let anybody into the secret of the enormous cost that arbitration is attended with, sometimes even in the most simple cases. Suppose it happens that there are two architects employed; they disagree upon some trivial point, on which, if they had considered the subject, they would have "split the difference," as Professor Kerr says, at once; and they had better split the difference in almost any case, or give up the point rather than go to arbitration. When you have two arbitrators and an umpire there are meetings after meetings, and the expense is continually going on. That does not occur with juries. The cases are not so interminable when they are brought before a proper legal tribunal. It is possible that juries may *split the difference*, but each party has made out in the most complete and intelligible manner the view he takes. That view is well set before the court. Barristers are apt to give more emphasis and to speak longer than the subject seems to demand, and those who listen to them may think them very tedious; but the counsel on both sides are determined to do their best for their clients. Then comes the real evidence of the witnesses, and though sometimes the evidence does not fully bear out the elaborated statements of counsel, still you get the views of both sides, and you can weigh them. Then you have the guidance of an impartial and experienced man, the judge; and when he has gone through the case perhaps a half-an-hour the view of the jury may be unanimous. I quite agree that when arbitration is unhappily necessary, a professional architect is better than a lawyer as arbitrator, and if the issue can be reduced to *a case*, so that the points to be considered are limited to the narrowest compass, so much the better. But I repeat, before an architect pledges himself or his client to arbitration, he should duly consider the responsibility he incurs. For my own part I fear that the newly-made rule or bye-law with respect to the *arbitration clause* in contracts will operate very irksomely. The builder will be more ready to stand upon what he considers his rights, and have every little question conceded or arbitrated upon, while the architect's vigilance must be correspondingly exercised to avoid prejudice to the client.

Mr. EILOART, Visitor.—As I cannot congratulate myself on being an architect, I fear I have scarcely anything of interest to say; my experience in arbitrations has been confined solely to compensation cases, and I have had nothing to do with such references as mostly come before you gentlemen as architects. But I will venture to say that I think Mr. Fletcher has made some little mistake with respect to the duties of an arbitrator or umpire, inasmuch as all matters connected with the legal department (to which he has so ably alluded) are, as far as my experience goes, always prepared for us by those whose business it is to understand that department thoroughly as legal men; and I think it would be as unwise for us to attempt to encroach upon the functions of the solicitor as it would be on their part to trespass upon the province of the architect or surveyor. There can be no question that in any technical matters relating to building affairs an architect or surveyor is the best arbitrator, and that a better judgment is likely to be obtained from such an one on account of the practical knowledge he naturally possesses of the questions brought before him, than would be expected from anyone else; as it has already been observed, there are multitudes of instances in which the want of technical knowledge has interfered with the judgment and ultimate decision of the case under consideration. I have experienced that myself to a considerable extent. I have seen men sitting in judgment upon technical questions of which, practically, they knew nothing, and were consequently obliged to arrive at a doubtful conclusion, solely upon the conflicting evidence brought before them. Therefore our friend Mr. Fletcher will allow me to suggest that our movements should be guided by the legal mind, and that our awards should be drawn up by the solicitor to whose province such matters rightly belong. I quite agree with him that our architect or surveyor is more competent to give a proper judgment than a legal man. I may say and I believe that nine out of ten of such cases as I am now speaking of are in fact referred to what are called lay arbitrators. Most of the great railway cases, those on the Thames Embankment, the new leading thoroughfares, the city improvements, the Law Courts, and other works of magnitude when referred at all, have been referred to gentlemen whose names are well known in this room, and it is the exception to find any such matters referred to a lawyer. There is another matter which Mr. Fletcher has touched upon with respect to the difficulties which a lay arbitrator is sometimes placed in. Now gentlemen of the long robe when they get a bad case will frequently endeavour to puzzle a lay arbitrator with points of law, and it rests with the arbitrator whether he will accept certain evidence or not; I believe an error of judgment in this direction will not affect the award. I have known cases in which an endeavour to invalidate an award on such grounds has not succeeded. I have always found that those learned gentlemen, though they will sometimes endeavour to puzzle a lay arbitrator as much as possible, generally do so with great courtesy and deeply expressed regret at having to hamper him with such questions. There is, however, a wide field open for both professions. I don't like to see the lawyer trenching on the province of the architect, and I equally dislike seeing the architect trenching on the province of the lawyer.

Mr. J. E. SAUNDERS, Fellow,—As no member has as yet seconded the motion of thanks to Mr. Fletcher, I am very happy to do so, and I beg personally to thank him for his practical and useful paper. In dealing with the subject he has touched lightly upon the broad question of arbitration, more especially going into details and giving useful information as to the law as it now stands. But we shall find a deeper and wider range than that which he has given in the paper. What is arbitration? It is the reference of matters in dispute between two or more persons to a competent man to decide what is right between the parties; and from the earliest time, when Moses sat in equity actions as judge between the people, that simple notion has been kept in view in all good laws. But if we look around us now we shall come to this conclusion, viz., that lawyers (and I say give to Cæsar the things that are Cæsar's), when they work, whether it is to establish the settlement of

Ginx's baby, or in a case of higher import, want to do everything for you, and to be well and fully paid accordingly. Now I say the notion of good law is to give a man honest moral justice; and that our laws, if interpreted in a legal and strict sense, are weak to do this is perfectly clear, because when you come to large matters like those of the European and Albert Assurance Offices, the law would have distrained everyone, and hence it was referred to men as arbitrators in whose honour and impartiality all had confidence to give equity and fair dealing to all concerned. Does it not, therefore, appear clear to this Institute that all questions affecting building lands, &c., ought to be referred to men who know practically something about the business? Chambers of Commerce are established for the settlement of commercial matters, while naval matters, though somewhat singularly referred to police magistrates, yet always have two nautical assessors, and the magistrate is but the mouthpiece of those who sit with him. It is generally the case that lay arbitrators, members of our profession, have to gather the whole facts from their own special knowledge, and are little helped or benefited by the statements and addresses made and brought before them from all the lawyers or barristers in the case. What we want is this: just as the Court of Chancery is established to give equity, and thus put the common law right, so what we seem to want is a Chancery Court for our profession. I believe it could be done. Place one or more members of our profession as judges, give them an adequate salary, say equal to that of the present legal puisne judges, and allow the members of our profession to become the barristers in that court. You would then have the various cases put clear enough. We should not be gentlemen of the long robe exactly, but more useful and effective. It may be true that as one party generally takes a maximum and the other a minimum view of the case, justice may often lie between the two. In the conduct of the case the architect advocate would have free scope for the statement of the facts, or if you like to have affidavits as in Chancery, you would still get full and quick justice by a court of this character. Let the payments be by a fixed scale of fees, and the court would sustain itself. If some such course as this were adopted, cases would be decided with a promptitude that would at all events be very gratifying to all parties immediateiy interested. In cases of party walls and obstructions of light, such a tribunal as I have indicated would be a great boon to the community at large. As many present are aware, particular cases of dispute between architects, building owners, and district surveyors are brought in the way of appeal before the Metropolitan Board, who adjudicate upon them (as an open court accessible to the public if they feel sufficient interest in them), and the decision of the Board is final upon both parties. If you get ninety-nine good decisions and one bad one, the public will be benefited, even if the one goes unchallenged, because we know there must sometimes be a breakdown in all human affairs, and it is clear the present courts are not looked upon as perfect. I think it would be a great boon if we can prevent our legal friends from appealing from one court to another, and thus adding to cost and delay. We all, unfortunately, know what a tedious process arbitration, as it now is, sometimes proves. It becomes a question of costs, and in many cases it stops important building and other operations, and damages the litigants. If the hint I have ventured to throw out should be thought to have any merit in it, I shall be much gratified, and if it should be regarded as a feasible thing, I feel convinced it would greatly benefit both our profession and the community at large.

Mr. Roger Smith, Fellow, supported the vote of thanks, but remarked that his experience had not been of such a pugnacious character as to enable him to offer any useful remarks on the subject.

Mr. H. Oliver, Fellow,—The subject seems to me to have been well ventilated by the meeting, and I think we have had the most argumentative evening that we have enjoyed for a long time. I differ from Mr. Morris, for he would take the bread out of our mouths altogether if his objections to arbitrations and references were generally admitted. For my own part I think arbitration is a healthy

way of settling disputes. Mr. Fletcher has not, however, touched upon one very fruitful source of dispute, viz. party walls. I recollect on reference in a case of that kind a short time ago, in which I was concerned for the defence of a wall. The wall, I admit, was bad, but it was important to make terms, and to keep it up as long as possible. It was condemned by the district surveyor as long ago as July in last year, and subsequently by a magistrate, but still it was possible to sustain its existence for some months. At last the matter was referred, by mutual consent, to a gentleman well known in this Institute, and he gave a decision of this sort:—"That the wall was very bad, but not so bad but "that it could be repaired, and that the building owner should take it down and rebuild it at his own "expense," but he saddled my side with the shoring up of our premises, and of retaining the chimney stacks. The building owner did not proceed to take down the wall, whereupon notice was served by the Board of Works, that after a certain time they would take the wall down themselves. To this day I cannot understand exactly what the arbitrator meant by the chimneys being retained. I found, when the wall was down, that the chimneys remained for a height of three floors above the ground floor. I sent word to my client to that effect, and that he would be saved the expense of building them, but on my visit the following day the chimneys were gone. I saw the contractor's foreman and said, "I gave you a retaining fee to uphold these chimneys: how is this?" "Well," he replied, "I saw "the chimney begin to bend, and I went on the top floor and pushed it over;" now this was what may be called splitting the difference, though not, perhaps, in the sense meant by Professor Kerr. I should state the arbitrator had given the other side the old materials. Last Saturday I met the surveyor to the building owner to define the line of the future wall, and that is how we stand, after seven months of opposition; but it was very satisfactory to my client that the arbitrator, who was a man of unblemished integrity, should have given us the terms I had offered months before. I beg to add my thanks to Mr. Fletcher for his paper.

Mr. R. L. ROUMIEU, Fellow, remarked that every one present must be very much pleased with the comprehensive character of Mr. Fletcher's paper: but there was one point to which he had not drawn attention, or in any way alluded, and that was the common misfortune attending most cases of action in building matters when brought into a court of law. Immediately any technical evidence was given the Judge directed it to be referred; and instead of referring it to a professional man, he always appointed some barrister of seven years standing to try the cause out of court, and under these circumstances the most cruel injustice was almost invariably done to one or the other of the suitors under the awards given by really incompetent arbitrators.

Mr. FLETCHER, Associate, in reply upon the discussion, said,—I have to thank Professor Kerr for the kind manner in which he has alluded to my paper. With regard to his observations about each side presenting an exaggerated claim, I agree therein, believing that even in arbitrations there must sometimes be that which will appear to the parties like a *splitting of differences*, though if in arbitrations a similar result is arrived at as if the case had been tried before a jury, little harm probably is done. Our great difficulty is to keep the awards free from legal defects, and I do not think the dislike to our employment arises so much from splitting differences, as that we are so liable to have our decisions upset upon legal points. The cost of arbitration is in some cases, as we know, enormous, and after all this expense has been incurred, there is less certainty as to the award standing if the arbitrator is not a legal man, for the reasons I have mentioned in my paper. We must therefore strive to acquire that legal knowledge which is so essential to the proper adjustment of cases of this kind. I quite agree with Mr. Morris's remark that we should not provoke arbitration; but the long list of cases in which arbitrators must be employed under the several Acts of Parliament, without any option, shew the great field open to our profession. No doubt we should try to keep

our clients out of arbitration (and all litigation) as much as possible. The point I am arguing is that in which I think we must all agree, namely, if we can select a gentleman of our profession competent to deal with the facts as arbitrator, it will be more satisfactory to ourselves and to our clients, than if the case were referred to a legal man totally unacquainted with the practical matters he has to deal with. A gentleman has spoken of the advantage of these matters being decided by juries, as the case is thus so rapidly disposed of. But I desire to rival the rapidity of the jury with the greater certainty of skilled arbitrators, and I have stated that this might be compassed if the proceedings of arbitrations should be carried on *day after day*, as is done in a court of law, until the decision is arrived at. If you have a surveyor as arbitrator or umpire, I think there are very few cases which would extend over a week; instead of which, we know sometimes cases are carried on over two or three years, and the intervals of the meetings are so long that when you take up the case you almost forget where it was left at the previous meeting. With regard to Mr. Eiloart's remarks, his great experience gives them weight, and I would only say I have no intention whatever of encroaching upon the functions of the lawyer. It is known that lawyers, by their indifference, have lost one portion of their practice; so, I am afraid, our own profession have lost arbitrations sometimes, through neglect, and it may be that the lawyers will gradually get all arbitrations, unless we shew ourselves capable of managing them. There is one point we should not lose sight of, viz., that after we have made our award we can submit it to a lawyer to be prepared in legal form, and that is the *only* legal charge which can be added to our fees as arbitrators. I had a case myself in which a vestry was defendant on the question of a road: the amount involved was not more than £300. I read up all the authorities I could find, because the amount did not admit of my paying fees to solicitors, and I was told my award would be upset if possible. I am glad to say that it was not. I am certain we labour under the liability to have our awards set aside on legal grounds, for as I have said, the legal preparation of the form of the award is the only matter on which we can usually have legal advice, and this leads me to think how much good it would do us if we studied this object more. Mr. Saunders tells us it would be a good thing if we had a court of appeal of our own. If the Institute could assist in the maturing of such a plan, I am convinced it would be largely resorted to both by architects and builders; but I am afraid that this is something rather in the future. I quite agree with Mr. Roumieu's remarks, for it does seem a most absurd thing that the moment you go into evidence the judge says, "This ought to be referred." The jury, of course, are only too glad to agree, and so get rid of the case; and then the judge is probably asked to name the arbitrator, and he, looking round amongst the bar, says, "Mr. So-and-so can take the case" (I believe it is customary to select some barrister then present), and it is referred to a barrister, and with what result in the matter of costs many of us know only too well. A case may be extended over twelve months, and all because the courts of law will not fully recognise us in those matters which specially should be referred to us.

After a few remarks from Professor Kerr in support of what had been urged, it was resolved that the Council be requested to take into consideration the suggestion with regard to the establishment of a professional tribunal, such as had been proposed by Mr. Saunders.

The vote of thanks to Mr. Fletcher was unanimously agreed to, and the meeting adjourned.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, the 20th of January, 1873, the following Paper was read—Professor KERR, Fellow, in the Chair:—

ARCHITECTURE PRACTICALLY CONSIDERED IN REFERENCE TO MUSIC.

By H. H. STATHAM, JUN., Associate.

SOME thirty or forty years ago, my native town, Liverpool, used to be the scene of triennial musical festivals, which were then held in a fearful building of the Batty Langley Gothic type, known as St. Luke's Church. Considerations, partly of a religious, partly of an artistic nature, inducing dissatisfaction with this arrangement, it was resolved to build a hall suitable for the purpose, and which should at the same time be an architectural embellishment to the town. The result, or a portion of the result, is pretty well known. A competition was instituted; a design was selected in which a young architect of remarkable genius had embodied his idea of the application of Greek architecture to modern wants; and the municipality of Liverpool obtained a public hall which, whatever criticism may be directed against its details, is in general effect one of the finest and most impressive interiors which the classic revival can boast of; and which may claim the less desirable distinction of being, in all probability, the worst music room in the world.

In fact the building referred to, St. George's Hall, is a notable instance of that want of relation between the architectural form of a structure, and the purpose for which it was intended, which has unfortunately characterised so many of the productions of both the Classic and Gothic revival. And in the case of buildings erected for music, there is less excuse for this discrepancy than in most other cases. The designer of a church or a town hall may reasonably think that he can invent no better type than is furnished by some of the finest buildings erected for the same purpose by former generations, except so far as changes of custom may modify their arrangement in detail. But a building for musical performances on a large scale is one of those things for which there really is no precedent previous to our own architectural dispensation. Music is pre-eminently the modern art, the only form of high art which has, practically, had its rise during the era of modern life, and the grandest results of which have been realised almost within our own generation, in those choral and orchestral performances on a large scale, which are becoming year by year more frequent and more frequented among us, and which, as Mr. Fergusson has truly observed, probably supply in modern Europe, more nearly than any other public entertainment, the place filled by the great dramatic fêtes in ancient Greece. In regard to buildings erected for such a purpose, therefore, we have a special encouragement to disregard precedent, at all events in the plan and arrangement which form the basis of architectural treatment; and to take the problem on its own ground alone. With the modern architect rests the responsibility of supplying buildings which shall give to this grand form of artistic entertainment the highest effect of which it is capable, and place those concerned in it in the best relative positions for hearing and being heard. Now in regard to one part of the question a great deal has been said and written, and a great many experiments made, viz.: the question of acoustics, both as regards the formation, conduction and reflection of sound, and the materials which are favourable or unfavourable in these

respects. This subject has been fully treated by our esteemed member, Mr. T. Roger Smith, in his valuable little work on acoustics. He also went into it at some length in a paper read here in December, 1860, and to his conclusions I have nothing material to add, except by way of offering one or two further illustrations of their practical correctness. But while the subject of music halls has been much considered from an *acoustic* point of view, it seems to me that it has hardly been looked at sufficiently from a *musical* point of view, I mean as to the best form, size, and arrangement of plan for different classes of musical performances. It is chiefly on this portion of the subject that I wish to offer a few suggestions, based, I must admit, not upon any precise scientific theory, but on some practical acquaintance with the art of music, combined with a pretty constant attendance at musical performances of all kinds for a good many years past. That some such practical acquaintance with music is necessary in dealing with the subject, as well as the knowledge of acoustics as a science, is evident from the whimsical and utterly unpractical schemes occasionally put forward by scientific theorists. Every now and then the subject comes into notice in the professional papers, and acoustic correspondents offer suggestions and theories, on the most profound scientific grounds, which the slightest acquaintance with music, and with the conditions of musical performances, would show to be utterly illusory.

Since the building of St. George's Hall we have had no structure of the same class which has attracted so much attention from architectural critics, until we come to the great hall opened about two years since at Kensington. The contrast between this and the first named building, regarded as structures for musical performances, is certainly remarkable and suggestive, both as to the spirit and intention with which they were built and the nature of the results obtained, and may be taken as a gauge of the progress we have made in the interim. In Elmes's building, the real object of the structure, the performance of music, was, one may almost say, ostentatiously and contemptuously disregarded. In an interesting series of letters written by the architect to Mr. Rawlinson, and printed by the latter for private circulation, it is noticeable that although other practical matters, such as the warming and ventilation of the building, are largely dwelt upon, the one solitary reference to the main object for which the building was supposed to be erected, occurs in a passage in which Elmes, replying apparently to some remarks of his correspondent as to the probable effect of the interior when finished, says, "I hope, when you 'contemplated the finished structure,' there was *no organ** at the end." How different this was in the case of the Albert Hall, we learned in the course of the interesting paper read here last year by its constructor. From what was then said it appears that the object of the hall as a place for musical performances was always kept in view, and that a great deal of thought, consideration and consultation was expended in order to secure the best acoustic qualities possible in so large a building. We may therefore regard the Albert Hall as the most recent specimen of a building carefully and intentionally constructed in reference to the performance of music on a large scale, and it may be instructive to consider how far it can fairly be said to have answered this end.

As before hinted, the question divides itself into the two heads of acoustic effect, and arrangement of plan. As to the former, without attempting to go over again the details of a subject which has been so ably treated here on a former occasion, it may here be observed, that in regard to the materials, of which a room is constructed, we may aim at three different results. We may either employ materials which will damp all resonance and absorb all sound as soon as it strikes the sides of the room, such as woollen stuffs, curtains, and draperies; or we may seek for materials which will give a direct and sharp reflection of the sounds that impinge upon them, as stone, marble, polished cement or

* The italics are Elmes's.

plaster: or, lastly, we may select materials which will neither sharply reflect nor absorb the sound, but will, if one may use the expression, sympathise with it, adopt its vibrations, and strengthen and intensify its tone, without reflecting it back in such a marked or violent manner as to cause confusion or annoyance to the ear. There may be circumstances in which the first system has its advantages. The Liverpool Philharmonic Hall is a specimen of this treatment; the room is full of curtains and upholstery, and what is heard there is heard distinctly and without disturbing influences, but it is a very dead room, very deficient in sonority, and I have reason to think the effect of the band is impaired by this. The only case in which I think such a muffling of a room might be of service would be in the case of a very large hall intended mainly for organ performances: for the organ, on account of the mechanical power and persistent character of its sounds, requires scarcely any assistance from the room, while on the other hand its effect is more readily confused and impaired by reverberation than that of any other instrument. The second system, that of employing sharply reflecting substances, cannot, I think, under any circumstances, be otherwise than positively injurious to musical effect. In a small room it imparts a meanness and hardness to the *timbre* of the music; in a large room it produces, of course, echoes which go far to do away with music altogether. This may be observed in our cathedrals, where the organ music especially becomes, when at all loud, a maze of indistinguishable sounds rolling about the building. This is popularly supposed to be very fine; and so much nonsense has been written on the subject, that it may be allowable to take this opportunity of pointing out that effects of echo are not "music," but only a disturbance of music. From letters which appear from time to time in the papers it is evident that some persons are very much in the dark on this point. Some little time ago some wiseacre made a violent attack, in the shape of a letter to the *Building News*, on the respected surveyor of St. Paul's Cathedral, for that he caused something to be done, I forget what, which had interfered or would interfere with the echoing qualities of the building, and thereby, as the writer said, spoil the grand effect of the organ. The fact is, that if Mr. Penrose could do away with the echo, he would be doing the very best thing for the music. Music must be regarded in the light of a highly intricate and delicate language, every syllable of which ought to be distinctly heard; and to imagine that its effect is increased by echo is as reasonable as it would be to say, in reporting the speech of a distinguished orator, that the effect of his eloquence was much enhanced by the fine echo of the building, which prolonged each syllable for several seconds after it was spoken. To return however, we have then the third system, of employing resonant but not highly reflective materials; and of these by far the best, and perhaps, for practical purposes, the only one available is wood. This, as we know, has been adopted in the Albert Hall. The result, considering the size of the room, has been a decided success; and I believe the degree of clearness with which a single voice can be heard in that very large edifice is to be attributed, in great measure, to this resonant wood lining. And here I may again compare the Albert Hall with St. George's Hall, which latter building is an example of a room constructed entirely of reflecting materials—marble, stone, tiles and cement. This is a most trying room for a solo voice, insomuch that vocalists who have been listened to with pleasure in other places have failed to satisfy an audience in this hall, and have been most unfairly judged in consequence, by those who were not aware how much the construction of a music room influences the effect of a voice. But the contrast is most marked in regard to the organ; and here the opportunity for comparison is unusually good. St. George's Hall contains the only other organ in England of the same size as the Albert Hall organ, built by the same builder, and played upon mostly by the same player. Now in St. George's Hall, the effect of loud music, of at all an intricate description, played upon the organ, is an absolute chaos; all detail and clearness of form in the music is obliterated; and it is only the *habitués* of the

organ concerts there, who have grown used to the effect to some extent, who can manage to make anything at all out of it. I used to suppose that this was a drawback incident to all organ performances in large buildings; and the Albert Hall being still larger, I expected a still worse result, and went to hear the organ one day as a kind of duty, and not anticipating any great pleasure from it. I was most agreeably surprised and pleased to find that though the resonance was in excess of what was beneficial, it was by no means such as materially to interfere with the effect of the music; which for the most part was distinct and well defined in effect. This, of course, was after the velarium was up; had it not been so, the result would no doubt have been less satisfactory, as the large concave surface of glass must have reflected the sound in a very detrimental manner. As it was the sound impinged upon surfaces which, though resonant, were not highly reflective, and the result was as described. That this organ was not as disadvantageously circumstanced as the one in Liverpool was apparently no fault of the organ builder, who, according to General Scott's statement, particularly recommended that the floor of the Albert Hall should be laid with tiles, and the walls finished with hard polished plaster. Fortunately for the effect of his own instrument, as well as for every other kind of musical performance in the Albert Hall, this ill-judged advice was not acted upon: but it may be mentioned as a warning to my professional brethren who may be engaged on buildings of this class, not to place much faith in what organ builders tell them. Organ builders know how to voice pipes, but beyond that, their opinions are very little to be relied upon.

Coming now to the consideration of arrangement and planning of concert rooms, so as to place performers and audience in the best possible relation to one another, we find this matter has received in general comparatively little attention, if we may judge from the results. Most of our concert rooms are a kind of enlargement and expansion of the old ball-room model, with a flat floor for dancing and promenading, and an orchestra for the players up above, out of the way; and this plan is mostly adhered to, although we have long ago recognised in our theatres the necessity of placing the auditorium at such a slope and angle that all may see and hear what passes on the stage. The building of which we have been speaking, however, is an innovation in these respects, and is held up as an example by a writer of an article in the last number of *Fraser's Magazine*, entitled "The True School for Architects." "The Albert Hall," this writer observes, "has been constructed on the sound theory of the beauty of fitness;" it has been built "in accordance with all the newest lights in connection with acoustics and optics which modern ingenuity has struck out, the object being to build a room in which the greatest number of people possible should be able to see and hear perfectly. The shape and proportion of the hall being thus decided on, its outer walls were properly regarded as a mere external case, to afford shelter and protection to what was within, and were built so as to follow the lines of the internal structure. The result has been the production of a building which is simple and dignified, and which, but for a certain need of economy, might have been exceedingly beautiful." Now all this sounds very logical and consistent, and the principle indicated is no doubt correct. But in point of fact the Albert Hall is in its general design as much the result of precedent as any other music room, and it is exactly in proportion as it is so that it is not successful as a music hall, nor can be adduced as an example of "the beauty of fitness." It is based avowedly on the form of the Roman amphitheatre, as our other music halls are (unavowedly) upon the English ball-room; as we have been distinctly told on the best authority,* "the general form of the amphitheatre was considered one of the fixed conditions of the problem." It is not generally desirable to go into such a problem with a fixed condition of this kind at the outset; and in this case the result has been an architectural and

* See General Scott's paper on the Albert Hall last session.

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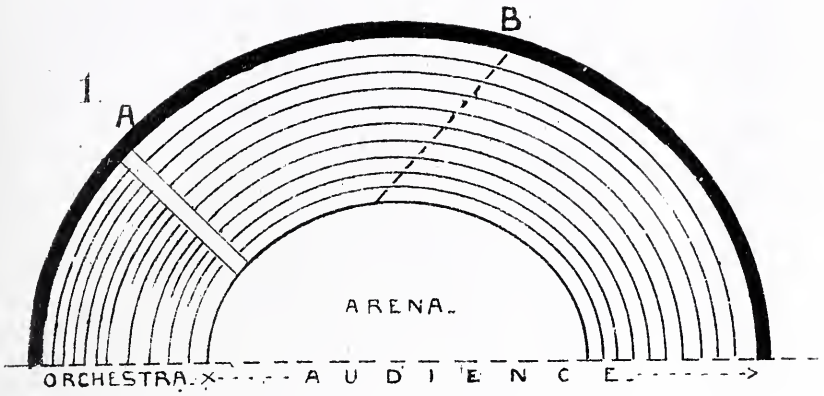

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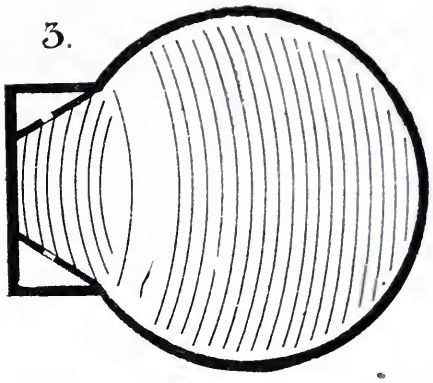

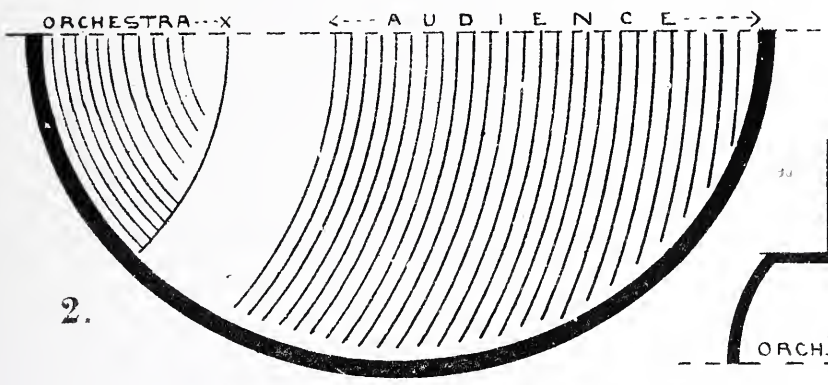

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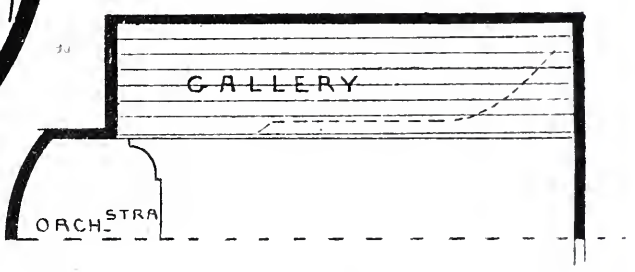


5. ENLARGED SECTION OF ORCHESTRA SEATS &c.

[SEE DIAGRAMS 6-7]

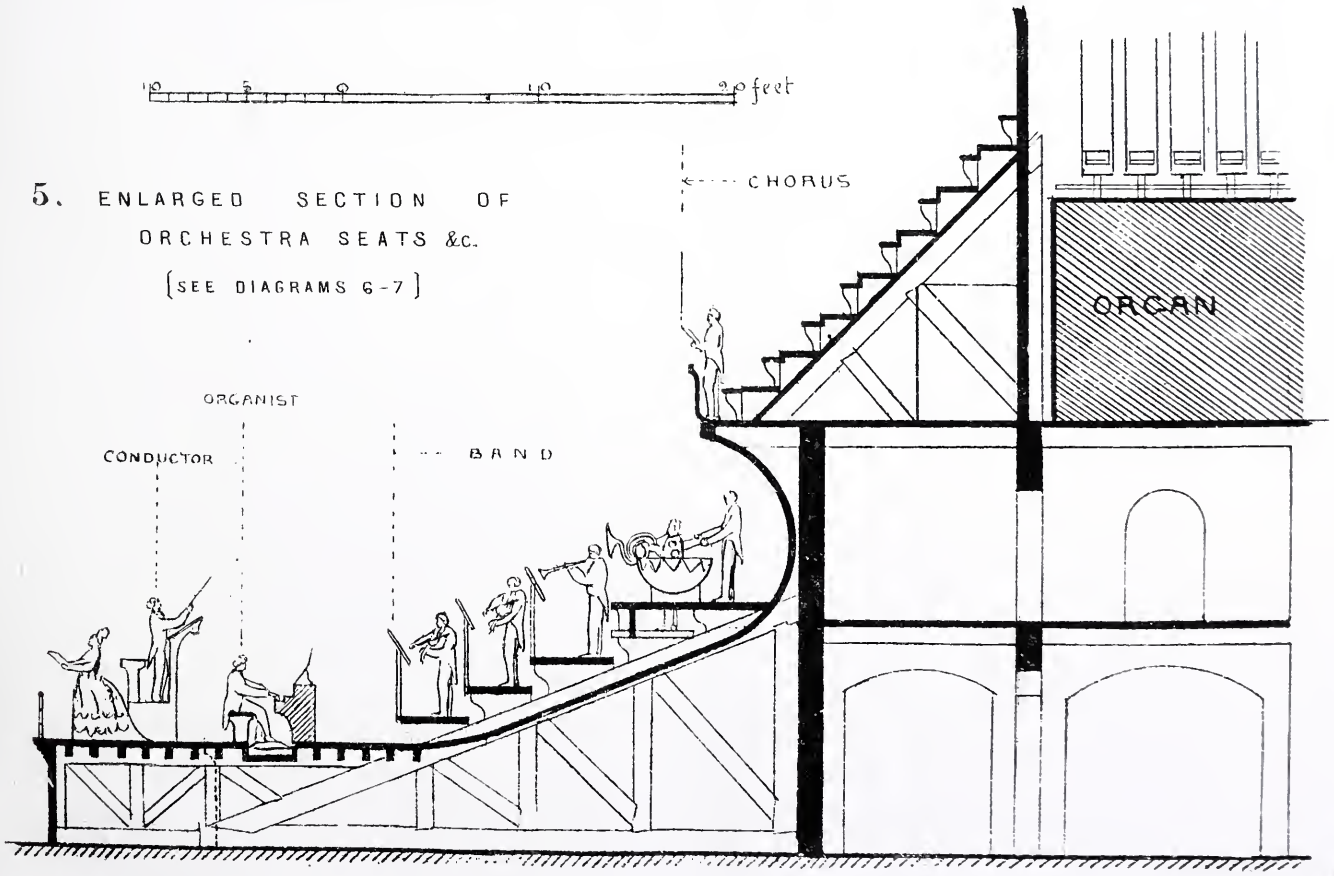


Photo-Lithog^d for the RIBA by Kell Bros London E.C.

practical inconsistency. The building is really one in which an audience occupying a part of the hall is to hear music performed by an orchestra at one end of it. The conditions for the favourable placing of those who are to produce, and those who are to hear the music, are so different, that on the usual theoretic principles of architectural design, such a disposition would certainly appear to involve a totally distinct treatment of the two extremities of a building. We have heard a good deal of late, not without reason, about the undue adherence to precedent shewn in church building, and the retention of the mediæval form of church without sufficient consideration of its adaptation to modern requirements. But the adoption, in a building where an audience at one end are to hear music performed at the other, of a form which was specially designed originally for persons seated round the sides to witness a spectacle in the centre, is surely a far greater inconsistency than is involved in building a three-aisled church for modern worship. For the objection is a practical as well as an æsthetic one. This arrangement of the seats brings a considerable portion of the audience into an altogether wrong position for hearing the music. That everybody can hear is perfectly true; the question is, what do they hear, and is it what they want to hear? Now the orchestra and a large part of the auditorium form part of the same ellipse, only separated from each other by an arbitrary division so placed as to mark off space for a sufficient number of performers. The result is that those portions of the audience within the space A B marked off by the dotted lines on fig. 1 can form no adequate idea of the effect of the music, because they are at one side of it; indeed, on the seats nearly adjoining the orchestra the audience are actually seated nearly behind the singers, at all events behind the direction in which the sound is impelled; and are hearing one side of the chorus close to them, while the other side is in the distance at the opposite extremity of the orchestra. This is the inevitable result of applying to a building for music an arrangement originally intended for a spectacle. If it were decided that the amphitheatre form of building was to be adopted, the best arrangement of the auditorium for enabling an audience all to hear an oratorio satisfactorily would probably be that indicated in fig. 2, where they are all brought in front of and facing the performers, and the disadvantage of a position at one side of a large orchestra is reduced to a minumum.

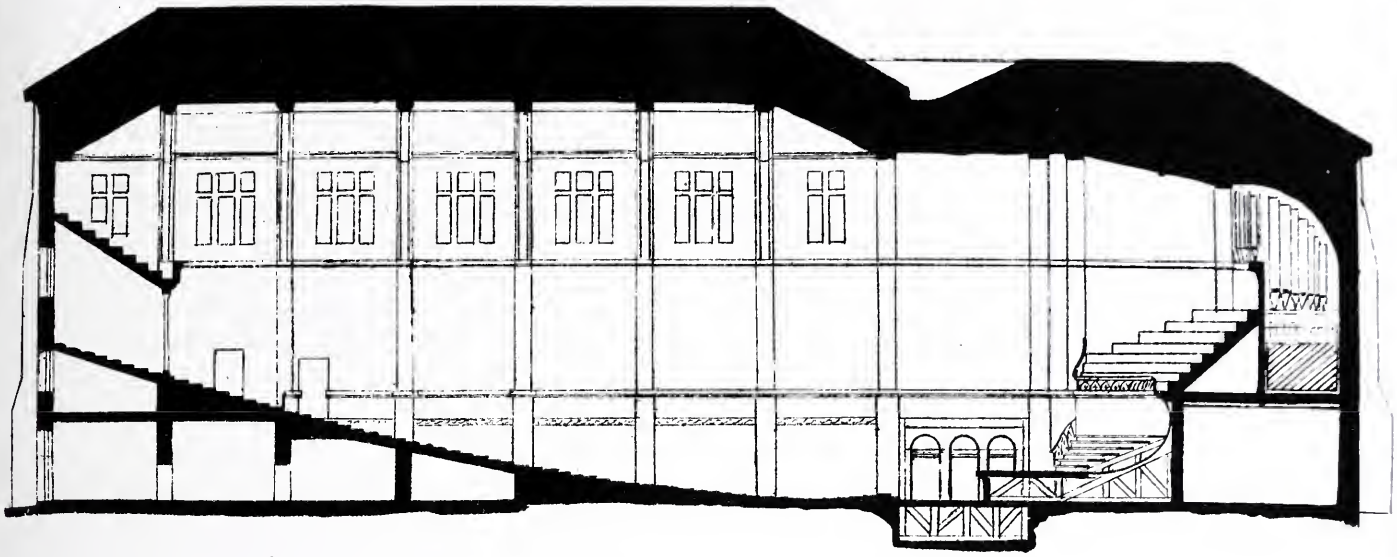
But it is probable that for the largest class of musical performances, the execution of great works of combined choral and instrumental effect, neither the amphitheatrical nor the theatrical form will be found the most suitable. The form of the complete amphitheatre, though its symmetry and simplicity may seem to recommend it, has this serious disadvantage (when used on a large scale) that the sound, as produced in the orchestra, is not properly controlled and confined in the direction in which it is most wanted. A certain proportion must be observed between height and width, and the wide area of an elliptic amphitheatre requires a lofty roof, and consequently a great space for the production of echo; a space into which the sound is launched with nothing to confine it in the direction of the audience, so that a considerable portion flies off to the roof, and is either absorbed there (if absorbent materials are placed to retain it), and so wasted, or it is reflected back again and becomes a source of serious disturbance. Something approaching to the theatre form is better, as the orchestra can then be confined under a lower roof and between side walls, and the sound driven more forward; and for a concert room on a small scale for vocal performances, the form shewn in fig. 3 would probably prove a good one. If employed on a large scale, there is still the same objection of a necessarily lofty roof and vast centre space, in which much sound is lost and dispersed, besides a degree of difficulty in getting all the audience sufficiently in front of and facing the music. Accommodation, too, in such a case must be obtained by the use of successive tiers of galleries, which, except in the front row or two, can scarcely ever be so good for hearing as the uninterrupted area. On the whole, therefore, I believe it will be found that the requirements of the case are best met, and the difficulties best avoided by the

long form of room, rather than the theatre or amphitheatre form, and that conduction is a more direct and successful way of conveying the sound to the audience than radiation. The waste space of air in a room of this size may be made much less in proportion to the area than in an amphitheatre, as the amphitheatre could not be made to look otherwise than ill-proportioned, unless its roof were placed at a considerable height from the floor; but for a rectangular room, a smaller proportion of height to width would be satisfactory enough, and the sound in its transit from the performers to the audience could be confined within more manageable limits. For the successful conduction of sound in this way through a long building it is essential that the sound, as produced in the orchestra, should be confined from spreading above or at one side of the performers, and reflected forward as strongly as possible; that the height of the auditorium, though greater than that of the orchestra, should not be such as to give room for any unnecessary loss or dispersion of sound, or to allow space for a disturbing echo from the roof; that for the same end the roof should be nearly flat rather than circular, so as not to collect and focus any reflection of sound which may be inevitable. The orchestra should be constructed principally of wood, and the walls of the auditorium lined with wood; but the walls, as well as the ceiling, require to have their otherwise flat surfaces broken at intervals by projections, in order to avoid the conduction of sound along the walls, and break up any reflection from the ceiling; and careful provision must be made against a return echo from the end of the room. So much for the principal acoustic provisions, which have been before laid down from experiment by some of the best authorities on the subject, and in regard to which I need only observe that my own experience, as far as it goes, completely confirms them. But now as to arrangement of the audience and performers in regard to one another. One of the principal advantages of the longitudinal room is that the audience all sit facing and directly opposite to the performers; not only a better position for hearing, but more comfortable in every way; for although we do not hear with our eyes, there is an irresistible tendency to look towards the quarter from which the sound comes; and in a side gallery in a music hall you will always see the audience with their heads all turned sideways to look at the orchestra. A room with a flat floor, however, is always unsatisfactory for hearing, and I hold that the seats should always rise as they recede from the orchestra. When sitting, as I have often done, at the back of a long flat-floored room at a concert, I have always *felt* that the principal volume of sound was over my head, and out of my reach, so to speak. In the roughly sketched diagrams (figs. 6, 7), for a concert room on this model, the floor is accordingly shewn ascending, not by a regular slope, but in a curve, on the principle called by Mr. Scott Russell the "isaconstic curve," the method of setting out which is fully explained and illustrated in Mr. Roger Smith's work on Acoustics (page 43 *et seq.*). In a room of such length as this, however, it is not possible to carry out the rise of the seats to the extent contemplated by Mr. Russell (raising the sight line 1 foot 6 inches for each seat) as this would soon bring the auditorium up to the ceiling, unless the performers were placed very high, which for other reasons is undesirable. I have been content with a rise of seven or eight inches for each person. The tendency of this curve is to fall near the point of sound production, and to rise again further on; this brings the front rows of the auditory higher up in relation to the performers, so that the sound is not carried so far over their heads as would otherwise be the case. Another point to be considered in placing the audience is, that for a performance on a large scale (which alone we are now considering), no person who wishes to enjoy the music, or to realise its true effect, would ever choose to sit close up to the orchestra. As concert rooms are generally arranged, it may be taken as a rule that for this class of performance all the first ten or twelve rows of seats, if not more, are thrown away, so far as any real enjoyment of the music goes. Now we generally find, in connection with concert rooms, a considerable space in front of the audience end

6.

HALL FOR ORATORIO CONCERTS &c.

TO SEAT ABOUT 4,000 WITH BAND AND CHORUS OF 600.



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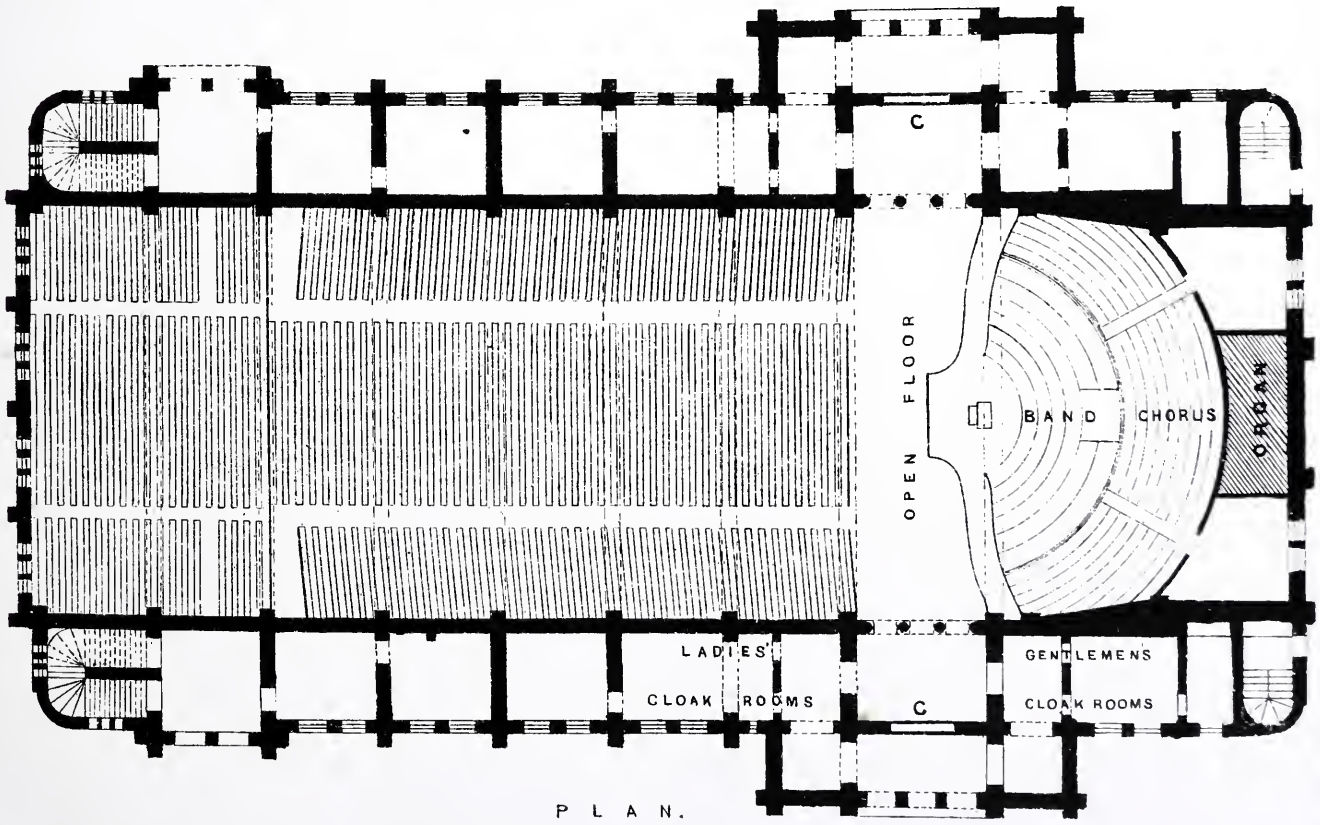


PLAN.

Photo Lithog.ᵈ for the R.I.B.A. by Kell Bros. London, E.C.

occupied by a large lobby or crush-room, serving mainly as a waiting place for relieving the pressure of the crowd in going out or coming in. Now I have proposed here the system of carrying the auditorium to the very back of the building, and making the entrances to the principal portion of it at the sides, between the auditorium and the orchestra, and transforming the space usually occupied by the front seats, in which no one can hear with pleasure, into a vacant space which may act as a crush-room or *foyer* before and after the concert, and as a promenade for part of the audience during the interval which generally occurs in the middle of a performance. If this space were laid with parquetry flooring on joists, with a hollow space underneath, it would not only make a very effective entrance to a room, but would probably act as a reflector and reinforcer of the sound from the orchestra.* The fact that any of the audience leaving before the close of a concert would have to pass before the performers, may occur as an objection; but it is only the solo performers in front of the platform who are much disturbed by such an untimely exodus, and by the arrangement of the aisles it will be seen that the audience need not pass near them at all. It may be observed that there should never be a centre aisle between the seats in a concert room, as this places the solo singer opposite an empty strip of floor instead of a range of appreciative countenances. The possibility of draughts to the performers appears a more serious objection to this placing of the entrance, but I think it may be entirely obviated by such an arrangement as is indicated in the plan, of making the lobbies to the ladies' and gentlemen's cloak rooms the approach to the inner vestibule, and having no direct communication between it and the outer vestibule; and by keeping the inner vestibule well warmed, and with a sufficient outlet at the top, any draughts which might be drawn in would be disposed of here, without finding their way into the concert room.† This is of course only a question of ordinary planning; but I think in all cases of entrances to concert halls some such decisive means should be employed to shut out any access of cold air from without, which is the cause of much indisposition among singers, independently of the discomfort to the audience.

Now in regard to the orchestra: it may be said that the placing of the various performers not only so as to be well heard by the audience, but so as not to incommode or interfere with each other, has been almost entirely overlooked in most cases. It is generally considered sufficient to make a tier of semicircular stages, one behind another, and the band and chorus fit themselves into these in a kind of promiscuous manner, while the solo singers find room where they can in the narrow strip left for them in front of the band. This might have done very well in old days of smaller performances, and when the band was used much more in conjunction with the chorus than it now is, and for the most part played the same notes which the chorus sung. Now the case is very different; the modern band is much more powerful and brilliant than the old one, and is mostly used quite independently of the chorus and in a different manner: and the usual construction of the orchestra, which crowds the band and chorus together, is a double disadvantage. The band is immediately backed, not by any sound-reflecting substance, but by the mass of the chorus, whose dress forms a body of sound-absorbing material; and on the other hand the singers are liable to be put out and disturbed by the noise of particular instruments close to them; for it may be supposed that a chorus singer is not likely to go through his part the more correctly with a trombone bellowing in his ear something quite different from what he is singing. The construction of the orchestra which I would propose as an improvement is, as shown on the section (fig. 5), to enclose the band with a kind of wooden shell or sound-board bending

* This open space might, with advantage, be wider than shewn in the plan, in cases where economy of seat room was not a primary consideration.

† It would be easy, of course, to provide large sliding doors at C, to be thrown back for a general exit, or in case of any sudden rush of people.

round them in the rear, and coming under their feet to the front, the stages on which they stand being carried by framing at intervals. The sound-board would be carried above the heads of the upper rank of the band and bent forward over them to some extent; and then above and behind this and on the upper level would be ranged the chorus seats. By this means I expect that the sound of the band would be thrown forward into the room, while at the same time the sound especially of the louder instruments, the brass and drums (which are always at the back) would be to a certain extent veiled from the singers, who would be able to hear their own voices better, and hear the band as a consentaneous union of instruments, instead of having here and there a particular instrument close to their ears, drowning everything else.

This arrangement of the orchestra in two tiers would be susceptible also of very good decorative treatment. The orchestra as planned in the drawings is intended to accommodate a band of about eighty; a good average number for the best class of band. It may be useful just to mention how the instruments are generally placed, and what space is required for each. A band of this size would include about thirty-two or thirty-four violins, divided into first and second, and occupying the lower stages to left and right of the conductor (who faces them); about twelve tenor violins placed in the middle of the same stages, between the firsts and seconds; and from eight to ten violoncellos, and nearly the same number of basses, which are usually divided and placed half on each side, behind the violins. Then there are the quieter wind instruments, the wood instruments, almost always eight in number, which should range in a row behind the tenor violins, as sometimes they are kept more to the left; and as the back are placed the drums, and on each side of them the brass instruments. If the stages are made about 3 ft. wide, it will be found sufficient for the violins; the two back rows should be wider to allow plenty of room for the larger stringed instruments. About three feet longitudinally should be allowed for each violin, and about a foot more for the violoncellos; the basses, which are very bulky instruments, must be reckoned as requiring nearly five feet to each player. A platform the width of two stages should be left in the centre of the two top rows for the drums, which for want of such a provision are often very inconveniently placed. The wind-instrument players require little more than easy standing room longitudinally, their instruments not necessitating much action in playing. These details are not quite superfluous, as I knew a case where an architect was instructed to provide room for a band of sixty, and very conscientiously provided standing room for sixty persons; which did not quite answer. The organ should be at the back of the whole, behind the chorus, to whom it is the greatest assistance; and it should, wherever possible, be rather spread out laterally behind the singers than projecting forward among them in a square mass: the latter is the almost universal arrangement, but it is bad, as it places a part of the chorus on each side in a recess where they are not well heard and cannot hear each other; which latter point, it should be remembered, is an essential for satisfactory performance. The rest of the space behind the singers would be filled up with a wooden partition like that behind the band, or it may be partially filled by carrying round some of the larger organ pipes in a segment of a circle, which might add very much to the architectural effect. In the organ height has to be provided for a pipe 32 feet long, which is the longest used; but these larger pipes may be placed below the level of the visible organ case; they will be just as well heard, it being an understood thing that the organ is connected with and supported by the same system of timber framing which carries the chorus seats. The organist should *always* be placed below in front of the whole orchestra, which, now that the electric movement can be applied, is easily done. This is most important; for when the player is caged up close under the instrument he cannot possibly tell what effect he is producing; but there are very few concert rooms in England where this has been attended to. Lastly, the solo singers

I would have advanced on a small projecting platform of their own, so as to be a little nearer the audience and further from the band; by this means not only will their voices stand out better, but they will not be incommoded by the too near proximity of the band.

These deviations from the regulation arrangement of the orchestra would, I believe, conduce to the more successful and clear performance of music on a large scale, and to the comfort and ease of the performers in going through their work. The auditorium, it may be observed, is not unlike that of Exeter Hall in general arrangement, but the seats there are not arranged on a curve, and the proportions of Exeter Hall are broader and shorter. But, ugly and faulty in many ways as that time-honoured room is, I have never heard the effect of oratorio choruses on a large scale so clearly and satisfactorily as from the back part of Exeter Hall. I attribute this to the raised seats and to the position of the audience directly facing the performers; the ceiling is low, and it is a question of simple conduction of sound. In fact there is too much sound for the place; and I believe that rooms built on this principle, and with the best acoustic materials and arrangement, might be made much longer than they commonly are, without at all losing the effect of the music. In my sketch plan the auditorium is 150 feet long, exclusive of the space in front of the audience. The length from the front of the orchestra to the back of the hall in St. George's Hall, is about 140 feet, and a flight of steps at the back rises to about eight or ten feet above the floor level. From the manner in which a band at the other end can be heard at this extreme point, I have no doubt that with proper construction the room might be prolonged 100 feet further with success. So also Exeter Hall might be prolonged, without the gallery, to a very considerable extent, with improvement to the effect. Of course, it may be said that side galleries would give the same accommodation without increasing the length. But side galleries are most unsatisfactory places for hearing music. In one hall with which I am very familiar, there are long galleries at each side arranged in a slope from front to back, which take about one thousand of the audience. But in those galleries the part in which you can hear the effect of band and chorus fairly even, is just the small portion outside of the dotted lines in diagram 4; in all the rest of the gallery it is an unsatisfactory endeavour to hear. Large windows in any position where they can reflect sound are undesirable, and lighting from the roof is generally bad on this account. On the whole the windows are probably safest high up in the side walls; and concert rooms being so much more used by night than by day, lighting is not the most important point. One practical difficulty in dealing with a hall on this plan is, of course, the utilisation of the space under the seats at the back, which is too large an area to be thrown away: in towns probably it would generally become an available source of revenue as shops, or in some similar manner; and where the site allows of no approach at the side the entrance of course would be here.

Very large ideas have been afloat lately as to the number of persons who may be accommodated to hear music in one building; and a well known writer on architecture has made it a charge against us that we are content with getting three or four thousand people into a concert room, whereas, if the buildings were properly arranged four or five times that number might hear. This idea I believe to be a complete fallacy, and one which those who build such rooms should discourage. It is impossible by any acoustic expedients to secure that music should be intelligibly heard and effectively rendered in rooms beyond certain limits of size. I say *intelligibly* heard, because that, as before hinted, is really the point. You may no doubt group 15,000 or 20,000 people in such a way that they shall all be within sound of the performers, and have a general notion of what is going on, but that is not hearing music. It does not in the least follow that because 500 performers produce a certain effect in a building of a certain size, that 2,000 will produce an equal effect in a building

of four times the area; for two reasons. The organ can be in some degree adapted to an increased scale of building, because its sounds are produced purely by mechanism, and by a heavier pressure of wind they can be forced up to a proportionate strength. I do not think these huge over-blown music-mills give as much pleasure to the ear as the old quieter instruments; but it must be admitted that they can make themselves heard. But in regard to other instruments and voices, increase of power can only be got by multiplying the numbers, and this is not the same thing at all. With increase of numbers comes decrease of delicacy, accuracy and precision; and, besides, a peculiar indistinctness and want of sharpness of effect, better felt than described, as if the outlines of the composition were blurred and uncertain, the result I suppose of the fact that when a thousand or more performers are to sing together they must be so far asunder that their sounds do not strike the ear with that combined and instantaneous effect which can be secured with a smaller number. In the second place 15,000 or 20,000 people cannot be accommodated within hearing of music at all except in a building having a great cubical capacity in proportion to its area; that is to say, a vast mass of air space between the performers and a great portion of the audience, and sound cannot, by ordinary means, be forced through this space without a liability to be dispersed and disturbed in its passage. This is not, certainly, a very scientific way of putting it, but this is the only way in which I can explain the singular effect of the music in the Albert Hall as heard in the balcony. You get a part of a phrase, from the violins for instance, distinctly, and the other portion of it seems to go away somewhere else—

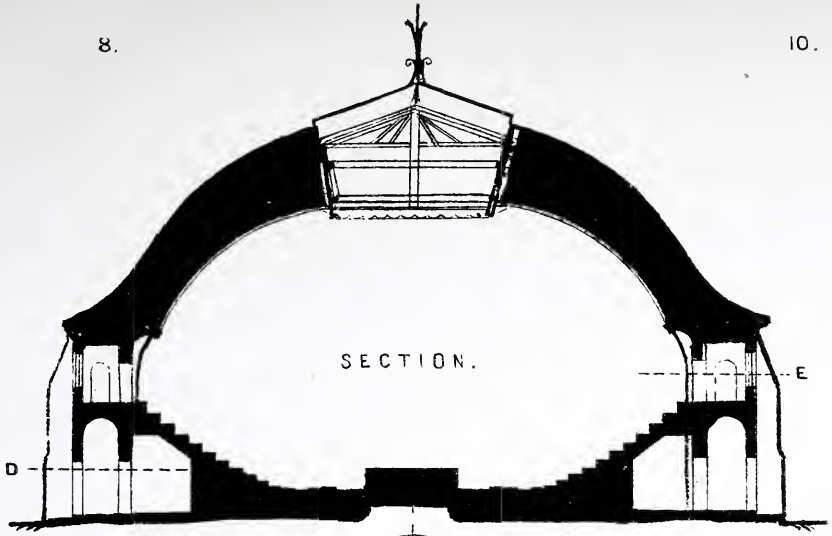
"The rest the gods dispersed in empty air."

You do not hear particular instruments come in when they ought, but you find them out when they have got half through a phrase. This singular effect I noticed over and over again the first time I visited the building. This is not "hearing music." I have heard, within a short period, 1000 performers in the Albert Hall, 500 in Exeter Hall, and 250 in the Liverpool Philharmonic Hall. The 500 produced the greatest effect; but certainly the 250 in the comparatively small room at Liverpool produced more effect than the 1000 in the large Hall, and as to clearness of rendering, in regard to detail, there is absolutely no comparison. I should apologise perhaps for going into what may seem purely musical questions; but the corollary from all this is that great buildings like the Albert Hall are unsuitable for a clear and intelligible rendering of music: and the result would have been far more satisfactory, for this end, if two halls of half the size had been built, and the audience and performers divided between them. It may be possible to enable 10,000 people, or at all events 8,000, to hear 500 performers satisfactorily, but I do not believe it is possible to enable 20,000 to hear 1,000 with the like result.

We have been considering so far the problem of buildings for large combined choral and instrumental performances only. A different class of performance, however, changes the conditions very much. In comparing vocal and instrumental concerts, it must be remembered that voices can be satisfactorily heard in front only, but the greater proportion of instruments can be heard nearly equally well all round; even the wind instruments, which come nearest to the conditions of voices, can be heard as well sideways as frontways for all practical purposes, and can be very fairly heard even when playing away from the listener. For this reason a central position may become the best for the performers in a building intended specially for this class of music. There is a most beautiful and intellectual class of compositions written by the great masters of the art as "chamber music," consisting mostly of music for three, four or five stringed instruments. The idea occurred some few years ago of bringing these works within the knowledge of a larger public by that series of performances which has gained such

ROOM FOR INSTRUMENTAL CHAMBER CONCERTS.
TO SEAT 2,000.

8.



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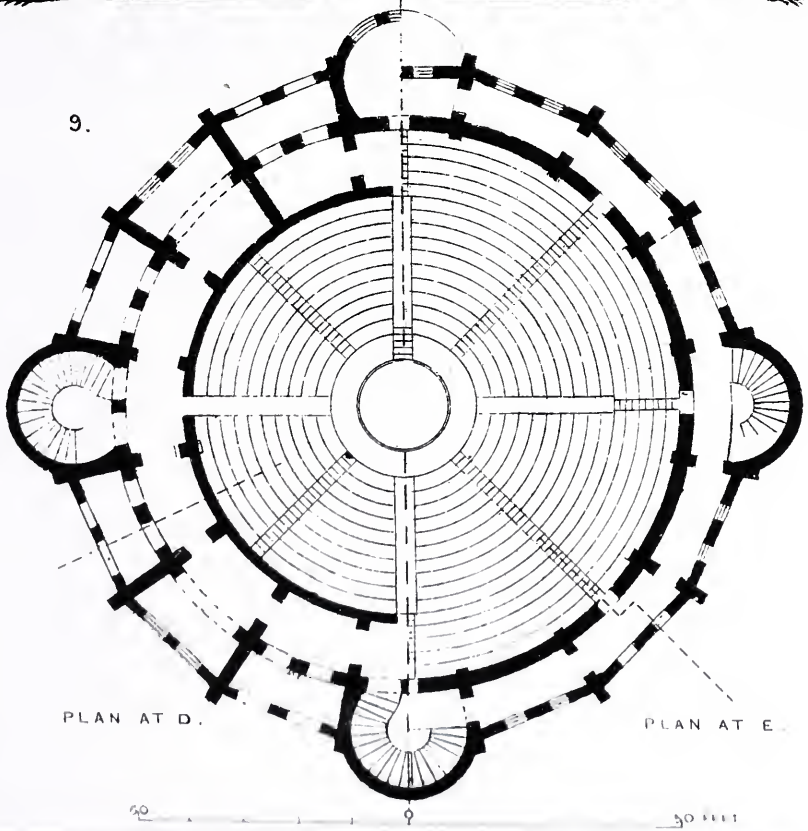

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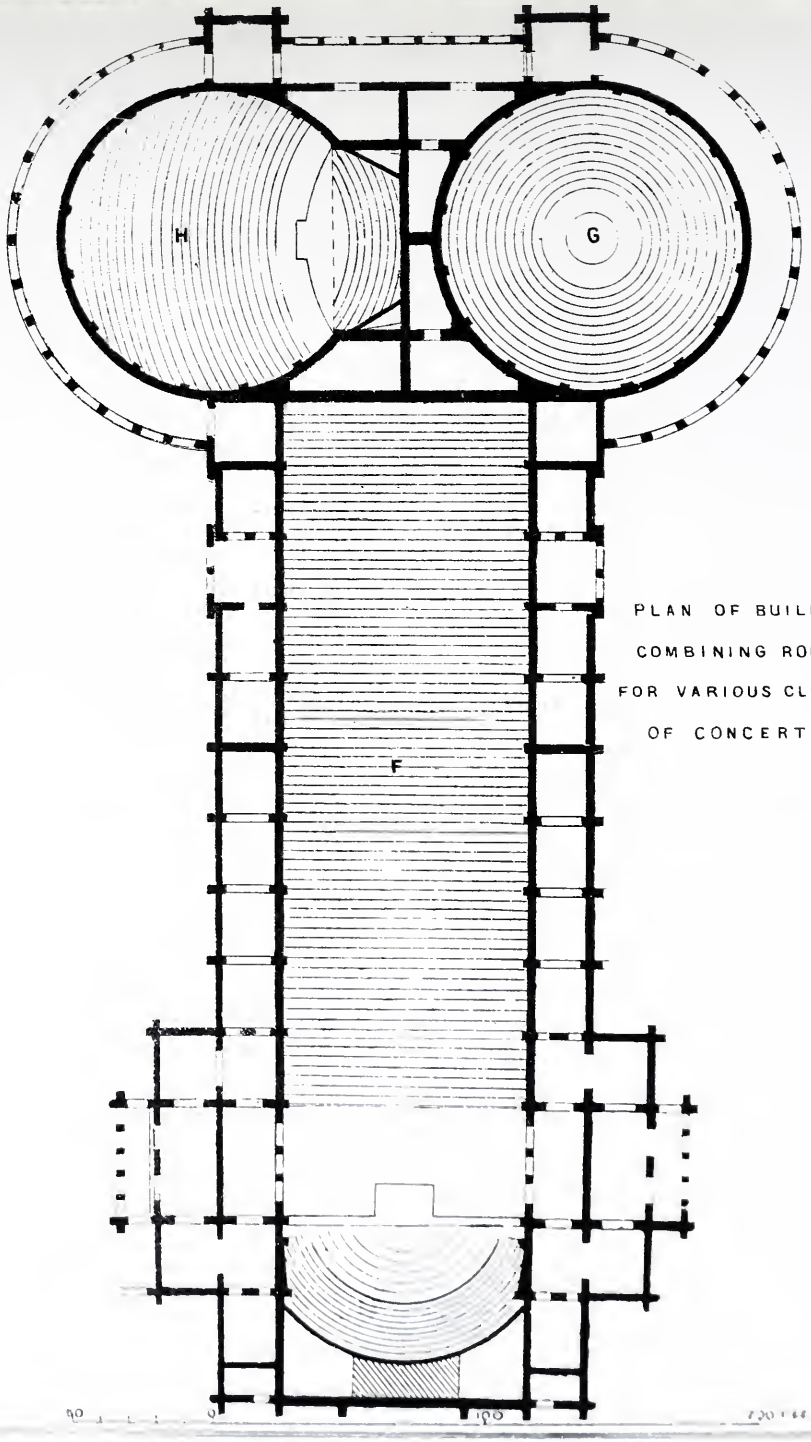

PLAN OF BUILDING
COMBINING ROOMS
FOR VARIOUS CLASSES
OF CONCERTS.

celebrity under the title of "Monday Popular Concerts." These, though in one sense a great success, are given under the most serious disadvantages from the want of suitably planned and constructed rooms for them. It is absurd to suppose that the same concert rooms which are suitable for an oratorio performance can be suitable for this fine and delicate class of music. To treat chamber music so is as reasonable as it would be to place a statuette intended for a drawing room in the centre of a large square. What is wanted in this case is a room where all the audience shall be as near as possible to the performers, and where there should be as little waste air space as possible. In this case the centre of the room is quite the most suitable place for the performers, and a circular building, with concentric ranges of seats, and a raised platform in the centre, would be probably the best form that could be employed. Fig. 8, 9 represent a proposed plan of such a room, the seats for the audience to be arranged on the isacoustic curve, the whole building kept low in comparison with its area, and roofed by a dome, with light iron or timber ribs,* and a central light. The inner surface of the dome should be lined with wood panelling, as also the wall above the top row of seats. The central skylight would be the simplest and most natural method of lighting in a case of this kind; but to obviate the echo from a flat surface of glass, I would glaze the inner skylight as a congeries of small circular lights, with convex glass, the convex side downwards; this would effectually break up and disperse echo; and at night artificial light could be applied within and above the centre of each of these lights. In a building arranged on this plan, there would not be more than about thirty-five feet above the players at the highest point: the whole of the resonant surfaces, the roof and walls, would be equidistant from the players, and the sound would impinge on every point at the same moment; the building, as suggested here, would seat 2000 people, of whom the furthest row would be within fifty feet of the players. In such a room I believe 2000 people would be able to hear string quartett music with the effect which the composer intended. This is certainly not the case in St. James's Hall, where these compositions are now played. It is possible that for instrumental music on a larger scale the central arrangement of the players might be found the best in some ways, as bringing a larger number within good hearing distance of the more delicate passages, though the arrangement and placing of the musicians in such a case is a matter of some little difficulty. I was not aware till the other day that this idea had been practically adopted for some time past at M. Pasdeloup's Sunday instrumental concerts in Paris, which are given in a building at other times used as a circus, the orchestra being placed in the centre. The *Athenæum* of January 11th contained a long communication on orchestral concerts at Paris, in which the writer mentioned this arrangement as realizing a very satisfactory effect, and added, "the matter is worthy the consideration of architects who may have to erect new concert halls;" and though I think the Albert Hall far too large as it stands, to realize the more delicate effects of orchestral playing, it is very possible that if you were to take the amphitheatre portion alone (omitting the boxes), with a lower roof, and place the orchestra in the arena, it might prove an exceedingly satisfactory arrangement for enabling a large number of persons to hear a symphony to advantage. It would be impossible to place the wind instruments so that they could be equally well heard by every one; but this, I think, would be the only serious difficulty. Of course this central arrangement in both cases supposes concerts of instrumental music alone, unmixed with singing. We are not much accustomed to this in England, but this is mere matter of fashion, and since the conditions of successful hearing for voices and instruments are so different, it seems better, when large audiences are in question, not to mix them.

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* Timber would be preferable for acoustic reasons, as well as for attaching the wood ceiling, though the practical problem of a low wide roof might be more difficult than with iron.

There is one instrument which is the means of bringing architecture and music into more direct and immediate relation than any other. The organ, which really is not so much an instrument as a second orchestra in itself, not only demands great practical care as to its position and surroundings, but forms in itself so important and permanent a feature in a building—an edifice within an edifice—that its design and architectural treatment become a matter of some moment. The architects of the classic revival, from Wren to Elmes, seem to have had a special spite against the organ, and to have regarded it generally as a nuisance interfering with their architectural compositions. The architects of the Gothic revival profess often a great interest in the organ; but the unfortunate instrument, or its representative the organist, might well exclaim "Save me from my friends." The greatest ingenuity could devise nothing more cruel, more absolutely ruinous to the effect of the instrument, than those receptacles in churches, called "organ chambers," in which it has become the almost universal practice to confine the instrument—placed under a low roof, and its sound only allowed to escape through arches on two sides (or sometimes only on one side), all possibility of anything like grandeur of effect is removed; and the result is, a great noise in the immediate vicinity of the instrument, and a muffled and unsatisfactory effect further off; all the harsher tones are exaggerated, instead of the whole being blended into one volume of sound. The position is bad in other ways, for it is commonly against two outside walls, subjecting the instrument to changes of temperature to which it is extremely sensitive; and cramping it up into too small a space, which not only increases the chances of disarrangement of the mechanism, but the difficulty also of keeping it in proper repair. The ideas of architects generally, about the space required for an organ, are far too limited, and the consequence is that the organs have to be squeezed into too small a space, at the expense both of musical effect and mechanical construction. There ought to be room for all the pipes without crowding, and for every part of the instrument to be got at without disturbing any other part. This is scarcely ever the case in the conventional organ chambers. If, from ritual considerations, it is a fixed condition that the choir are to be at the east end, the organ must be near them, but need not be in a cage; it should be provided for in an open transept near the choir, and the same height as the rest of the church, or nearly so. If, from any circumstances, the architect is compelled by pressure from without to adhere to the organ chamber, the floor of this should be made lower than that of the church (proper provision being made against damp); the bellows and other parts of the mechanism will then go below the floor, and the pipes may have a chance of being sufficiently low to sound fairly through the arches. But, taking the question on musical grounds alone, there can be no doubt whatever that the west end of a church is the place for the organ, even if it has to be placed in a gallery in order to clear a west doorway, though it is of course better nearer the floor, and merely on a raised platform. In cathedrals by far the finest position for the organ, in regard to effect, is the time-honoured place on the choir screen; nor can I quite share the feeling which regards it as necessarily an architectural eyesore there. At all events, in endeavouring to dispose of it otherwise, it will never do to dismember the instrument in the way which has been proposed on some occasions. In the architect's report as to the re-arrangement of Salisbury Cathedral (printed in the *Builder*, in July, 1870), it was proposed, after a lament over the increased size of modern organs, to "draft off all the cumbersome parts of the organ to the back of the stalls in the first arches right and left, in the choir aisles, where they would be very much concealed, or possibly, if found practicable, into the triforum." Such a cutting up of the instrument into bits would be very injurious to the musical effect, however it might be for the architectural. The difficulty of the increased size of organs might be met in such a case, by placing the largest pipes lower down in the choir screen on each side of the entry into the choir, where they could either be sunk partly below the floor level, or (if the safety of the piers might be affected by this) the pipes could be placed horizontally; as the larger pipes, the wooden

ones in particular, which occupy the most room, can be placed so with little, if any, loss of effect. Another plan would be, if the architect were very desirous to keep the vista unimpeded, to place the organ sideways just under the north or south transept arch, or it might be placed on each side in this way with good effect, as it might then be divided into two instruments of equal power, capable of being used together or separately by the same player. But to cut up an organ into bits, and to put one bit here and another there, is, musically speaking, absurd. In regard to the position of organs in concert halls something has been said already: it may be added, however, that, considering what a very large and important object a great organ is in a hall, almost a piece of architecture by itself, it is not in generally considered sufficiently in reference to the general design of the building. In almost all our concert rooms the organ looks like an after-thought, put there with no relation to the general design of the room. In St. James's Hall the organ is balanced on the top of some long posts. In the Albert Hall the organ is a gigantic excrescence, and the case, if case it can be called, has positively no relation whatever in point of design, either to its position or to anything else in the building. So it is, more or less, in most instances. This might be avoided. It is generally possible to ascertain at the outset, when a large concert hall is being built, the intended size and position of the organ; and I should like to see this made a portion of the design from the first; the basis, at all events, on which the organ stands being connected with the architecture of the room, in a permanent manner. In using the larger pipes as a part of the design (and nothing could be more suitable) it should be remembered that in the construction of an organ the largest pipes are always arranged on the two sides, and the smaller ones in the middle; the natural arrangement of the design, therefore, is with large wings and a low centre; an organ case with the principal feature in the centre is a contradiction of the intended arrangement, besides being an inconvenience to the builder, as it takes the larger pipes further from their proper position. In the manner of designing organ cases at present, there seems to be too much of what may be called a studied simplicity, but which amounts to bareness. A row of pipes of different heights, with a band across, seems often to be considered quite enough to constitute a design. I do not think the new plan of leaving the tops of the pipes totally displayed, without any finish, is any advantage to their sound, and the result, in many cases, is anything but beautiful or ornamental. In this respect there is certainly room for improvement in the prevalent manner of designing organ cases; and I think it can hardly be disputed that, in regard to smaller instruments especially, many of the organ cases made one hundred or one hundred and fifty years ago are, in regard to general artistic treatment, far superior to what are frequently put in modern churches.

I have, of course, purposely confined myself to suggestions as to the practical nature of the requirements of buildings for musical performances, without pretending to offer examples or specimens of their possible architectural treatment in point of design, which it would be quite out of place for me to do here. In suggesting practical dispositions of plan and arrangement for any class of building, it is however impossible for us to look at them in our minds on this ground alone, or without reflection as to what bearing these requirements may have on architectural design, or what scope they offer for architectural treatment. And if the general conditions suggested above as the best for concert rooms be in the main correct, it must be admitted that the prospect of the architectural designer seems rather unpromising, and his relations with music likely to be among the least interesting to his artistic feelings. Interiors without flat floors, for instance, especially when in the parallelogram form, seem so much at variance with all our notions of architectural effect, that one may understand that many persons would prefer to lose a part of the musical effect in order the better to realize the architectural effect. The undoubted fact, too, that a comparatively low-proportioned room is the best for music, is another stumbling block to the enthusiastic architect, such rooms certainly not being in general the

most architecturally effective. It would almost seem as if architecture and music, the two arts which in their metaphysical principles and effect on the mind most resemble each other, are physically in a state of opposition, and that one cannot exist along with the other. One would wish that it might be otherwise; and that with noble music we might also join noble architecture, "the music of the eye," as it has been termed. And in regard to the principle of construction suggested, of course there would be many cases in which it would be considered undesirable to carry these out in their entirety, as necessarily unfitting a building for other purposes; and until the love of music has become more strongly and widely developed among us (though it is progressing rapidly) we can scarcely expect in a general way to see a set of buildings constructed and set apart on purpose for such performances, in the same way that the universal love of theatrical exhibition has specialised the class of buildings called theatres. But even at present there will occur here and there occasions when a building can be erected solely and exclusively for music, and in which the architect will be justified in adopting every practical means for increasing the efficiency and suitability of the building in regard to this one object. Can he hope, with this, to be able to combine architectural beauty and effect? In regard to the treatment of circular buildings there is a good deal of scope for effect in the internal design, with the aid of colour, without interfering in any way with the properties of the building as a music room; and in rooms of this form the rising slope of the seats perhaps rather assists than injures the architectural effect. It is in the external design that the tug of war would come in this case. In regard to the question of long rooms, the conditions are still more unsatisfactory; and the architect who should succeed in producing a satisfactory internal effect from a long, not very high room, with a sloping floor, might consider that he had done something to keep his name alive. The treatment of the building externally so as to indicate the internal construction might give scope for some piquant effects; internally it has seemed to me that the best chance for the architect would lie in treating separately and very plainly the lower portion of the walls between the highest and lowest level of seating, making this as it were the receptacle for the audience, then marking as strongly as possible the horizontal lines at the highest level of the seating, and let the architectural composition proper commence above this line, or rather stand on the flanking walls of the auditorium as a basement. Such a treatment would at least get rid of the appearance of the lower part of the architectural design being cut off by or buried beneath the floor. But in general, in regard to this problem as well as all others in architecture, is not the secret to be found in the most truthful, solid and durable treatment of the materials employed, and the coincidence of design with construction?

This not very novel reflection recurs the rather in connection with the subject, because it may be said that in general it is our places of amusement which stand most in need of this purifying gospel of architectural truth. Theatres and concert rooms seem to be too much considered as places where the lighter and less legitimate forms of architectural embellishment may disport themselves. The decorations of concert rooms, in many cases, seem to range under two heads—*cupids* and *pilasters*. "If music be the food of love," the cupids perhaps have a leg to stand on; but as to the pilasters, they surely are "not in the bond." In different essays and suggestions on this subject, however, we are constantly told that the wall must be "broken up with pilasters" at certain points, to prevent echo, &c., and instances are given in which the breaking up has been successfully accomplished in existing buildings. Though my own innate leanings are mainly in the Gothic direction, I confess to having more respect for that venerable feature, the classic pilaster, than to wish to see it used as acoustic padding. If it is desirable that the wall surface should be broken up, what, in the sense of genuine architectural treatment, does that mean? Simply that the curtain walls between the main piers or buttresses are to be set back from the interior face of the former. If the interior is best lined

with wood, need we make it like a huge painted band box inside, with applied (so-called) architectural features? Rather, may we not use the wood visibly and confessedly as a lining between the points of support, making the most of its natural texture and tint, contrasting various woods, making use of parquetry or surface carving where means will allow? So on through every acoustic and musical requirement of a building: there is surely no reason why such things should be architectural shams, any more than anything else.

In regard to general architectural treatment externally, there would be room for specific character of design and detail, in dealing with the various forms of building here supposed to be most suited for various forms of musical entertainment, even when these were dealt with separately; much more so if they were built in combination. If it should happen again, either in London or elsewhere, that an opportunity occurs of erecting a great building as a centre for musical performances, I should wish to see, not one immense chamber, but a combination of rooms suitable for the requirements of different classes of music, somewhat after the manner indicated in the plan, fig. 10: a long hall holding 5,000 or 6,000 for oratorio performances and great instrumental works (F), a room for smaller instrumental concerts (G), and a room for smaller vocal concerts, &c. (H), each in its appropriate form and dimensions. Such an arrangement would contribute far more to the intelligent enjoyment of music by the public, than the erection of one vast room, in which all things great and small, vocal and instrumental, have to take their chance of being heard; and though such a building would necessarily be low in proportion, yet I think even in the rough sketch of a plan here given it will be admitted that it might be made the basis of a very fine architectural composition.

There is another suggestion I should like to make as to the architectural treatment of music halls, which occurred to me a good while ago, when reading the account given of the erection of a building for the Beethoven festival at Bonn, by the late Mr. Chorley, long known as the musical critic of the *Athenæum*. As Mr. Chorley's style is very lively and graphic, and he records an instance of the practical application of architecture to music on a very interesting occasion, I will quote his own words. It appears that after all the musical arrangements were made for the festival, and the date fixed, the good folks at Bonn suddenly awoke to the fact that there was not a public room in their town fit for the purpose; and that they would have to build one. Mr. Chorley continues: "By good fortune Bonn is only now one hour distant from Cologne, and the latter city, in Herr *Baumeister* Zwirner (the head architect of the works at the cathedral), possessed a master spirit, at once experienced, energetic, and having a competent staff of workmen under his command. A waste plot of garden ground in a suitable situation was at once pitched upon; the trees were grubbed up; the earth was levelled; timber was fished up out of one of the great Rhine rafts; decorations were made at Cologne; and the *Fest-Halle* rose like a palace in a fairy tale. . . . . Assuredly never did concert room answer its purpose better; few have ever been so thoroughly picturesque. The *Fest-Halle* was an oblong apartment, nearly 300 feet in length, with a nave defined by two rows of fourteen arches each. The roof, with its timbers displayed in the old fashion, was tinted a pale blue; the beam work was liberally festooned with those rich garlands of oak leaves which are seen nowhere else save in Germany. Up the pillars, which were so many fir trees merely trimmed—not shaped and planed—ivy had been trained; the walls were hung with a cool pale red paper, the effect of which, seen from a distance and in such quantity, was almost that of a warm and delicately tinted marble. As might have been expected, the resonance of the room thus constructed was entirely satisfactory."* I have quoted this, not of course on account of the red and blue paper effects, which is a very German mode of decoration, but to call attention to

* *Modern German Music:* vol. II, p. 252.

the fact that here was a concert hall of very large dimensions built entirely of timber, and pronounced by an excellent authority on such matters to have been one of the most satisfactory rooms ever built for the purpose. Now this certainly suggests the idea, why should not timber enter more largely into the construction of more permanent buildings of this class? It seems to be a settled point that all which is not brick or stone is to be iron now; but we have no evidence that timber is not as durable as iron (it might be more correct to say, we have no evidence that iron will be as durable as timber has in many cases proved to be), and it is certainly a material more pleasing to the architectural mind than iron. Some of our most original architectural designers are employing combinations of stone and timber construction in houses and other buildings, on grounds of architectural character only. Here, however, seems to be an opportunity of combining a characteristic architectural effect with the strictest utilitarian principles; getting a solid basis of masonry or brickwork for the building, and making the rest of the structure not merely a shell lined with the materials most favourable for acoustic effect, but in itself constructed of that material. In such a case there would be much more scope for exhibiting the construction instead of masking it; for even the supports introduced, or the framing of the roof, might be expected to be helpful to sound, encouraging resonance without echo; on which point I may quote General Scott's remark in regard to the Albert Hall, that probably "the hearing has never been more perfect in the hall than when it was to a great extent filled with a forest of scaffolding." As to the danger which such buildings might be in from fire, one may be allowed to refer to the opinions on this head given at one of the sectional meetings of the Conference last year, when the experience of those who had seen most of fires tended to send us away with the conclusion that on the whole nothing was so incombustible as timber; at all events, oak timber. Some of us, I think, would be very glad to find a fair architectural and practical ground for the use of so grand a building material as oak, on a larger scale than we are commonly allowed to use it. Whether there is anything really to be made out of this idea I will not undertake to say at present; but I can feel sure of your concurrence when I claim for the suggestion one very decided merit, viz., that it is the last I shall trouble you with this evening.

The CHAIRMAN said—I am sure you will all agree that the paper read is one characterized by sound practical, scientific usefulness. There are gentlemen present who are competent to deal with this subject, particularly Mr. Roger Smith, and I would ask him to favour us with his remarks upon it.

Mr. T. ROGER SMITH, Fellow (responding to the invitation) said.—As Mr. Statham has been good enough to compliment my little book, I think I am entitled to the honour of proposing a vote of thanks (which I beg to do very heartily) for his exceedingly practical paper. It is of great advantage for us to get papers on special subjects from gentlemen who have given special attention to them, and who have special qualifications for treating them. This paper is one of that kind, and I think those of us who may in future be called upon to build or design a music-hall will bear in mind many of the suggestions which are made in the paper. I am rather surprised that Mr. Statham has not alluded to the largest experiment that has been made within our present experience in the way of accommodating large audiences for musical performances. I do not refer to the Boston Peace Festival, because we know nothing of it except from the newspaper accounts; but I refer to the Crystal Palace. There you have an orchestra capable of holding 4,000 performers, and you have a place which it is the proud boast of the Directors has never yet been completely filled, even when there have been 100,000 persons present. At some of the oratorio performances they have been able to bring from 15,000 to 18,000 people fairly well within the range of the music. Now there is no question that you get most

surprising effects in the musieal performanees at the Crystal Palace. You get a vast sense of the mass of sound, and at the Handel Festival performances, the chorus being well selected and carefully posted; you get the full quality of sound and great precision; and it seems to me that hearers centrally placed experience but little loss of distinctiveness, considering the large mass of sound there is to be heard, and even at a great distance from the orchestra you hear surprisingly well: a circumstance, I think, mainly due to the large hollow covering of wood with which the orchestra is roofed over at an exceedingly low pitch compared with the height of the building, and to the excellent shape and resonant construction of the orchestra itself. Another point noticed by Mr. Statham is well illustrated by the Crystal Palace—the great inconvenience of music rooms with flat floors. Orchestral performances of a high character take place in a separate portion of the Palace, which will accommodate, speaking at a guess, 3,000 or 4,000 people. Nearly the whole of these are seated on a level floor, and it is a matter of great difficulty to find a thoroughly good place in any part of the room in which you can hear the music with perfect satisfaction; the effect of its brilliancy seems deadened, and its distinctiveness is marred by the neighbourhood of the different heads of people in front of the hearer. I think we are much indebted to Mr. Statham for the suggestions he has thrown into the practical shape of plans and sections. It is more satisfactory to see ideas on paper than to have them described, and I hope in the printed paper we shall have these illustrations engraved. I have great pleasure in proposing a vote of thanks to Mr. Statham.

Mr. E. Roberts, Fellow.—I have great pleasure in seconding the motion. The paper has opened up a large number of subjects, and at this hour it is impossible even to refer to the many topics which one might otherwise have been disposed to discuss; but I confess to some little surprise touching one prominent observation in the paper. In referring to oval and circular forms of buildings, Mr. Statham did not state that practically the circular form of building is the worst form possible for music unless rendered unreverberative, as in the auditorium of a theatre, by a series of boxes and draperies, or some draperies projecting from the face, to obliterate the effects of the circular form. The circular and the oval form constitutes a whispering gallery, so to speak; and if the building is intended for music it is absolutely necessary that some steps should be taken to prevent the circulation of sound which is destructive of musical gratification.

I recollect that not long ago a paper was read in this room descriptive of a large oval building, and a statement was made as to the extremely satisfactory nature of that building in regard to its acoustic qualities, the success claimed in that respect being greater than had ever been achieved before. I was disinclined to dispute that statement, and I do not think any observation was made upon the paper. But I think the building, perhaps one of the largest ever erected, has been properly stated to-night to be one more suitable for spectacles than for music; and I can perfectly understand the reason for the remark being made about the building being more beneficial for sound with the scaffolding in it than when it was finished, because the impediments broke the sound, and there was less reflection from the walls. I have been on the platform of that building, and found my voice and that of other people came back like the blow of a hammer in our faces. That shows that it cannot be a good room for music; and though when it is well filled with innumerable ladies' dresses, and when the boxes and galleries are fully occupied, and with the velarium, no doubt it becomes less objectionable; and I think it could be made one of the most perfect for music if draperies were to be projected, or if in some other way reverberation and reflection were to be prevented. Such draperies should be all round, even behind the orchestra; it might thus become an excellent place for music. But without that expedient it is, I think, the very worst and most unsatisfactory place for music, except perhaps the Crystal Palace. I have heard the Crystal Palace applauded. I have sung there myself, and I have always observed that the

music never closely follows the bâton. Perhaps I may be hypercritical. I know that my voice follows the beat of the bâton, but have frequently felt I was singing a solo, because the majority of the singers follow the sounds which come to them instead of attending the bâton; the result is, that there is a dragging of the choruses, which to me is very unpleasant. I go there occasionally to see if there is any improvement, but I must say I prefer to go elsewhere than to the Crystal Palace to hear music. I am speaking of the great transept, and not the small concert room. Another building referred to by Mr. Statham was St. George's Hall. I should like to have heard his reasons why he considered that is so bad for music. I have spoken and sung there myself. My idea of the reason of the failure is the reflecting spaces over the galleries and elsewhere, and you get a number of reverberations from very hard walls which are undraped.

The CHAIRMAN. Mr. Statham stated that the organ builder advised the same form of arrangement for the Albert Hall.

Mr. ROBERTS.—I should doubt very much the satisfactory effect of the circular building suggested by Mr. Statham for chamber music, unless it were with the restrictions to which I refer, that is the breaking up of the circulating surface by draperies. Of course we are all familiar with the effect of draperies. On one occasion I was asked to offer suggestions for preventing the extraordinary echo at the Corn Exchange at Northampton, and I experimented on the effects of sounds from several positions, and having persuaded myself that some curtains at one end would suffice if the singers or speakers were in the centre of the hall, I so advised, and it was tried with success. Reverting to the subject of the shape of music rooms, and speaking practically, my own experience induces me to think that the best room, though a small one, is that in Hanover Square. That room has sides unbroken, but it has a gallery and draperies at the end. There is not any cove to the ceiling, and there is no reflection. A coved ceiling tends to cause reverberations which are unpleasant to the singer as well as destructive of musical accuracy. With regard to the Albert Hall, I may mention a circumstance which I have not read of or heard stated by any student of acoustics. I was invited there with many of our Fellows to test the acoustic properties of the Hall; and on every occasion I observed that the sound appeared to form a curve, and as I was passing from one part to another, and departed from that curve the sound flattened, as though the vibration, in departing from the space within the curve lessened and the note was manifestly out of tune. It was not only once but perhaps twenty times that I observed it, and intentionally tested the fact. On approaching the instruments or voices, I found they were perfectly in tune, but outside a sort of parabolic space they sounded flat. That may account for the remarks I have often heard that the singers were out of tune, while others have denied it, because if I am right the effect produced in some parts of the building would be really as if the tone was flat. My own belief is that the voice does not cause the same number of vibrations in the atmosphere except in particular directions. The amount of variation I cannot state, but I speak of it as an effect I have observed several times. I beg to second the vote of thanks.

Mr. JOHN P. SEDDON, Fellow, said.—I beg to add my thanks to Mr. Statham for his paper. I am not a musical man myself and should not have risen to join in the discussion excepting that I wish to say a word with regard to what has been suggested about the position of organs in churches. I was surprised to hear Mr. Statham suggest the transept as being in his opinion the best situation for the organ, because from all I have heard I am inclined to think an organ fixed in the transept is apt to speak to the end wall at the opposite transept, and produce a harsh effect. I was consulted with regard to the arrangement of the organ in Great Yarmouth church. It was proposed to place it in the transept, and I gave the above as my opinion, but it was fixed there under the advice of the organist, and afterwards all confessed it was a mistake, although in that case the enormous size of the

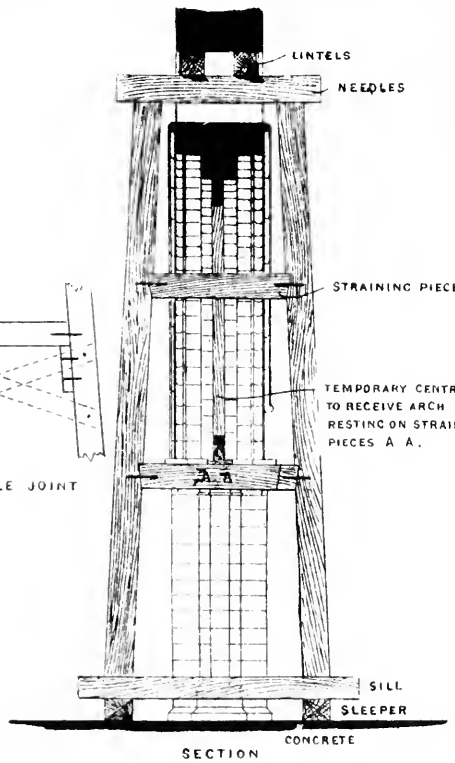
arches between the transepts and the aisles gave special facility to the instrument to speak right and left. In the smaller church of Christchurch, in Victoria Street, the organ is placed in the eastern part of the aisle facing west, with space all round it, and such a position seems preferable. The ordinary method of poking the organ into a box cannot be right. As regards the arrangement of pipes, it appears that the usual fancy pyramids are not consistent with the requirements of the instrument, and entail serious musical difficulties, and after all many are often dummies. Organ builders are too complacent in telling architects they may arrange them as they like. They should explain what is the practical need, and the architect would then design his work accordingly.

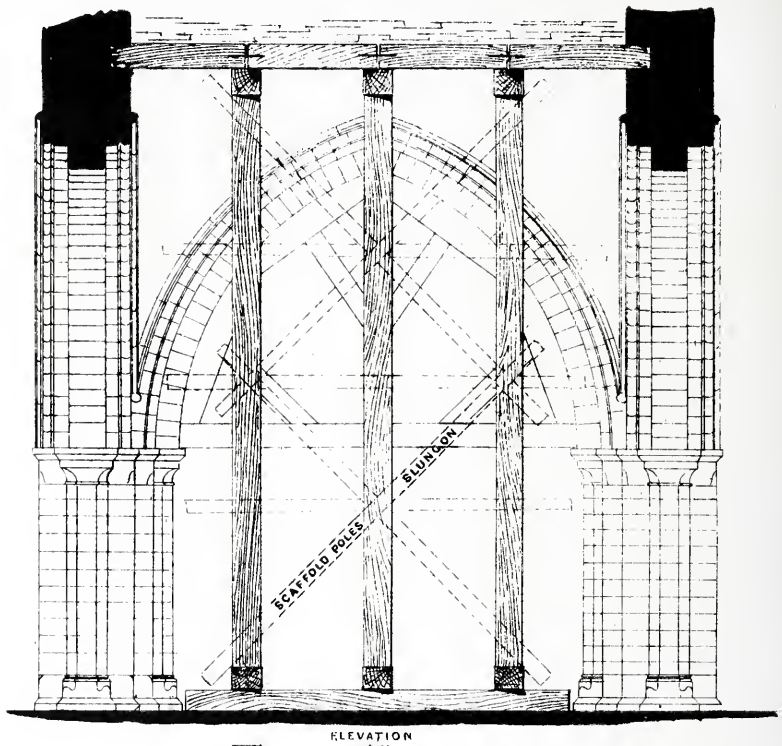
The CHAIRMAN.—Before putting the vote of thanks I would beg to ask one question. I may appear ignorant in so doing, but it seems to me a common sense question—Why not place the organ, as you say, at the back, the band next the organ, and the chorus in front? If there is any reason against that I should be glad to hear it.

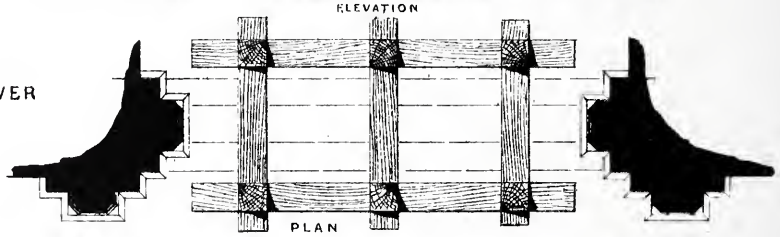
Mr. STATHAM said.—With regard to the Crystal Palace I have never attended one of the Handel Festivals there, but it has been described to me by friends, in whose judgment on such a point I have confidence, that the result of the large chorus there was not what might be expected from their number. That confirms me in thinking, that these large performances, though they may produce grand effects now and then, are not calculated to realise music as an artistic language, but only as a series of effects. With regard to the circular room, I have shown the buttresses brought forward into the room, and the walls might be further broken up by statuary, to prevent it acting as a "whispering gallery;" and the roof, if an exact circle in section, should be divided into panels, in cants. There is a great difference between the effect of music in a large room and a small one. In a room in which the circle is not more than thirty or forty feet from the centre, there is hardly time for an echo; but when you get to 250 or 300 feet there is room for a distinguishable interval between the sound and the echo. I should have more confidence in a small room on this type, than in a large one: I should think it a good form of room for delicate musical effects, and there is something pleasing and symmetrical in the circular arrangement of the audience. With regard to organs in churches, I contemplated in my remarks on that subject, a wide and not very deep transept. This position for a church organ was recommended by Mr. Best, the organist of the Albert Hall, who is certainly one of the best authorities we have. My own opinion is that, for musical effect, it should be placed at the west end of the church. With regard to Mr. Seddon's remarks as to the arrangement of the pipes, it should be understood that the pipes in an organ are not placed in the order of the notes of the musical scale, but the larger pipes, which form the lower tones, are divided and placed at each side, and the smaller ones in the centre, in a perfectly symmetrical arrangement: this is necessary in order to ensure an equal distribution of wind to large and small pipes. The design for an organ front, therefore, with large wings and a low centre, symmetrically treated, is the correct expression, in design, of the internal arrangement. With regard to the Chairman's suggestion, I think it important that the band should be near the conductor, as their work is much more delicate and intricate than that of the chorus, and they must be in more intimate relation with the conductor; and as they have to accompany solo singers as well as the chorus, their position between the two is desirable. It may be added that in modern oratorio performances, the organ is not much used, except in choruses, and when the chorus are singing, and therefore its place is naturally in close contiguity to the chorus-singers, more especially as it affords material assistance in keeping them together and in tune.

The vote of thanks to Mr. Statham was then passed unanimously, and the meeting adjourned.

SHORING & NEEDLING OF NORTH ARCH.



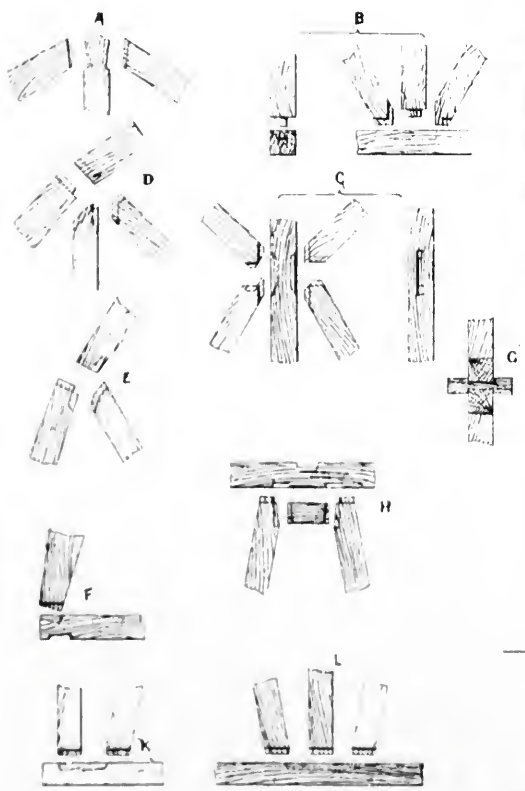


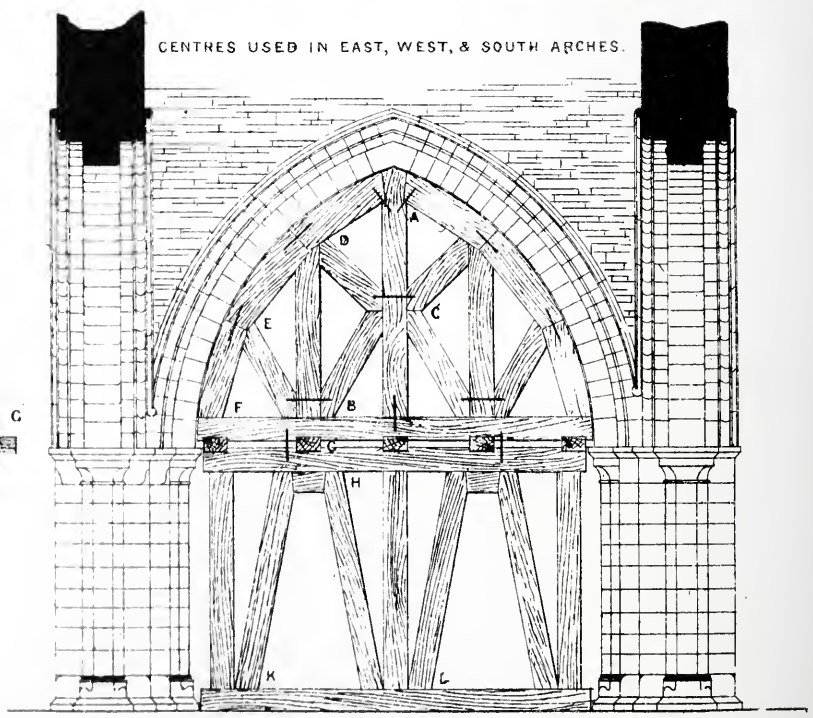


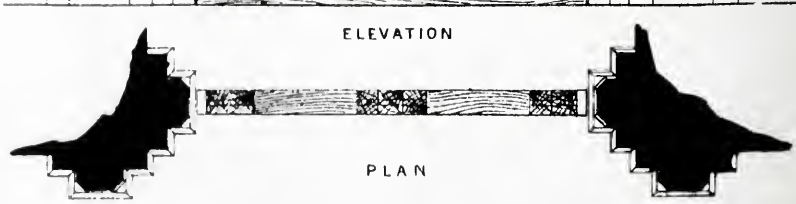
CROSMONT CHURCH. SHORING OF TOWER

J P SEDDON ARCHT

CENTRES USED IN EAST, WEST, & SOUTH ARCHES.







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Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, 3rd February, 1873, A. WATERHOUSE, Vice-President, in the Chair, the following Papers were read:—

ON THE SHORING, &c., OF GROSMONT CHURCH TOWER.

By J. P. SEDDON, Fellow.

THE parish church of Grosmont, dedicated to St. Nicholas, in the diocese of Llandaff, is situated in Monmouthshire, near to where the border of that county joins those of Herefordshire and Breconshire —a very beautiful and retired part of the country.

The structure is one which, by its historical interest and architectural value, justifies the pride taken in it by the inhabitants of the surrounding district; but it has even wider claims for consideration, and particularly in connection with this metropolis, distant though it may seem to be.

It owes, if not its origin, at least its enlargement and embellishment to the same munificent patronage which directed those on a grander scale at the Abbey of Westminster; and though Grosmont Church is, as befits its position, a comparatively humble structure in point of style, it may claim some resemblance to its nobler cotemporary. Had the same caution been exercised in its case as in that of the Abbey, and had only a modest lantern surmounted its crux, I should not have the following chronicle of disaster to bring before you. But the substructure was in all probability never intended to support the ambitious though elegant central octagon tower and spire which at a later period were piled upon it—exemplifying a temerity of which mediæval architects were often guilty, and which brought ruin in the case of Chichester and serious danger in that of Salisbury.

Grosmont is now but a small agricultural town, hardly more, indeed, than a village (three miles distant from Pontrilas railway station), but formerly it must have been a place of some note, for it was an occasional residence of King Henry III., and Henry V., when Duke of Monmouth, wrote hence to his father, Henry IV., to inform him that the greater part of the town had been destroyed by fire at night; and his letter, written the day after, is preserved in the British Museum.

Henry, the grandson of Edmund Crouchback, Earl of Lancaster, was surnamed Grismont or Grosmont,* from the fact of this town having been his birthplace; in fine, it was a favorite residence upon the Duchy of Lancaster, and is still one of its possessions, and the views of its Castle† are still considerable in extent as well as charmingly picturesque, and have in one octagonal chimney shaft an architectural gem, to give an idea of the character of its former detail.

The church—the plan of which is a Latin cross—consists of a nave, 67 feet by 18 ft. 6 in., and aisles 9 ft. 6 in. wide, separated by arcades of five bays (with responds deeper than ordinary, obviously to give more abutment to the crux arches), central tower and spire, transepts with aisles on the western

* In the church is an unfinished effigy of Henry, Earl of Lancaster, surnamed "Grysemonde" (as spelled in ancient map in Hereford Cathedral). The effigy is of gigantic proportions, clad in coat of mail, and bearing a kite-shaped shield of the 13th century.

† The Castle was named Rossyln Castle, a corruption of the Celtic name Rosllwyn, "rose-bush;" and in tradition is spoken of as "The Castle of the Red Rose," and the Lancastrian party is said to have thence assumed that flower as its badge.

sides, of the same width as those to nave. Chancel and chapel south of same. These is also a porch on the north side opposite the central bay of the main arcades.

Of this structure the crux arches and transepts are the earliest portion, being in the style of the Transition between Norman and Lancet. The chancel is fully developed Lancet. The tracery and details of the chapel (styled the Eleanor Chapel, after the foundress, Eleanor of Provence, Queen of Henry III.) are Geometrical, but the east window of the north transept, with the internal porch door, would indicate a later date for these parts. The western façade, tower and spire are still more recent erections, and may be referred to the latter part of the fourteenth century: the porch is fifteenth century. The aisle, walls, and roofs, together with the nave roof, are comparatively modern. The present aisles have, in my opinion, superseded previously contemplated (if never erected) wider aisles, with compass roofs of their own (they are at present covered with lean-to roofs, forming one slope with the nave roofs), since it is not to be supposed that the original plan could have had the fine western arches of the transepts opening on the mean angles formed by the present aisles. This is a point that it is to be hoped will be elucidated during the progress of the present works.

It is now many years since I was first called in to examine this church, and then it was in a condition which cannot be described as other than tottering from old age. In this part of the country it must always have been a difficulty to obtain proper building sand, and the loamy sand at hand would soon destroy the value of any amount of lime mixed with it. From this cause the mortar of the walling throughout had became little better than earth, and the whole of the external walls exposed to the weather were grievously dilapidated. The earth on the northern side of the church had become heaped up seven or eight feet against the walls, and a rude flight of steps was carried up on the eastern side of the north transept, blocking up its window, to get access to the ringing stage of the tower; apparently no proper means of approach to it having been ever provided.

Under the great weight of the tower and spire which were added, the earlier crux, piers and arches have been crushed and twisted out of shape, and this pressure has been transmitted in the directions of north, south and west, by the several arches which had themselves become distorted so as actually to thrust outwards the end walls of nave and transepts. The more solid walls of the eastern side of transepts and of the chancel had yielded less, yet still in some degree.

The whole eastern limb, viz., chancel and Eleanor Chapel, by far the richest architecturally, was in the worst condition, and imperatively needed rebuilding. Under the circumstances described, however, it seemed a perilous operation to undertake, as even the temporary removal of such support as they gave the central tower might accelerate the ruin of the rest of the fabric. Funds adequate for this work only having with difficulty been collected, this was effected with great care. The chancel and Eleanor Chapel were in 1869-70 almost entirely taken down and rebuilt under my directions, by Mr. Thomas Williams, builder, and a new means of access to the belfry stage was devised, by partitioning off the western portion of the aforesaid chapel, and by the insertion of a circular stone staircase in the south-east angle of the tower, leading to a gallery carried across the western end of the chancel, and a doorway made in the eastern face of the tower under the chancel roof.

Careful examination was made before and after the execution of this work of the state of the crux, piers and arches, and marks set to show whether these yielded at all by reason of settlement in the new masonry. This, which was mostly to be feared at the north-east angle pier, does not seem to have taken place to any great extent. But still I received reports from time to time that the original mischief was proceeding ; and I caused a close examination to be made, from which it appeared that the cracks were surely though slowly extending, particularly in the north-west pier. In consequence of this I reported that it was, in my opinion, essentially necessary that the tower and spire should be

so shored up and supported by centres, as to be independent of the piers: which then, as funds were procured, could be made good; after which, the restoration of the arches and superstructure could at any time be taken in hand.

I estimated the cost of this preliminary work of supporting the failing arches at about £400., and received instructions from the vicar, the Rev. W. H. Twyning, to direct it to be done at once. I entrusted the contract to Mr. Thomas Williams, of Cardiff, the builder who had so successfully re-erected the chancel, and the supervision of the works to Mr. William Ed. Martin, 11, Park Street, Westminster, and Hereford, whom I am in the habit of employing as my measuring surveyor, and it is to the very lucid reports of that gentleman, who had personally conducted the difficult and somewhat dangerous operation about to be described, that I am indebted for most of the information I am about to give you, and also for the remarkably accurate drawings and the whole of the photographs exhibited, all of which have been made by himself on the spot.

The failure of the substructure of the tower is primarily traceable to two causes. First, errors in design; and, secondly, errors in construction. The design is in fault from the weight of the tower being carried upon insufficiently abutted arches; and the construction, from the imperfect execution of the dressed stonework and the masonry of the walling.

From the first cause (imperfect design) four distinct *classes* of failure are to be traced: (1) Spreading of arches at their springing; (2) flattening of the arch-curves, thus neutralizing the keying, and rendering the arch insecure, by the liability of voussoirs to fall out; (3) thrusting of the vertical supporting piers under the tower arches out of the perpendicular; and (4) transmission of the thrusting force to all adjoining piers, arches and walls, throwing them out of the normal stable condition—verticality.

From the second cause (imperfect construction) three classes of failure may be traced: (1) The crushing of the wrought stone facings which form the casing of the piers; (2) the bursting asunder or drawing of the bonders, of the various members of which the piers are composed; and (3) rents or fissures of the walling generally.

The most prolific causes of failure in buildings are generally two, viz.: unequally yielding of foundation trenches, and uncompensated thrusts, whether from roofs or arches. The case now under consideration is a signal example of failure from the latter cause—an *equally unyielding* foundation having contributed in some degree to intensify this failure.

Writers of books on building generally assume it as a fact not to be questioned that a solid rock foundation, roughly levelled or stepped where necessary, is *the* foundation most to be desired; but an attentive consideration of the present case would lead to the belief that such a foundation, if not absolutely dangerous as a base for a building erected in the ordinary way, is at least very undesirable unless extraordinary precautions are used in the selection of the material for the walls, in the bonding, and in the elimination of all unequal settlement from a greater number of mortar joints in any one portion of the walling, than in another on the same level. In this case the functions of the tower piers were to transmit the weight of the tower to the foundations; the latter being rock and incompressible, the piers became crushed between two unyielding forces, which would not have been the case had the foundation been of a partially yielding nature, such as a stiff clay or gravel.

Taking the various classes of failure enumerated in detail: (1) The spreading of the tower arches at the springing. The four arches carrying the tower spread as follows—North arch, ·584 ft. (7 in.); east arch, ·375 ft. (4½ in.); south arch, ·75 ft. (9 in.); west arch, ·625 ft. (7¼ in.). This spreading has not taken place equally at both sides of the original central line of each arch; the abutments to some

of the arches being more solid and stable than others, remain almost in their original positions, whilst the spreading has taken place on that side of the centre line towards the weakest abutment.

Spreading of the arches leads naturally to the second class of failure, viz., flattening of the arch curves. This flattening has not taken place regularly; the arches preserve in some parts their original curves, whilst in other places the curves have been forced into straight lines. The general outlines now assumed by the soffites of the arches are irregular lines not amenable to any known mathematical curve.

Spreading of the arches also involves the third class of failure, viz., thrusting the piers supporting them out of the perpendicular. It is evident that the piers could not have remained upright when the arches spread, except on the supposition that the springers of the arches slipped back on the abaci of the caps; but this would have been impossible, for the vast weight of the superstructure augmented the friction between the two stone surfaces to such an extent as to make the last stone of the cap and first stone of the arch practically one stone. Hence the number of inches by which the faces of two opposite piers are out of plumb becomes a correct measure of the spread of the superincumbent arch.

The fourth class of failure noticed is the transmission of the thrusts of the tower arches to the extremities of the building in all directions. It will be well to remember that those forces *commenced* and continued to act whilst the walling generally was *green*, and the mortar in a soft condition, thus facilitating to some extent the accommodation of the surrounding abutments to the thrusting forces, without involving any sudden, violent, or dangerous fractures; while the gradual subsequent piling on weight when the tower and spire were added continued to increase the distortion.

The forces generated by the thrusting of the north and south tower arches, are in the directions of the nave arcades to the westward and the chancel flank walls to the eastward. The latter being comparatively solid walls—on account of the narrowness of the lancet window openings, have sustained the thrusts in a fairly efficient manner; but, on account of the large openings and small piers in the nave arcades, they formed but an indifferent abutment; hence every pier and arch is thrust westward, the west gable itself being thrust out of the perpendicular, overhanging its base $5\frac{3}{4}$ in. The east and west tower arches acting through the transept flank walls, which are their abutments, have thrust out of the perpendicular the north and south transept and walls—the former $4\frac{3}{4}$ in., and the latter $8\frac{1}{2}$ in.

An inspection of the ground plan of the building will show the north-west and south-west piers to be those most deficient in abutment, and in reality it is found that these two piers are those that have suffered most, and are in the most dangerous condition. The south-west pier had to be cased some forty years since with carefully coursed wrought masonry, increasing the area of the pier by about 10 feet superficial; and the present extremely dangerous condition of the north-west pier compels its re-construction before any other portion of the building.

The first class of failure arising from the second cause is the crushing of the dressed stonework in the pier facings. This has taken place from the undue concentration of the weight on this facing; the backing being composed of rubble walling, with a greater number of mortar joints than in the facing, has settled down, leaving the casing to do the work of carrying the tower, and thus reducing the working area of each pier from 18 ft. to 8·34 ft.

The second class of failure under this head is the drawing of the bond stones, or bursting asunder of the piers. This is a very unusual mode of failure; and is due in this case to imperfect footings under some members composing the piers. The footings were crushed or squeezed away from this particular part of the foundations: hence the bursting or drawing of the bonders or headers in the quoins immediately over this defective work.

The last class of failure to be noted is that most commonly found in nearly every building, ancient or modern, viz., splitting of the walling in a direction at right angles, or inclined to the beds, commonly called "settlements." (It may be desirable to call attention here to the great want, in practical architecture, of a nomenclature at once correct, precise and determinate; at present there is much confusion from want of such. A practical man, looking at a crack in a wall, pronounces it to be "a settlement," though it is in reality *a fissure*, the *result* of a settlement. Architects invariably specify that timber is to be free from "sap," though the objectionable element is not "sap" but "sap-wood." Again, the word "foundation," which is of common occurrence, may mean four different things: (1) The "bottom," *on* which the footings are laid; (2) the trenches, *in* which the footings are laid; (3) the footings themselves; and (4) the word may be used in a collective sense to include the three things already mentioned—in fact, everything below the ground level!

Settlements result from the non-elastic nature of the materials composing a wall; no one part of the walling being free to sink, or settle down, or change its position, vertically or horizontally, without fracturing or splitting the stones, bricks or mortar joints in a greater or less degree; always in proportion to the depth of settlement. From the description already given of the movements of the arches and piers with their abutments, it will be no matter of surprise to find the masonry of the walls generally, in contact with the tower, fractured, and thrust and crushed in every direction, *horizontally* as well as vertically. The entire subject affords an interesting and instructive example of the effect produced by a weight of 600 tons acting upon four pointed arches for a space of 500 years, and serves to demonstrate conclusively the necessity of neutralising thrusts effectively, whether such thrusts be created by the exigencies of style or design.

The state of the tower, piers, and arches was, as may be imagined, the subject of much talk in the village of Grosmont. The oldest inhabitant recollected the structure to have been in *exactly* the same state ever since he first saw it; and by some extraordinarily subtle process of reasoning deduced this valuable conclusion, viz., that as the tower had never fallen in his time, it was *never* going to fall. Almost every village in this part of the world contains at least *half a dozen* of such old inhabitants, whose inexorable logical deductions are supposed to silence most effectually the objections of any unfortunate professional man who happens to disagree with them.

It having been decided in the autumn of the year 1869 to restore the chancel of Grosmont Church, the opportunity of seeking to determine if the failure of the tower substructure was at all progressive was seized. With this object all the fissures in the stone work were filled with cement, and the extent of the fissures lineally determined by drawing lines across the ends of them in transverse directions. The structure thus prepared was left after the chancel had been rebuilt up to the end of November, 1872 (about two years), when a careful inspection of the parts so prepared revealed the following startling facts:—First. That all the fissures which had been sealed up with cement were open again; and secondly, That the transverse terminal lines of the fissures of 1870 were left 2 in. or 3 in., in some cases as much as 6 in., behind by the extension of the fissures up to 1872. This discovery compelled immediate attention to the dangerous condition of the tower, and notwithstanding the renewed protests of the oldest inhabitants, I did not hesitate to recommend the taking of immediate steps to restore the four disabled tower piers and arches, and in the event of the necessary funds not being available to effect this restoration, at least to shore up three of the arches, thus relieving the piers of all weight, and to needle the fourth arch, leaving a clear space under it for its restoration, should the funds obtainable be sufficient to cover the expense.

An idea suggested itself that the piers and arches might be restored by taking out a damaged stone here and there, and replacing the stones so removed with other sound stones, thus effecting the restoration

with comparative safety and by slow degrees; but on consideration this plan was abandoned, because some parts of the piers should of necessity be entirely recased or rebuilt, of course vertically. This would have the effect of reducing the width between the piers to something about 9 in. less than the width of the arch at the springing, which would be a reversal of the proper way of treating the arches, viz., by having them, as originally constructed, 2 in. narrower at the springing than the space between the piers supporting them. It was therefore decided that the piers and arches should be entirely removed and rebuilt, using in all the old stone not damaged, and that this system should be first tried upon the arch and piers on the north side, the arch proposed to be needled, this being in the most unsafe condition of the four.

As in constructing an effective system of supports to the tower arches, a safe unyielding bottom was a primary consideration, it was determined in this case to clear away the entire space immediately under the tower, tower arches, and for a space of three feet all round outside or beyond the tower piers, right down to the solid rock, and to refill the space so cleared with carefully made cement concrete well rammed. The site to be thus operated upon was encumbered with old seats, fittings and wood floors, all of which having been cleared away, the excavating commenced, *planked runs* having been laid down through the church and across the churchyard to pits or graves dug to receive the human remains disinterred, the soil itself being spread over the surface of the churchyard at some distance from the building. On removing the soil immediately under the floors it was found that the bodies had been at some time interred with not more than four inches of soil over the coffins, which accounted for an hitherto "unaccountable smell" that had frequently sickened some members of the congregation during their attendance at Divine service.

Lower down, at about two feet under the floor level, five distinct springs made their appearance, evidently the drainage from the hill at the north side of the building. These springs flooded the space already excavated, preventing furthur progress. A drain six feet deep was cut through the south transept, and discharged through the south transept wall into the churchyard, which is lower at that side. This drain kept the working from being submerged, and discharged during the heavy rains over sixty gallons of water per minute, and still continues to afford ample water supply for use in the work.

The excavations were continued until solid rock was reached at an average depth of five feet under the floor level. The entire soil removed was of a very dark colour, light in weight, and spongy in texture, containing human remains in various stages of decay—in fact, the whole mass had apparently been used over and over again for burials, the most recent having been apparently thirty-one years ago. This appeared from the coffin breast-plate, which, with its gilded lettering, was as fresh as the day it was put in, although there was no trace whatever of the coffin, which was stated to have been of oak by a party who recollected seeing it lowered into the grave.

Some graves were hollowed out of the solid rock below the tower foundations; others were built with stoned half-brick sides, covered with stone slabs; the latter were found to be filled with a black fluid, emitting a stench so horrible as to be perceived even in the most remote parts of the building. All human remains disturbed were reverently cared for, and interred in the churchyard. The entire space dug out was now filled up with cement concrete, well rammed; 135 tons of concrete having been consumed in this operation. A drain was laid on the rock bottom under the concrete, to drain the springs which continue to flow in from the north side of the building. A finer concrete was spread upon the surface between the piers under the tower arches, and upon this a bed of cement 18 in. wide was floated off to a level to take the centreings.

The shorings to each arch are constructed in two separate portions, the lower portion on "tressell" and the upper portion or "centre" proper. This system has been adopted to facilitate "wedging up"

or "striking" the centres when and where required. The exact outline of each arch was obtained by "scribing" the soffite of the inner member of the arch to which the centre was to fit, on a skeleton template of $\frac{3}{4}$ in. boarding sufficiently wide to include the whole curve of the arch, which template was securely fixed against the side of the arch during the scribing. This template was shaped to the line so scribed, and the permanent framing worked to it; thus the centres now fixed fit accurately all the irregularities of the arches. The timber used in the shoring generally is from 10 in. to 12 in. square, some having been selected 14 in. wide to allow of getting out the curved backs without reducing the working section of the timber below, 10 in. by 10 in.

All the joints in the frames are tenoned, the tenons being 2 in. thick on the centre of each piece, and from $2\frac{1}{2}$ in. to 3 in. deep; the joints are all shown on the drawings precisely as they are executed. The framework was fitted together on the nave floor first, and having been numbered at the joints, was knocked to pieces to facilitate the removal and re-erection under the tower. Each tressel was afterwards built up in its proper place, and when the three tressels were securely fixed in their respective archways a temporary scaffolding was erected on them, to make a platform for the putting together and hoisting of the centres. The springing piece of each arch was laid down on its side in that arch, and centre framed to it and secured together with $\frac{7}{8}$ in. wrought-iron dogs; *a tackle* was rigged up to the the remainder of the bell beams with a *fall* to the tower floor, and each centre was thus hoisted to its proper position under the various arches and securely wedged up to the bearing with oak wedges.

In ordering the first lot of timber for this framing it was assumed that timber in the log, with one side only sawn, would answer every purpose required, as well as timber sawn all round; but this proved to be a mistake, as it was found to be an impossibility to square to the tenons, mortices, shoulders and bearings without having at least three sides of every piece sawn die square. There being no saw-pit near the building, this timber was squared with adzes and planes where required, causing some loss of time; but the next consignment of timber having three sides sawn square, much facilitated the work of fitting together and makes much better work in every way.

Three arches having been shored up with centreing as described, the fourth arch was treated as follows: a hole about 18 in. square was knocked through the tower wall over the apex of the arch, and about two feet above it, to allow sufficient head room for the introduction of a hammered stone discharging arch over the wrought stone arch. Two more holes were knocked through the wall of the same size, about two feet lower down on either side,* about half way between the centre of the arch and the transept flank walls. Three holes were thus made to take needles at distances of about $4\frac{1}{2}$ feet apart.

Needles 12 in. by 12 in. were inserted through these holes and supported by uprights inclining inwards at the top, and stiffened at the height of every five feet by means of straining pieces secured with dog-irons. The walling over the needles was pinned up, and wedged in every case with flat stones bedded in cement; and when the cement had set, a temporary centre was fixed under the arch, the key removed, and all the arch stones safely taken down one by one, one half the piers at either side were also removed, and the entire space occupied by the arch and piers cleared away to allow of the erection of the new work.

The above is a description of the work I have undertaken to explain, as far as it has been hitherto carried on; for by the report recently sent me the north arch had been successfully removed, and the

* Those holes are shown *on a level* with the first hole on the drawing of the needling; this arrangement being considered better than that actually executed and here described.

tower and spire now stand upon the needling on that side. The two outer needles have sagged at little, but not sufficiently to cause apprehension.

I propose to add, as an appendix to this paper, some details of the weight thus borne, with the calculations as to the manner in which it has been distributed, and the strength of the several portions of the timber framings.

With regard to the drawings exhibited, they consist, firstly, of very accurate elevations of the building before any restoration was attempted, prepared for me by Mr. Martin some years since. Next, of the principal working drawings for the rebuilding of the chancel and Eleanor Chapel and east wall of the north transept; and, lastly, of the set of drawings taken specially for the present operation, and the working detail drawings for the present contract. With regard to the latter, it had been at first intended to show all the arches, &c. distorted as they are in reality, and the exact fitting of the timber work thereto, with the precise amount that the piers, columns and walls, are out of plumb. This, however, proved to be impracticable, for there would not have been a single straight line, as is apparent by the one longitudinal section, which has been so drawn. Not a line could have been drawn with other instrument than a common writing pen by hand. It was considered that as the detail drawings only purport to show the method of construction of the wooden framing adopted, it would answer every purpose if this framing were shown as fitted to a restored arch. The photographs show better than any drawing could do the condition of the arches and piers, and the sectional diagram above referred to shows the effect of the thrust of the tower upon the nave arcades, the piers of which, and even the western wall, have been forced out of the perpendicular.

The jointing of the arch stones on the drawing is of no value, for the arches have been (every one of them) practically restored before, so that the jointing is not original. On the $\frac{1}{4}$ in. scale longitudinal section the jointing of the arcade in the chancel is correct, and it is done systematically in the actual work; but in the tower arches every arch is jointed differently, even on the opposite sides of the same arch, and no system is observable. Every arch of these has, however, a key-stone, and the main features are as shown on the larger detail drawing.

It may be mentioned that the material of the casing of the piers is a hard excellent red sandstone, admirably adapted to bear the enormous crushing and wrenching strains to which it has been subjected, and which have, as described, torn them in parts, four and five inches, one from the other where bonded at the internal angles of the piers. The walling and spandrils above the arches up to the corbels of the belfry stage are executed in irregular range work of similar sandstone, the mortar in which having lost coherence, the facing is bulged and twisted out of shape and the heart much perished, but above the line of corbelling the masonry of the tower and spire is more recent and far more consistent and substantial.

The CHAIRMAN.—I am sure we have all felt much indebted to Mr. Seddon for this very practical paper. It is always interesting to hear what our *confrères* do if they tell us exactly what they have done; what difficulties they have met with; and how they surmounted them. Mr. Seddon has in this case, by means of his many illustrations and lucid description, succeeded in setting his interesting and practical ideas fairly before us. It seems a most extraordinary thing that the west wall of the church should have been so much affected by the yielding of the central pier at such a distance from it as is the case here. I will now invite discussion upon the paper.

Mr. E. I'ANSON, Fellow,—It appears to me that there is but little in the paper to be discussed. It is, as the Chairman says, an accurate and pains-taking record of a work done, evidently with the care and attention which we know Mr. Seddon would bestow. The only thing which strikes

me as giving an opportunity of asking a question is as to the mortar with which this church was originally built being composed of a peculiarly loamy sand. It seems to have been so deficient in the qualities of good mortar, that from the time it was built to the present it has been gradually giving way under the pressure of the superincumbent weight. We know that mortar, even when composed of the best materials, if enclosed in thick walls, takes years before it assumes a semi-crystalized state, and becomes solid mortar; but I never before heard of any mortar which was used some centuries ago not having assumed a solid shape, in fact remaining unset to the present time, and gradually giving rise to the compressions which seem to have taken place in this building. I have great pleasure in proposing a vote of thanks to Mr. Seddon for his very interesting description of the restoration of this structure.

Mr. DAWSON, Fellow,—I beg to second the motion of Mr. I'Anson, and fully endorse his opinion as to the paper just read. With regard to the mortar, I understood Mr. Seddon to say that the material mixed with the lime scarcely came under the nomenclature of sand: that it was so loamy that no crystalization took place, and there was simply a certain amount of cohesion between the particles of loam and the lime. On the question of the west wall being pushed out five inches by the subsidence of the crux tower arches, I know of a somewhat similar instance in the case of a church in Lincolnshire five or six miles north-east of Boston, where the nave piers have all been thrust out of perpendicular toward the west, and the west wall has gone too, but I don't know whether it has been to the extent of five inches as in Grosmont Church. We have to thank Mr. Seddon for bringing before us these admirable drawings in connexion with the shoring and settlement of the old work; they are of immense use, especially to the younger members of the profession, and on that account I regret that so few are present this evening. There appears to be a remarkable solidity about the top of this spire, and I do not recollect an instance of so large a stone as 16 feet in height being used in a spire of that dimension.

Professor KERR, Fellow,—There are two questions that occur to me. I understand Mr. Seddon to say that he regards a foundation of solid rock as being prejudicial practically to the building, inasmuch as there was no yielding of the foundation corresponding to the settlement of the work above. I do not know whether that is an original theory, but it is certainly new to me; and if it is a novelty, I should be glad to have a little further explanation about it. The other question which occurs to me is one of practical interest. We have heard that mediæval builders did occasionally have mishaps; but I have heard for the first time to-night that the builders in Wales, at all events, allowed their buildings to become twisted while they were green, and that they proceeded with the work while the distortion of the building was increasing. I am sure you will agree with me that these are two rather startling allegations, and I should be glad to hear from our friend a little more respecting them.

Mr. SEDDON, Fellow,—With regard to the mortar, I find in many of the old buildings in Herefordshire and Monmouthshire the walls are as if they were put together with earth, all trace of lime having disappeared. From this cause the walls of this church, and particularly those of the chancel, were tottering, there being no cohesion in their materials. When building in that part of the country I have had great difficulty in getting any good sand for the mortar; and I am afraid much that has been used upon some of my works will prove of inferior character, for in small contracts it was impossible to insist upon sand being brought from a distance, especially before there were railways for its transport. With regard to the character of the foundation; when you have a building such as a central tower and spire, the parts subjected to the greatest weight will compress more than the rest, and it would be desirable that the foundation should slightly yield to such pressure, unless the greatest care be exercised throughout the superstructure.* We must remember

* An unyielding flat bed of rock or concrete is no doubt theoretically the best, or rather a perfect foundation, the superstructure upon which should be carried up with homogeneous materials to an even height, and time allowed for settling before further weight be added to any part. But in building with ashlar facing and rubble hearting, the

that these buildings took a considerable time to erect, and at Grosmont, at first, no doubt, they had a first class architect to set out the work, whereas, when the place had been abandoned as a royal residence, the subsequent works were probably carried out by men of a very different class, and it was no doubt such men who put up this central tower, which I believe was never contemplated originally. I do not think in Westminster Abbey it was intended to have a central tower and spire, and indeed there are very few instances of such of an early date. We find a great deal of inferior work of the later decorated and perpendicular periods, and they then certainly, in some cases, built with great recklessness; but I do not think we can blame those who laid out the original lines of the building just described, and we must remember that in these rural parts all the village churches must have been executed by men who were mere imitators of the works in the towns.

Professor KERR suggested that the difficulty with regard to the mortar might be to some extent met by calcining the earth, which would come out partly silicious and partly argillaceous.

Mr. SEDDON.—You would burn the earthy portion, and make it into brick ballast, so that I certainly think it would be a satisfactory mode of treatment.

Mr. EASTLAKE asked on what authority Mr. Seddon supposed that Westminster Abbey was never intended to have a central tower and spire.

Mr. SEDDON said he believed the piers were not strong enough, and that it was intended to put up a lantern like those of Cistercian churches. Had it been attempted, as was done at Chichester, it would probably have fallen in the same way. In the case of the tower and spire at Salisbury, which was another example of an over ambitious erection at a later date, a like disaster had nearly occurred.

The vote of thanks to Mr. Seddon was then passed unanimously.

GROSMONT CHURCH—APPENDIX.

By actual experiment ashlar in spire is found to weigh 1·527 cwts. per cube foot.

„ „ rubble masonry in tower weighs 1·33 cwts. per cube foot.

There are in spire 2,534 cube feet, weight (at 1·527 cwts. per foot) = 3869·418 cwts. = 193·47 tons.

There are in tower 9·016 cube feet weight (at 1·33 cwts. per foot) = 11991·28 cwts. = 599·564 tons.

There are six bells, framing and floor, weighing about 5 tons.

Total weight at arch springings = 798·034 tons.

There is no discharging arch over tower arches. Actual working sectional area of each arch, 3·45 feet. Many stones fractured.

Sectional area of each pier, wrought facing, 8·34 feet; super rubble core, 9·66 feet: total area, 18 feet super.

Weight on each pier, 199·5 tons = 11·08 tons to the super foot. On failure of the rubble coring, the ashlar facing doing duty for the whole pier carried 23·92 tons, and was crushed.

Actual total weight per square foot on foundation, 11·71 tons.

Breaking weight of the three needles, 216 tons; weight of one side of tower at level of needles, 170 tons; estimated actual weight on the needling, 70 to 75 tons. (The corbelling to octagon, with arching over, throws from 45 to 50 tons on each quoin N.W. and N.E. These quoins rest on the parts of the piers allowed to stand.) The load on the needling being only temporary, a co-efficient of safety of only 3 was adopted.

Actual breaking weight of *each* warped-up centre, 1,050 tons; weight on each, 199·5 tons; safe working permanent load, 210 tons; co-efficient of safety, 5.

NOTE.—The breaking weights given here are based on information derived from works on the strength of materials. As no two of those authorities agree, little value can be set on results thus obtained.

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conditions are different. This may, and should be, obviated by building the inner work in cement. We have, however, continually to deal with cases in which the use of such materials is imperative, and that precaution precluded. A slightly yielding foundation would therefore be preferable, as, though inevitably it would lead to a settlement, it would effectually prevent at least two other classes of constructive failure mentioned above, and the facing could not become crushed, as the piers at Grosmont have been. The point contended for is that with a yielding superstructure a reasonably yielding foundation is desirable; but of course both one and the other should be absolutely immoveable if it be practicable to make them so.—J. P. S.

ON THE VENTILATION OF HOSPITALS.

(A critical notice of M. Pauli's Communication, read on the 18th November, 1872.)

By JOHN BARBER, Esq., Engineer.

The two systems alluded to by M. Pauli as means of ventilation are each especially suitable under different circumstances. For instance, in a building with a lofty central tower, which may be utilized as a ventilating shaft, the principle of ventilation by aspiration or inhaustion may be equally as effective without the expenditure of machinery, but if no such tower exists, wherewith to cause a draft and draw the vitiated air from the rooms, no doubt, the more effective means of ventilation would be to use the machine-driven fan as an impulsion or pressure ventilator. I would cite, as an example, the abandonment of the fan exhaustors at the Houses of Parliament, and the adoption of chimney drafts in the tower instead. I am aware that there were other reasons for the change beyond the mere respective principles of ventilation themselves, such as injudiciously laid ventilating flues, &c., which might suit one system but not the other. Still, I think it only fair to give due consideration to the question, by shewing an important instance where the system, advocated most strongly by M. Pauli, has been abandoned in favour of the system which he thinks inferior.

The argument against the aspiration system of air being drawn in at open doors, crevices, &c., is even a greater argument against the impulsion system, in which latter case, when the door is open, the warm pure air being brought in from above and gradually vitiated by contact with the inmates, is very liable to escape into the corridors, by that means of exit, instead of the ventilator gratings near the floor.

Impulsion ventilation must, to a very great extent, obviate draughts from crevices, &c., but I do not see, after all, very much argument, either for or against either system described by him. Certainly ventilating by aspiration is the most generally applicable, for there are few even large buildings, where the expense of a twelve horse-power engine, boilers, and fan, perpetually working, can be borne, and in the carrying out of the system described by M. Pauli, the ventilating fan must never cease operating, for, if it does, the method of introducing fresh air from above and taking away foul air from below, cannot operate when the fan is stopped. I will afterwards refer to this.

WARMING.—The system of warming by hot water is, no doubt, the most generally effective, for no matter what size the building is, the range of pipes can be extended almost without limit as to distance, without materially losing in temperature; still, it is expensive to put down, and unless properly managed, may be expensive in fuel consumption. Warming by stoves, although open to the objections raised by M. Pauli, may be adopted without much difficulty in many buildings. 1st. if one stove centrally placed is too small to heat the whole building, two or more should be used, and so placed, that each has its fair share of area to heat. 2ndly. The unwholesome atmosphere may be, and has been, completely overcome by placing water in such close proximity to the stoves as to evaporate and mix with the warm air carried on from the stoves. M. Pauli surely forgets that warming by hot water is open to the same objection, if the pipes containing the water become too highly heated, since they, equally with stoves, expose "heated metallic surfaces" at a high temperature. There is no reason why the gills of a stove should be of a higher temperature than the pipes of a hot water apparatus, and from the nature of the thing, a gill stove of the same temperature as pipes will heat considerably more air and circulate it more freely. 3rdly. The defect of mixing smoke, from the furnace door, with the heated air is a defect so simply remedied

that it does not hold as an objection; and 4thly. The danger of fire I think is equally trifling, in as much as no combustible material is required in their construction, and consequently nothing can be fired by their working. Steam warming is open to objection more on account of its rapidly condensing, and hence it does not travel for long distances without very materially decreasing in temperature. To obviate this tolerably high pressures have certainly to be resorted to, but I cannot see any great danger in heating by steam, even if attended to by very inexperienced persons. The pressure required is rarely above 30 lbs. per square inch even in the largest building, and the town's pressure of water is always much in excess of this, so that without any attention from the stoker, and without the intervention of machinery, sufficient water to make up the loss caused by evaporation and condensation can easily be supplied in a self-acting manner, by the waterworks' mains. The only danger I can think of is caused by inexperienced builders, who do not understand engineering, and who frequently place the construction of a steam heating apparatus in the hands of third rate engineers, or ironmongers, whose object is to get the contract and make as much money out of it as possible, not considering probable danger in working. This same is undoubtedly the reason for the objection raised as No. 2, for if this pipe-fixing is superintended by an engineer of any repute or real experience, the joints need never give way. The answers above all reply to the advantages claimed by M. Pauli—as specially the property of heating by hot water, excepting the advantage of being able to neglect your fire and still maintain the heat of the building. This is THE great point of hot water heating—the body heated being so very great, and no air being able to get to the water to cool it—it remains heated for a very long time, for the same reason that hot water hermetically sealed in a vessel remains much hotter for a longer period than equally hot water poured out on an open dish.

The fact of the hospital at Ghent being only one storey high, at once proves that ventilation by impulsion is preferable to aspiring ventilation, the latter having but a short draught column in so low a building.

M. Pauli is clearly right in introducing the warm fresh air near the ceiling and taking it out near the floor (*i. e.* under the impulsion system). Air in a room is vitiated by contact with the inmates of that room, whose breathing organs are almost always (except when lying down) nearer the top of the room than the bottom. The main part of their bodies being nearest the floor of the room, and it being essential for health that the air they breathe should be free from any vitiation, it should be brought to the respiratory organs before it can come in contact with any impure object within the room. On the impulsion principle, this can be only effectually accomplished by bringing the fresh air in from above; *it is forced in, and it must go out*, and the only outlet being at the bottom, the current is, without doubt, established from above to below, thus giving pure uncontaminated air for the lungs, and letting the stale, vitiated, heavy air impregnated with all sorts of gases, fall to the ground outside the building, there to be purified by nature's process of deodorization in contact with the soil, &c. In the open air the supply we breathe follows the same course, and no doubt M. Pauli is only following nature's example, though requiring machinery to do so.

But when the impulsion fan is stopped for repairs, &c., then the rooms, as described by M. Pauli, become practically unventilated, for though the exit openings near the floor will doubtless serve as inlets, the openings in the ceiling cannot perform the duties as outlets, as in the aspiration system, because the free passage of the vitiated air is impeded, not only by the tortuous channels leading to the fan, but by the fan itself blocking the way like a damper.

The paper is very valuable, being for the most part a thoroughly practical one, while the experiments which illustrate M. Pauli's scheme are thoroughly convincing and to the point.

No discussion having followed Mr. Barber's communication, the meeting then adjourned.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, the 17th of February, 1873, the following Paper was read, HORACE JONES, Vice-President, in the Chair:—

ON THE HEATING OF PUBLIC BUILDINGS, CHURCHES, &c.

By JOHN BARBER, Esq., Engineer.

BEFORE entering upon the subject of my paper, I think it is only right to offer some apology for my presumption in addressing you. I consider that the two professions of Architecture and Engineering are far more closely allied than any other professions; both treat of construction, but while the talents of the architect are more generally and more naturally devoted to the production of effects pleasing to the eye, the engineer has to follow the much drier study of cause and effect, and try to produce most economically the greatest result from a given cause; his whole life must be spent in discovery and invention, the ideas of his younger days must frequently give way to the theories discovered later in life. In fact he is always at a fresh starting point, and this naturally causes him to look deeper below the surface in any subject brought before his notice than the architect has occasion to do. This leads me to suggest that there are many points, nay, their name is legion, coming under an architect's requirements, about which it would be well to ask an engineer's opinion and advice. How many architects are anathematized by clients on account of the failure of some trifling appliance connected with the furniture of their buildings. There is scarcely one item of the general fixtures required to make a building tenantable, the minutiæ of which do not come more under the province of an engineer's scrutiny than that of the architect. The patentees and inventors of various appliances and (so called) improvements, warranted to effect unheard-of per centages of economy, all besiege the architect, frequently adducing theories applicable to their inventions, which have no ground in reason, and not unfrequently their improvements are put into buildings only to prove failures, and so bring discredit, to a certain extent, on the architect. Now if these improvements were placed under the consideration of an engineer, it is more than probable that the special training of his profession would enable him, without expensive trial, to say whether they are worth the extra cost charged for royalty, or will really accomplish the end intended. The introduction of iron as a material of construction is one very important subject which is liable to be and (you will excuse me if I say so), is very frequently maltreated by the architect; my own experience has shewn me instances of where pounds might have been saved if some of the iron details of a building had been designed by an engineer instead of the architect. But my remarks are more specially directed towards the smaller details of a building. By an engineer I do not mean an ironfounder, who simply turns out castings at so much per cwt., or the ironmonger, who, having put up a heating apparatus in a church somewhere, considers himself henceforth a hot water engineer, (though he might far more appropriately be called an engineer in hot water.) I mean, rather the man who has had his earliest training among mechanical objects, and whose whole life has been spent in overcoming obstacles in their construction. These, which are my convictions, I take to be sufficient excuse for bringing before you the subject to which I now address myself.

The Heating of Public Buildings, Churches, &c.

Time will not allow me to do more than treat very briefly of the various systems, each of which might be a subject for an evening's lecture, so I purpose placing before you simply heads for consideration of the various descriptions of apparatus.

There are two kinds of heat at our disposal, namely, radiated heat, and transmitted or circulated heat. Heat from radiation, without the intervention of any foreign appliance, is that arising from open fire-places as used in houses; and although this kind of heat is not applicable, as a rule, in large public halls and churches, I think a few remarks on the subject will not be out of place here. It is not an uncommon remark for people to make of a fire-place, that nine-tenths of the heat goes up the chimney; they are short of the mark, for I contend that all the products of combustion, and the heat thereby generated, go up the chimney, and it is well for our lungs that they do. The heat transmitted to the room is not products of combustion, but simply radiation from the glowing embers in the grate; the particles or globules of air in actual contact with the cinders impart the heat to the adjoining globules, and so on until the heat imparted to the first particles has diffused itself over the whole apartment, the temperature decreasing as the radius from the focus increases. It fortunately happens (in fact Nature has so arranged it) that the radiation of heat travels at a greater velocity than the strongest chimney draught; and hence we find that, although the currents of air within a room must of necessity all flow towards the chimney opening, the radiation is travelling in an opposite direction, and although many of the particles of air, heated by contact with the fire, have been drawn up the chimney, they have not done so without first transmitting heat by contact to the other particles adjoining. We find that if we have a strong wind in our faces, and a hot sun behind us, we feel the radiated heat at our backs, although the current of air is blowing it from us. These remarks are intended to bear upon those patent grates which have beautiful perforations through the front plate all round the fire-place opening, which perforations are supposed to supply warm air to the apartment in which they are fixed. That warmed air does come in through these perforations I readily admit, but that it goes immediately round the corner and up the chimney, I assert; and it only affects the heat of the room to a slight extent, due to the supply of external air assisting combustion, and causing a less rapid current of air from the room to the fire-place, thereby increasing the powers of radiation. To prove this, light a cigar, and pass the smoking weed round the region of the perforations, and you will invariably find that the smoke is drawn towards the chimney, unless the draught is very sluggish. If, however, the air is heated in chambers around the back of the grate, and carried thence through flues, pipes or other channels, and admitted higher up in the room itself, or in an adjoining apartment, as in Captain Galton's plan, the Manchester School grate, and other examples, I at once grant that the effect is economical, for then the room becomes warmed by transmitted or circulated heat, *i. e.* heat produced by the circulation of air over heated surfaces or plates. Of the proper place for the admission of such heated air into a room I will not here say more than that, in my opinion, the point of admission should not be over 7 feet from the ground, nor under 5 feet. I could say very much more on this subject, illustrating my remarks by reference to many special stoves designed for this end, but I must pass on to the more extensive part of my subject. I will just add that, in my opinion, the idea of having the back part of the fire-place inclining inwards with a view to throwing the heat forward into the room is not the important improvement it is generally held to be, for all the heat at that point must be carried up the chimney; besides, this arrangement almost necessarily increases the depth of the fire at the back, a point to be avoided, if slow combustion is aimed at. The firebrick back, inclining towards the room, will certainly have some effect in smoke consumption, but

not in throwing a current of heated air into the room. The most effective and economical house grate would be that by which a thin vertical sheet of candescent fuel is obtained, thus providing with the same cubical contents of grate a larger superficial radiating surface. I now leave the subject of radiated heat and pass directly to heat produced by the circulation of air over heated surfaces, and I will divide this subject into four heads as follows:—First. Hot-water apparatus. Second. Steam apparatus, as being closely allied to it. Third. Stoves, including hypocausts and gill-stoves; and Fourth. Gas stoves.

The hot-water apparatus is most generally approved of, because of its great safety and economy, and its freedom from derangement. But on the other hand it is very frequently a most unsightly object to an otherwise lovely building; I can conceive nothing more objectionable in a church, or in fact any building finished in an artistic manner, than the ugly perforated black iron grating and coil boxes covering the pipes required to transmit the heat to the air circulating in the building. We frequently find a handsome tesselated floor or passage cut in two by a long row of so called ornamental grates; or the view down a corridor marred by a "Gothic iron coil case" at the end. The floor plates entirely destroy the quiet harmony of the tiling, and the coil cases, elaborate and handsome though they be as works of art, are still an eyesore to the architectural effect of a well considered building. But first let us see what the advantages of hot-water apparatus are. The heat derived by the combustion of fuel within a boiler being carefully wrapped round that boiler, so that little of any value is allowed to escape up the flue until it has paid its toll, is with very little loss of temperature transmitted through the boiler plates to the water next in contact with them. The water thus heated rises, and its former position is occupied by cooler water from below, which in its turn also rises, consequently the heated water may be led off in rising pipes, round corners, and up steps to a part very remote from the boiler (the distance of this point has its limit), thence it must be turned down and carried back to the boiler to be reheated: hence, the heat raised by the burning fuel is carried mechanically to a greater distance from its starting point or focus than could be expected from radiation alone. This, however, is not *the* chief point where hot-water heating is economical. The system of pipes becomes one long stove of large superficial area, and if free access of air is permitted below the pipes, there is a very rapid current of heated air upwards throughout the whole length of pipe, but if that ready access is prevented by boxing up or hiding the pipes to prevent their unsightly effect, or placing them in channels, with a grating at the top for the same purpose, then their heating property is much decreased, unless, in the latter case, frequent openings are made into the bottom of the channels from the outer air, so that the current coming in may readily displace the air which otherwise would lie partially stagnant around the pipes.

I will here remark that two rows of pipes 3 inches in diameter for the flow from the boiler are better than one 6 inches in diameter, for though they have the same superficial area, they only contain together one half the quantity of water, and consequently the same power of boiler in each case would produce much hotter water at the same distance from it in the 3 inch pipes than in the 6 inch pipes.

To prove the absolute necessity of admitting free access of air to these hot pipes, I will now cite an extreme case of prevented circulation. Put a corked bottle full of boiling water inside an air-tight box, and after the lapse of several hours re-open the box, you will find the temperature of the water will not be very materially diminished, and why? because circulation of air around the bottle is positively prevented. This is the great cause of complaint in cases where pipes are laid in channels under the floors of churches, etc., the only openings into these channels being through the perforated gratings at the top, where the warm air is expected to escape into the church; but this warm air cannot come out and leave a vacuum in the channel, other air must take its place, and it is expected to enter by the same openings through which the warm air escapes; this is most unnatural to expect, and were the currents visible

we should no doubt see a contention between warm and cold air for the possession of certain openings until the day is gained by one side, and thereafter the ascending warm air will take some openings and the descending cold air others. This is an involuntary arrangement. Now, why not prevent this fight, and provide a distinct entrance for the colder air, admitting it to the lowest part of the channels, and so permit nature to work on harmoniously? Numerous are the complaints of the slowness in getting up the temperature in a church used once a week, owing to the difficulties in the way of displacing the stagnant air. Nearly all complaints may be traced to the cause I have just mentioned, and if vergers or sextons can only be induced when trying to get up the temperature for Sunday to open *all* the windows after lighting their fire, and let the stagnant stuffy air out, and replace it by warm air from the channels, we should hear no more of such complaints. The heating apparatus should be treated as an ever-flowing fountain of *fresh* air, warmed to the required temperature.

Another cause of economy in hot water apparatus is, that the outer casing of brick-work round the boiler absorbs much of the heat from the fuel (which would otherwise have passed up the flue), and when the fire is neglected and gets low, it transmits back again the heat previously absorbed, thus preventing the sudden decrease of temperature which would obviously be the case if the heat transmitted to the building is effected by circulation from an apparatus with a smaller superficial heating area. For this reason hot water apparatus is more applicable to greenhouses, where excessive extremes of heat and cold would be injurious to living plants, which will only really flourish in genial fresh air; and why should there not be the same care bestowed in supplying air to man? Still, in this very changeable climate, where it is impossible to foretell one day what the following day may be like, it would be a very great advantage if hot-water apparatus were capable of more variation in temperature than they generally are. As a rule the most economical hot-water apparatus is that containing the largest body of circulating water; because, when once heated it takes a longer time to cool. To effect more extreme changes of temperature, any of the following plans may be adopted: first, when the flow is arranged to travel in two rows of pipes, one row may be shut off, so as to diminish the superficial heating area; or the fire may be drawn out, cold water let in, and the hot allowed to run to waste (this would not be economical); or, in the channel system, the openings into the channels for the admission of cold air from without, being in the first instance of a much larger area than actually needed for supplying air to be circulated, may be opened excessively wide, to their full extent, and so flooding the channels with colder air, may allow the warmed air previously in the building to escape by ventilation outlets.

To avoid the unsightly appearance of hot-water pipes, gratings, and so-called Gothic coil cases, I suggest that in churches the area under each block of pews or stalls should be made into a large heating chamber: (the space below the floors of pews is frequently 3 feet deep and upwards, which is all that is required). In these recesses or chambers place the requisite superficial area of pipes in connection with the boiler, and arrange a good wide drain or channel from the bottom of each chamber to the outer wall, for the admission of fresh air. For the escape of warm air into the church or building, I would place perforations, of a trefoil pattern, all along the rises into the pews or stalls, or put small grates, out of sight, under or in the ends of the seats, always taking care that the united area of these perforations is four times as great as that of the channel admitting fresh air to the heating chambers; or, still better, I would recommend the entrance of warmed air to be where there might be much scope for architectural effect, viz.:—in a hollow string course or any perforated ornamental stonework pattern along the wall, about 7 feet from the floor, flues up to the string course being made in the walls from the heating chambers. I would carry the same idea out in the pillars of the nave (which are often considerably stronger than actually necessary to bear the crushing

strain of the weight above them) by having a similar hollow string course round the stem of the pillar communicating with the heating chamber by a flue down the centre. The ornamental capital of the pillar would also form a good field for perforation for the admission of fresh air, or, if very lofty, for the exit of foul air. The air we should breathe by this system would be really fresh air, warmed to the required temperature, and when done with it must be carried away by ventilation. Another place where the unsightly pipes may be placed, is in hollow recesses specially prepared for them under the window cills. That part of the wall under the cill of a church window need not be the same thickness as the rest of the wall, except for uniformity's sake; the pressure of weight upon the window heads being carried by that part of the wall vertically below the springing. A space may thus be formed for a large coil of pipes under each window, with a controllable opening at the bottom to the outside, and a grating over it on the top face of the cill, hidden from view by the cill being higher than 6 feet from the floor line. Even when exposed to view, it is not the unsightly thing a floor-grating is. This can be used in summer time as a means of admitting air unheated into the building, and thus may be avoided the unsightly draughty plan of admitting air through a swivelling lattice, which besides spoiling the quiet harmony of a plain window, must be removed if the window is fitted with stained glass. Another advantage of this plan is, that a stranger entering a public building, without knowing the means adopted for admission of fresh air, and fearing the atmosphere may become too oppressive to suit his taste, naturally seeks a position near a window, and if so, he finds under this recommendation, that he has exactly placed himself where the air is admitted, and his comfort insured. A similar advantage may be gained by a person of the opposite taste, who, placing himself as far from the windows as possible, avoids the copious and undraughty (because constant) supply of fresh air. I fear I am now encroaching somewhat on the subject of that very partially understood matter—ventilation: but the two elements of heating and ventilation are so very closely allied, that I am bound to give the latter some consideration when the appliances I recommend for heating are equally conducive to ventilation, and I may here remark that it is unreasonable to expect and almost impossible to obtain good ventilation without first having properly constructed heating apparatus.

Before leaving this branch of my subject, I may say that if your profession generally would lay their plans before a hot-water engineer before proceeding to build, and ask him what in his experience is the most advisable system to follow in that particular instance, and what special provisions he requires, then many failures and difficulties would be avoided, and also much of the unsightly appearance of the apparatus; but it is far too often the case that after the building is complete, and the plasterers have finished their work, the Building Committee invite tenders for the heating of the building, accepting the lowest offer as a matter of course, often without any regard to the probability or otherwise of its efficiency. The ironmonger; I beg his pardon, the hot-water engineer, then enters upon his work; cuts a hole here, takes a corner off there, and is frequently obliged to commit serious acts of vandalism to get his apparatus to work at all, when if the apparatus had been prepared for beforehand all would have been avoided. I must, therefore, most seriously impress upon you the very great importance, if you wish to obtain an efficient heating apparatus, of considering the whole matter before commencing the foundations. Draw up your specifications of the work required, and bind the contractor to carry all its details out to the satisfaction of some one who understands it, recollecting that the simpler the arrangement of pipes in a hot-water apparatus the more likely it is to be successful and economical; and, considered in time, an easy method can always be arrived at, for hot water in circulating much prefers an easy natural course, always finding for itself the readiest way, and it will invariably take that way, unless compelled by mechanical interference to do otherwise. For this reason, the application of hot-water apparatus to two or three storeys of a building, and connected with one boiler, is very frequently

troublesome, because the first tendency of the circulating water is to aseend to the highest storey, and it would confine its operations to that storey alone unless checked by valves in its progress, and compelled to take a lower room. When you oppose Nature in any way, she turns stubborn, and does not prove so good a servant as when allowed her own free course, which you may make your own also. Indeed, this system, besides the difficulty which it entails of regulating the cireulation so as to make the temperature equal through various storeys, is constantly liable to derangement, either by neglect or forgetfulness in the wrong manipulation of the checking valves.

Steam apparatus is open to the same objections as hot-water apparatus, regarding unsightliness of pipes, etc., with the addition of grave disadvantages: first, it requires more attention; secondly, until steam is raised in the boiler no heat whatever can pass round the pipes; thirdly, when the pressure drops to zero the circuit of heat ceases, whereas, in a hot water apparatus eireulation commences the moment one atom of heat is transmitted through the boiler plate to the water; and fourthly, for want of attention, it may be dangerous. Finally, steam being more volatile than water is more rapidly condensed or eooled, and so loses its heating properties, but it has the advantage of being more elastic in its treatment, it may be conducted in pipes, up or down, round corners and angles, and in this respect only does it exeel hot-water apparatus. Some of the disadvantages may be overeome by the same treatment I have recommended for overcoming the disadvantages of hot-water apparatus. The danger of blowing-up or explosion may be obviated by making the feeding operation self-aeting, whieh in towns can easily be done by connecting the boiler feed-valve with towns' pressure, whieh is invariably higher per square inch than any pressure of steam required for heating purposes. Even then, there is the possible want of attention whieh may develop itself, either by neglecting the fire, and so letting the steam down to zero, thus stopping the cireulation of heat; or by over-firing, and so raising much more steam than is required for the purpose, whieh must accumulate the pressure in the boiler, or else blow off at the safety valves, the former effect tending to the possibility of explosion, the latter by its violent noise annoying, if not alarming, those hearing it, who do not comprehend that in the violence of its escape from the safety valve does their safety from danger consist. Another possible, nay, very frequent objeetion to steam heating apparatus is, that the boilers are not seldom constructed by persons who are ignorant of the power of steam. The material is often bad, or at any rate not good enough for the purpose, and the design and workmanship, so far as they are eonduceive to strength, are often worse than the material. Of all this the architect cannot be expected to know anything, but the engineer, if he be one at all, *ought* to do so, and it would take very much of the burden off the arehitect's shoulders if he could lay the responsibility of sueh vital reqnisites upon the shoulders of some one capable of assuming it. I can candidly assure you I would much rather ride upon a locomotive engine, at seventy miles per hour, with 160 lbs. pressure per square inch in the boiler, within one foot of my body, than stand within yards of some steam heating apparatus earrying only 10 lbs. pressure per square inch. Not long ago, there came under my own notice a steaming apparatus for the cooking department of a large public establishment, the doors into which measured an area of 4,320 square inches, which at 10 lbs. boiler pressure, would give a total pressure on the doors of over 19 tons, and the only appliances for holding the doors against this pressure were three hinges to each door, and two fasteners barely stronger than those on an ordinary kitchen oven. True there was a pipe at the top of the cupboard to let out steam into the flue, but this pipe was furnished with a cock, in order to eontrol the exit of that steam. Imagine the effect which would be produced supposing the cock were controlled so far as to be shut off altogether, and all the boiler pressure allowed to press upon the doors in question. The whole apparatus would be blown to atoms, and this is no improbable supposition, for the whole control was in the hands of a woman cook. Luckily, the doors fitted so badly as to prevent that accumulation of pressure, and I was called in to devise a means of

making them steam-tight, when I discovered that the calamity had been averted entirely through bad workmanship of the hot-water engineer, who could not make his doors permanently tight, because the steam sprung them open slightly, thus making itself a safety valve where not designed, and effecting its own cure though thereby clouding the whole kitchen in steam. I instance this simply to draw your attention to the fact that dangerous practices do exist even in your profession.

I now pass to the subject of stoves as a means of supplying heated air to public buildings, etc. Foremost amongst stoves stands the comparatively new invention, the gill-stove, but its old-fashioned predecessor the long barrelled vertical stove deserves a few passing remarks. There is, no doubt, some merit in this curiosity, especially when accompanied by the usual vertical iron smoke flue, carried (not always vertically) upwards through the roof. The merit of these stoves consists in their ensuing a regular temperature without requiring constant attention. They may be made to contain sufficient "green" fuel to last for twelve hours; and there is very little doubt that if the system of gills had been applied to them in days gone by, we should have seen very few of them, if any, abandoned. On the other hand, they were generally got up with a highly finished surface, thereby destroying as much as possible the property of imparting heat to the surrounding air.*

For a given area of heating surface to be most effective, that area must be as *rough* as possible. A great merit in "telescope" stoves was the ascending smoke tube, the effect of which was positively to enforce ventilation. Being warmed by the smoke or gases within for a great height from the ground (and not unfrequently quite through the roof) it caused all the surrounding air to rise to the top of the building, and thence to escape through the crevices in the roof. I have now said all that I can in favour of the antique stove. The objections to it are—first, its extreme unsightliness, which could not be remedied; second, the nuisance of having the necessary fuel box and firing implements within the building; and, lastly, its insufficient heating of a large area without resorting to great consumption of fuel.

The gill-stove, whether circular in form, as in the London Warming and Ventilating Company's stove, or in the barrel form, also very frequently used, is, as I said before, up to the present time the most successful stove. And why? mainly because it has increased the heating surface of the fire-box in such a form as to ensure a larger volume of air coming in contact with its surface, thereby increasing its power of imparting and circulating heat in the opposite way to that which I have just pointed out, where the antique stove was robbed of its power by being made smooth. To make any construction of a gill-stove *thoroughly* effective, it is necessary that it should be in a cellar or vault below the rooms heated, as in St. Paul's Cathedral (and I can instance no better heated building than the nave of St. Paul's). As, however, country churches cannot all be built with crypts, an alternative in their case is to have a stoke hole below the porch, tower, or vestry (according to position in the particular church); to encase the gill-stove in a brickwork chamber, to lead a channel of fresh air from the outside to the underside of the gills, and to carry from the upper part of this chamber or casing a gradually rising flue (of brick by preference) to some point in the church most suitable for the admission of heat. There the opening must be of large area, and covered with grating. The point where I prefer to make this opening is as near the centre aisle as possible, and directly opposite a north, south, or west door (as the case may be) of the nave of the church, so that every time the door is opened the incoming air disturbs the pillar of heated air rising from the perforated grating, and assists in disseminating it through the building. Again, a good reason for the above position is, that generally the chief public entrance into the

* Instances have come under my experience, where to prevent the condensation of steam occurring in the steam pipes within an engine house, they were turned and polished bright in the lathe, and were found to produce a great saving.

building is from one of these three points, and the progress being eastwards a current in that direction is obtained, which again would be materially assisted by the ventilation being at the eastern end. Care must be taken that the perforated grating is not placed immediately under a gallery, or its effects upon those persons sitting in the gallery front will be far from pleasant.

When a gill-stove is placed upon the floor of a church without any casing round it, it is not only unsightly in design, but liable to the following objections. Any sudden draught of wind upon the stove from one side is certain to disturb the quiet steady upward current of air from it, and is thereby liable to blow about the dust between the gills, ashes from the grate and leakages of smoke from the door. The spaces between the gills soon get covered with dust, etc., making its appearance more unsightly still; and should there be any down-draught from the flue, or any sluggish draught in the flue, the strong upward current of heated air from the gills carries the smoke and sulphurous vapour leaking through the door up with it into the building. Now, in order to promote strict economy, the combustion should be as slow as possible, the smoke scarcely creeping up the flue, for there being no means of directing the products of combustion backwards and forwards round the stove as in a boiler, and the distance from the fire-grate to the flue being necessarily very short, most of the heat caused by combustion is drawn off to the flue, and is of no service in heating the building if the draught be rapid. It is obvious, therefore, the draught *must* be sluggish to be economical, and if sluggish it is extremely probable that the rapid rising current of circulating air from the stove gills will carry with it into the building any slight escape of gases which may occur at the fire door or ash pan. I have on more than one occasion experienced this defect in those employed for warming the nave of York Minster. If, however, the stove on the floor of the building be enveloped in a casing standing some inches from the ground, with a hood over the upper part of the fire door, this defect will be cured; but the unsightliness remains.

The only way to obviate that is to place it out of sight, encased in brickwork, as before suggested. It has been found that the quality of the heated atmosphere is much improved by letting the gill-stove stand in water, some advocating the idea on the score of the evaporation of water moistening the atmosphere, and some believing that the water in the trough at the bottom prevents the loss by downward radiation. In my opinion, the improvement is due to the first of these causes. The question is often asked, Why is the atmosphere arising from a stove more stuffy and choky than the atmosphere arising from a hot-water apparatus? I answer, that the same state of things does not exist in each case. Where a hot-water apparatus has square yards of air heating surface to a given size of fire, the gill-stove with all its gills has only square inches, consequently the same amount of heat being spread over a very much larger surface in the hot-water apparatus than in the gill-stove, the actual temperature of the metallic surface is proportionately less per square foot in the former than in the latter case. If the temperature of the metallic surfaces of the heating apparatus, whether hot-water, steam, or gill be the same, the atmosphere arising from each would be of the same quality; for this reason you will find water troughs placed upon the pipes in a hot-house where the temperature of the pipes is the greatest, whereas there presence is unnecessary in the green-house. The stuffiness thus being due to the higher temperature of the gill-stove, how should it be avoided? Clearly by supplying moisture to be mixed with the heated air. This is done either by keeping the stove standing with its gills partially immersed in water, or by placing water in a vessel in metallic contact with the stove, and so letting it evaporate by rise of temperature. It is not *air* being burnt which causes stuffiness, but the innumerable floating particles we so clearly see in a sunbeam, and which, coming in contact with the heated plates, get scorched, and causes the choky taste. The presence of moisture in the air prevents this feeling, because it is absorbed by these floating particles, and they are again reduced to

their former condition before scorching. Still, after all possible devices, we have an insurmountable objection, and that is the perforated floor plate, which must always be unsightly and a receptacle for the sweepings from the floor; and, again, the applicability of gill-stoves to large buildings would be inconvenient, when the size of the building necessitates more than one stove, for it would never do to have in some large churches at least four separate stokeholes, each with their separate coal cellar and steps, and each their separate chimney. As a means of heating a building, to hold, say, up to five hundred people on the ground floor, they are good, because it is not difficult to find a position for the admission of heated air, where its influence may be felt by all.

Of other stoves, I would briefly mention those brick furnaces which bake the air as in an oven on its way to the building, and the other hypocausts of various construction. These are all open to objection on the ground of the great liability of the bricks themselves, or at any rate the joints, to crack, and allow smoke to escape direct into the building. The application to many a green-house has been abandoned on that ground alone. One of the best plans of arranging the hypocaust is to lay a long flue down the centre of the room, covered with fire-brick lumps, and terminating in a chimney with a good draught at one end. Commencing at the end furthest from the chimney, a small square furnace is built with a grate at the bottom, and others at intervals of a few yards apart, according to the size of the building; a lid bedded in a groove filled with sand, and in appearance like a coal cellar grid, is placed over and forms a means of access to each of these furnaces. One or more of the furnaces may be lighted, according to the season of the year; and fresh fuel is put on by removing one lid at a time, and charging. The ashes fall into a place to accumulate for a whole season, when they are hoisted out through the lids. This system has its merits. It is cheap in first outlay, is thoroughly out of sight, and if properly attended to is not uneconomical; and, again, the smoke from the first fire passing over the second fire becomes in a measure consumed, and so on until we perceive little more than the smoke from the fire nearest the chimney issuing therefrom. More than ordinary attention, however, is required for this system to ensure its efficiency.

I will now pass to the last branch of my subject, viz., gas-stoves. We live in an age of improvements, and none of us will deny the fact that much happens now as a matter of course, which was deemed impossible years ago. Economy, or at any rate convenience, is derived by dealing with essences. It is much more convenient to swallow a tea-spoonful of medicine than to drink the bucketful of wash from which it is concentrated. Why should we not apply the same principle in warming our buildings, and use a few thousand feet of gas in preference to burning a ton of coal? and why, taking all things into consideration, should such a course be uneconomical?

During a late professional visit to Denmark, I became intimately acquainted with a Dane who had gone much further than any enlightened Englishman I have yet met with in the treatment and use of gas for other purposes beyond lighting. I visited his house several times before being aware it was heated by gas; and having had my attention drawn to the subject of stoves (heating and gas) by Mr. Seddon, only a short time before, my mind was naturally ripe and ready to take in any ideas which might improve my knowledge on those points. I looked round his room on one occasion for a novelty in the stove line, and not finding one, although the day was very cold and the room warm, I asked how it was heated. My friend took a panel out of his window bottom, and there I saw a few gas burners, with perfectly blue flame, playing on a firebrick lump, with no pipe to take the products of gas combustion away. The heat from combustion and the heat absorbed and imparted by the firebrick was all allowed to enter the room, and although I was in the room for hours I did not feel any choky or stuffy sensation. Here was a realization of the very idea which had presented itself to Mr. Seddon and myself, and which I was proposing to bring to a successful issue. Now I must tell you that the gas

there was the best I have ever seen, though no dearer than London gas, (6s. per thousand, if used for lighting purposes, or 4s. 3d. per thousand, if used for cooking and heating). I ought also to tell you that my friend cooked entirely by gas, his roasting fire simply consisting of a 16 inch drain pipe, with a cross bar at top, inside which the meat was hung, the bottom of pot resting on a tripod, which also carried a circle of gas jets; a sort of ventilated dish cover crowned the whole. The consequence was that carpets and furniture were not spoiled by dust and cinders from fire; chips were saved, as also space for holding them, and labour in not having coals to carry to and cinders from the fire; and the first cost of the stoves, if we may call them so, was much less than the elaborate iron ones generally used in the Scandinavian kingdoms.

Now I feel I may be speaking to sceptics, but I fully believe it is possible so to burn gas, even London gas, that the heat arising from combustion shall be neither unpleasant nor injurious; and if so, I contend that we may most reasonably expect to find economy in its adoption for warming houses in lieu of the use of coal; for this reason—that in coal all the products of combustion itself go up the chimney, whereas in gas, treated as I propose, they would serve to heat the room; and in considering the economy of gas as a heating apparatus for houses, we must credit it with the saving in wear and tear of carpets, chips, coal cellar and chip house, chimney breasts and chimney tops, hearth-rugs, fenders, fire-irons, and register grates, the marble chimney piece and its necessary accompaniments, chimney ornaments, mirrors, etc. In fact, it thoroughly re-models a room, and renders much expensive furniture unnecessary; and it is my firm opinion that if due and proper consideration is paid to all these points, the economy will be in favour of the essence of coal—that is gas—and not coal itself. I am not a chemist or a gas engineer myself, and must leave the actual treatment as to admixture of air to ensure the Bunsen flame and other matters to them to work out; but I think I have just held out to them sufficient promise of success. With the foregoing remarks fresh in your memory, you will most readily conceive how easily and convenient it would be to apply a gas stove under the window cills of a church or public building, as previously suggested when treating of hot water apparatus; how easy to regulate the temperature of the building, giving more heat or less, as required, by turning a tap; in fact, the more I think of it, the more advantages turn up in its favour over and above any other system of heating apparatus. What is wanted is a fair and impartial trial, and this may be accomplished without very much trouble or expense. Try one room in a house first, and have a meter specially for the gas stove; carefully register on a thermometer the temperature inside and outside the room for a week; then repeat the operation, use coal in the firegrate, maintain the same temperature inside for the same length of time, weighing the coal, and this will show the actual cost in consumption—the other items of economy, as enumerated above, require no test. After arriving by experiment at the proper form of gas jets to adopt, in order completely to destroy any pernicious effects arising from the combustion of gas, it becomes an easy matter to arrange the form of stove to which the burning gas jets are to transmit their heat. I would recommend the following plan: fix a system of gas jets within a terra cotta or earthenware cylinder placed horizontally, the outside of which is ridged to as great an extent as possible (similar to the gills of a gill-stove), to increase the superficial area of the heated surfaces with which the circulating air is in contact. Upon the top of this cylinder or terra cotta gill-stove lay a vitrified earthenware trough, to be filled with water, and place the whole apparatus in a recess under the window cill, as previously recommended. By following out these suggestions we obtain—first of all, the great advantage of the form of gill-stove for transmitting heat to circulating air; secondly, we obtain the advantage of softening the heated atmosphere by evaporation of water; thirdly, we have compulsory induction of air by placing the stove in a recess slightly larger than itself, then the advantage of introducing the warm air into the building

in a convenient, unconspicuous position, where its effect is more likely to be general. Again, we have no dirt, ashes, coals, or other lumber to provide for or to remove;* and, lastly, we succeed in obtaining a heating power which can be increased or diminished at will, to suit the requirements of the day or the tastes of the public within the building. There is yet the crowning advantage of all to enumerate, which is the securing of the whole products of combustion and radiation, as well as the heat caused by simple circulation. This last advantage I must confess, is not yet certainly secured; but why should it not be? Nothing need now be put down as impossible to obtain, for every day brings us fresh evidence to prove that what were impossibilities once are now admitted as simple facts.

I must now sum up. You will find I have not condemned any one system of heating; on the contrary, I have endeavoured to shew that each has its merits. I will go further, even, than this, and say that the arguments I have laid before you prove that any system of heating may be made successful, and that it is in short the character of the building or the conditions of its use which will make one system better than the others. It is impossible to lay down a fixed rule, and those who expect to arrange their heating apparatus successfully, by copying faithfully what has been accomplished elsewhere, deserve to find a failure, unless they first contrive that all the accompanying arrangements of the building are equally assimilated. I have said nothing about the flues from the heating apparatus, and time does not now permit my entering upon that subject. It may suffice for me to say that I am in favour of slow draught and slow combustion, in order to exhaust the heat in the apparatus (whatever its description) before the smoke leaves it. This can only be effected by slow draught and slow combustion; to obtain these, the bottom throat of the flue should be wider than the terminal, or else be provided with a damper. If a flue is contracted near the fire, the draught is very much increased, as you may easily prove by holding a newspaper in front of the fire a few inches off the hearthstone.

I thank you very much for so patiently listening to me. I hope my remarks may have interested you, and if they prove of service, I shall be thankful. There are many subjects beyond the particular one treated of in this paper, which I should like to have brought before you, among others, ventilation, house drainage, and the treatment of interior fixtures, and should this, my first appearance before you, warrant you in allowing me to repeat it on another occasion, I shall be very glad indeed to lay my ideas on those subjects before you during some succeeding session. I am afraid that my introductory remarks may have conveyed to you the opinion that I entertain a somewhat egotistical idea as to the infallibility of the engineer; but such, I assure you, was far from my intention, for no one admits more thoroughly than myself the frequent failures which result where successes were positively expected.

The CHAIRMAN said: Ably as the paper has been read, I am quite sure we must all regret the absence of the author, inasmuch as on such a subject as this there are sometimes questions of a crucial character which we should like to put; and which I am sure the author of so intelligent a paper would only have been too pleased to answer. No doubt there are gentlemen here to-night who have given this subject considerable attention, and we shall be happy to hear their remarks, either in confirmation of, or in opposition to, the views which have been put forward in the paper. I would make one remark, which may perhaps start the subject. There has been but slight allusion made to the Continental mode of heating by charcoal and earthenware conductors, similar to that adopted by bakers in heating their ovens in this country. They heat their brick or tile-work ovens, after which the fuel is drawn out, and the heat is sufficient to bake the bread; and a very considerable amount of heat is retained for many hours through the non-conducting nature of the material. The

* That frequent marrer of architectural effect in churches, the heating apparatus chimney, is removed altogether.

author mentioned one little point in which the effect was similar by using earthenware,—a slow conductor of heat, as compared with the gill-stove, which gives out heat very rapidly, and as rapidly cools when the fire gets low.

Mr. E. Roberts, Fellow, (responding to the Chairman's invitation)—I am afraid you have called upon one the least likely, perhaps, to make any acceptable observations on the paper read. We must all lament the absence of the author of it, because I think he might have been able to add to the information which, I confess, on some points seems to me rather spare. He has refrained from alluding to several methods of warming which have been in practice at different periods of the world's civilisation, and has only dwelt lightly on the hypocaust system, although that is unquestionably best adapted for buildings of one storey, to which Mr. Barber seems principally to have confined his attention, and more particularly to churches and halls. Probably the most convenient mode was the old Roman one of warming the floor and the walls, from which a genial heat was communicated to the air in the room, due provision being made for ventilation. Within the last week or two I have adopted in a church that very system. It is called a patent, but I apprehend it is no more subject to a patent than any other ancient system of warming; and the success of that plan, which has been tried during two Sundays, is unquestionable. It requires that the fires at the end of the church should be lighted early. The air to the furnaces is mingled with the evaporation from water troughs below the fires, which assists and increases combustion. The heat passes under the stone paving of the gangways of the nave and aisles to a flue at the other end of the church, and in twenty-four hours the temperature within the building is increased 20 or 30°, and has mounted up to 70° of temperature; but between 50 and 60° is ample heat for any church. The congregation is rendered comfortable, and breathes pure air, because there are no emanations from hot-water pipes, or from the extremely heated surface of flues, which are most objectionable in the warming of large public buildings. It appeared to me, in the course of the paper, that the author was going to recommend something of his own invention, or that of his friends, and therefore, I confess, I was disappointed, because I thought I might hear of something fresh which we could adopt with an assurance of success, obviating our present difficulties and ending our troubles on this point; for we really know very little about warming and ventilation, and we are constantly in difficulties with our clients on those subjects. On the subject of hot-water pipes, Mr. Barber recommended that which I thought was not quite the wisest thing. He recommends that hot-water pipes should be laid in channels. Those who heard my paper last Session on that subject will recollect my proving that heated air emanating from sunk channels really does not warm a building in a proper manner, but ascends to the roof and then descends cold.

Mr. Seddon.—Mr. Barber is of the same opinion; he spoke of what the effect would be.

Mr. Roberts,—I understand him to advocate pipes in channels. But my observations will only go to the extent of confirming his view, if he does not approve of the channels.* One of the most successful instances of heating by pipes that I have seen was that in which the hot water pipes were placed near the ceiling. That was a remarkable instance of the application of pipes, and I think we ought to mention our experiences to one another. It was in the case of a bedding and furniture manufactory, where it was necessary that a fairly high temperature should be maintained. A single one-inch pipe was carried round beneath the ceiling of the wareroom,

* I stated (pp. 3 and 4) that pipes laid in channels were not so effective, owing to the stagnancy of the air surrounding them, *i.e.*, the inability of the warmed air to rise, unless cold air were admitted below the pipes to supply its place, and I consider that if cold air is so admitted, pipes laid in channels can be made thoroughly effective.—J. B.

and was supplied by the waste steam from the boiler. These warehouses were heated perfectly, and a sufficient and agreeable temperature was maintained, somewhat confirming my previous view that heated air from channels or apertures in the floors of the room does not really warm the room, but ascends in a column instead of being diffused. The warming of buildings by pipes, I think, should not be in channels; but they should be placed somewhere in the room where the radiation of heat can effectually take place, so as to give out the warmth at a height to enable us to benefit by it, say about six feet from the floor. I have little or nothing to say upon the other subjects mentioned, except the question of gas stoves. At the present high price of coal, economy in the use of that fuel is very desirable; but I doubt whether it can be effected by burning gas, for if the present price of coal continues, we may expect an increase in the price of gas;* and then there is that important part of the subject, the getting rid of the products of the combustion of gas. No gas should be burnt in a room in any possible way if it can be avoided.† The gas, whether for warming or lighting, to make the thing perfect, should be burnt in a chamber not communicating with the room; and iron, as a heating surface, I consider, is excessively objectionable. If the heating surface can be obtained by means of gas, so that the air is admitted to the burners from outside the building, and the products passed out into the air, there might be economy in that mode of heating, but that would depend a good deal upon whether gas will continue to be supplied at the present price. Air admitted vertically, whether warm or cold, ascends in a column, and if admitted at a higher temperature than that of the room, it will ascend hot and come down cold.

Mr. E. R. Robson, Fellow,—I should have been glad if Mr. Barber had gone a little further with his subject, and had connected ventilation with warming, for not only are these allied, but absolutely inseparable in the treatment of a paper on either subject. A building may be warmed or it may be ventilated, but the warming and ventilation of a building, so that the air shall always be fresh and the temperature continually even, is so difficult a problem that I think hardly any gentleman in this room will be prepared to say that he thoroughly understands it. A good deal has been said and written lately about the Roman hypocaust, and scientific men are to be found who hold that it is a system which should be revived in these modern days, particularly when the continually increasing price of coal renders economy on this point of daily increasing importance. Indeed, in reference to public buildings, the annual cost of maintenance of the warming system is even a more serious point than that of the first cost of the apparatus, and probably the hypocaust and other things will receive more attention in the future. I think it is incumbent upon us to communicate to each other any knowledge, however little, which we possess on matters under discussion, and for my own part I will say I have derived from experience a strong antipathy against warming with plates of metal if heated much beyond 212°. No doubt the warming of rooms by hot-water pipes is a satisfactory method, but unless fresh air is admitted over the pipes it is merely warming the air in the room, and my impression is that it is better to have the coils of pipes or the heating vessels on the basement storey, and to send in the fresh air over them, and up into the several rooms by flues at various points. You then not only warm the room, but have secured the first vital element in all ventilation by admitting warm fresh air. In the case of a house, the simplest and most extracting power is the kitchen chimney, made as an iron cylinder, and having the extraction flue grouped round it, and air flues from all the other

* The price of gas has little to do with my theory as to actual economy in its use for heating purposes, as I am willing to accept a proportionate rise in the price of gas as the cost of coal increases.—J. B.

† Certainly not under present circumstances. I stated what I found in Denmark, and invited chemists and gas engineers to find out an equally efficient remedy against the unpleasantness of tasting products of gas combustion. —J. B.

apartments placed in communication. In the case of public buildings a particular system may be applicable to one description of building and not to another. My own particular work lately has been in the building of public schools, where you have to consider not only the wishes of masters and teachers, but how the daily warming of the building is to be maintained. If you have five-and-twenty fires in a school it would require a staff of servants, almost, to keep the fires going, and it seems to me, when you get beyond a certain size of building, resort must be made to artificial warming. With regard to gas, I have in the hall of my house a gas stove, on the principle mentioned of mixing atmospheric air with gas, and I find no inconvenience whatever from the products; but I am sure gas ought not to be used in a room, and certainly not in a school, without provision being made to carry the products of combustion away. I don't know that Mr. Barber is right in thinking that architects are so hopelessly ignorant on the subject of warming buildings. However, that is a point which architects must make up their minds to settle for themselves, and not to leave it to engineers entirely. There is one point which strikes me, and that is when scientific questions of this kind are brought before the Institute we cannot be expected to discuss them fully and exhaustively at once. For my own part, I should be glad of the opportunity of reading and digesting the paper, and then making such remarks as I may have to offer upon it. Mr. Barber has given us a valuable paper, and I have great pleasure in moving a vote of thanks to him for it, and if the discussion could be adjourned, I have no doubt a good many members would be prepared to say something on the subject.*

Mr. T. CHATFEILD CLARKE, Fellow,—If permitted to do so, I should be very happy to second the vote of thanks to the author of this paper; but I must confess the paper does not take the whole ground of the warming of buildings in quite the manner I should have desired. There is a mode of warming public buildings, which I have found in my practice efficacious, which has not been touched upon, and that is heating the building with hot air by a chamber below, and extracting the cold air partly from the building itself. For some years I used hot water, but as a rule I found it not satisfactory. The plan of hot air heating, which I have not only adopted myself but have recommended to my friends, is extremely simple, and has generally given satisfaction. This plan consists in forming a chamber in the basement of the building, the chamber being lined mainly with fire brick, the hot air being sent into the building by flues; and by means of an extracting shaft partly, and partly by external fresh air, the furnace is fed; in this way the building is heated in a very short space of time. Many young architects, who have been disappointed with the results of hot water heating, will find this system of using hot air in public buildings which require to be heated quickly very useful. I am myself building a library at the present time, and I have adopted the plan of laying the pipes above the surface of the floor. I think Mr. Roberts misunderstood the author of the paper, for he does not recommend that the pipes should be laid in channels. I believe it will be found better to floor the building completely, and let the pipes be under the bookcases.†

After a few remarks from the CHAIRMAN, concerning the importance and interest of the subject under discussion, a vote of thanks was passed to Mr. Barber for his paper, and the meeting adjourned.

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* I stated in commencing the paper that time alone would prevent my testing the subject of heating as fully as I could have desired; also, that ventilation and heating were almost inseparable subjects, and that ventilation could not be efficient unless the heating apparatus were first made efficient. As to the hypocaust at Silchester, if Mr. Robson can ensure such a supply of fuel as was procurable in the days of its use, I would at once recognize its efficiency as a heating apparatus, but unfortunately oak logs are not so abundant now as in the times of our forefathers, and the use of smoky coal would very soon choke the flues and check the draught.—J. B.

† If the pipes are laid under the bookcases, great care must be taken to provide an ample outlet for the heated air from the upper part of the chamber, and air should certainly be admitted from the outside of the building, beneath the floor, to the underside of the pipes.—J. B.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, the 17th of March, 1873, THOMAS HENRY WYATT, President, in the Chair, the following Paper was read:—

ON THE ART OF "SGRAFFITO" DECORATION,

BY ALAN S. COLE.

WHILST London contains some of the finest buildings in the world, its miles of shabby brick houses give it a dull air. Coal smoke and fog do not brighten it up, but make what is dull duller. In these times of individuality, cheapness has an uninterrupted sway of its own. The Londoner is free to build the cheapest of houses with bad stock bricks and mortar made chiefly of mud. Perhaps the worst period of cheapness is over; and although London will continue to have acres of little brick streets in the quarters inhabited by the working classes, there are signs that Baker Street and Sloane Street in their dull monotony are going out of fashion.

Houses of a rental of £300. a-year and upwards have usually a stucco face, and affect some architectural mouldings in cement. At best they are very mean and tasteless. But whilst cheapness must and will prevail as an influential consideration in the erection of houses, I venture to think that the experience of past times shows that there are processes by which even the cheapest brick architecture may be elevated by a little decoration produced at a low price; and I hope to prove this on the present occasion. I regret to tell you that Mr. Moody, who has been principally concerned with the experiments at South Kensington, is unavoidably prevented from being present this evening. He entertains views in connection with the employment of sgraffito, which, had he been here, he would have been happy to explain. I am unable to speak upon them in his absence, but from the conversations I have had with him, I feel sure they would have been interesting to you, and would no doubt have strengthened the belief which I hope to establish in regard to the utility and easy adoption of sgraffito as a means of decorating modern houses. As an illustration of the easy adoption of sgraffito for decorating house façades, I have had a diagram prepared, showing a house front of brick without the vestige of decoration about it. Mr. Moody has prepared a second diagram showing the same house front as it might appear by applying to it a facing of ornamental plaster work at a cost of say about sixty guineas. From inquiries I have made it appears that surfaces may be prepared at 12s. 6d. the square yard for sgraffito or stucco decoration. The cost of the ornament depends upon its elaboration. The materials and labour required for such a façade as the one indicated could be obtained for about £49. This is without allowing any charge for the drawing of the cartoons, which I think might be put at, say, £20. The whole work would therefore cost about £70. By simplifying the forms and reducing the amount of artistic labour this cost could be brought down to £50. If the panels designed for one house were changed in arrangement, they could be made to serve for a series of five or six houses. Hence a considerable reduction in the average cost per house for artistic work would be effected. It is needless for me to say that this method of decoration leaves the style considered to be preferable entirely at the option of the builder, the decorator, or the purchaser; though one dogma should be perhaps laid down in respect to this, namely, that the surface under treatment should be panelled, and the arabesques or ornament placed within the panels. The panels will necessarily follow

the prominent constructional lines of the façade, and so will not weaken the appearance of them. I have ventured to mention this both at the suggestion of Mr. Moody (whom I would call the Andrea di Cosimo redivivus), and on account of the unsystematic manner in which so-called ornament is applied to, or perhaps I should say dabbed upon, many of our modern houses.

It will no doubt be said that this plaster decoration will become as dirty as the common plaster work which covers modern houses, and that it will require to be protected by water glass or some vitrifying fluid. It should, however, be remembered that at first starting the ground of the *sgraffito* is of a dark tone, while the upper layer of plaster is white, or light in colour. Therefore the two may become dirty together, but the two colours will remain for a long time in contrast. When they are entirely obliterated the incised ornamentation will always be apparent, and be of service as a decoration in spite of the toning of soot and fogs. It has occurred to me that some modification of the artificial stone manufacture might be usefully adopted in strengthening the plaster, and in perhaps giving it an invisible vitreous coating after the work has been executed, so that from time to time the dirt which would accumulate might be removed from this coating. I have no authority for speaking about such an application, beyond that of my surmises, which go for nothing, since I am no chemist.

At South Kensington various methods of using cement for decorative purposes have been tried by Mr. Moody and the students in training. The practice ground has been the extensive wall surface of the inner side of the new Science Schools, the façade of which is in Exhibition Road, opposite to the site of the proposed Natural History Museum. Some of the original cartoons for these decorations are before you, and I hope that those who take an interest in this subject will visit South Kensington, to inspect this work. The surface has been treated principally from the experimental point of view; and I think I interpret Mr. Moody's views aright in pointing out that the work should not be judged of as a complete design, of which the details have an artistic *rationale* one to the other. *Sgraffito* proper occupies the largest area, and there are besides examples of other uses of stucco and cement, such as modelling in low relief, painting upon the stucco itself, &c. This evening, although I may allude, *en passant* to the general use of stucco as a vehicle for decoration, I propose to dwell chiefly upon sgraffito.

As you will see by the experiment which will be carried out this evening, *sgraffito* is the scratching of an ornament upon an *intonaco* layer applied to a black ground, leaving the white of the intonaco to represent the white forms of the design and the black to represent the black. To fix this preparation of plasters to a wall it is necessary that the wall should be well wetted; in fact, as Ceninni has said, "You cannot wet the wall too much." An ordinary "floating" coat of plaster three-quarters of an inch thick is first laid; when this is sufficiently dry—say in three or four days—a layer of black plaster not more than a quarter of an inch thick is then applied; when this latter has settled and is still damp the finishing coat of light-coloured plaster one-eighth of an inch or less is then laid, according to the delicacy of the work to be executed or the distance at which the *sgraffito* may be ultimately placed from the eye. This last named is the "intonaco" or "upper layer" spoken of by Bossi, who, in his Dictionary of Art Terms and Work, &c., describes "sgraffito" under "sgraffio." I have here a plaque which has been prepared in this way, and upon it Mr. Wormleighton will execute some pattern, in order to show the facility with which the work is done.

When the surface is prepared for being worked upon, and before the plaster hardens, the *sgraffito* or hatching should be executed. In this respect it will be observed that this method resembles fresco painting, since no more of the surface should be prepared than the artist is able to finish in one day.

Quoting verbatim from Mr. Moody's Report on this art, the following is his experience as to the transfer of a design and its subsequent execution on the plaster:—

"Having made a full-sized drawing of the proposed ornament, it can be transferred to the wall by tracing the lines through the paper on to the wet and yielding plaster, or if the drawing is executed in charcoal, it may be printed on the wall by turning its face towards the plaster and rubbing it firmly at the back; then with an ordinary desk penknife, which was found to be the best tool, the artist firmly incises the outline, cutting through the upper layer into but not through the black layer below; he then scrapes away the upper layer and exposes the black wherever black is wanted, leaving the upper layer wherever white is wanted, and in this way any design in two tints can be executed with rapidity and effect. Where large spaces of black occur it is as well to use a broad tool with a square end, which not only removes the upper layer easily and quickly but gives a tolerably even surface to the layer below. Although designs are very generally executed in black and white, any colours which are permanent when mixed with plaster can of course be used.

"Shading by lines can easily be done provided they are not too near together, otherwise the projecting white might be apt to chip off."

As regards the experiment at South Kensington, Mr. Moody says:—

"For the top part of the building (and this also refers to the work down to the first floor) the first, or floating coat, was composed of 1 part ground selenitic lime to 4 parts of rough sand, and a little plaster of Paris; this coat was three-quarters of an inch thick.

"The next, or black layer, was composed of 1 part lime, $1\frac{1}{2}$ black oxide of manganese, 2 of Barra shale or clay, and in the upper parts of the building this was three-eighths of an inch thick,—a thickness which was found necessary, at a subsequent stage, to reduce to less than a quarter of an inch.

"The third or finishing coat was composed of silver sand, lime and whitening in equal proportions. This coat was hardly more than 1-16th of an inch thick.

"The upper frieze was composed of purple, brown, and a little manganese; the colouring matter being somewhat less in proportion than in the black.

"In the second floor, the space above the windows has been divided into panels by a series of styles. These were made in ordinary Portland cement: as the effect was not considered satisfactory, they were afterwards painted maroon with common oil colours.

"As the work proceeded, it was discovered that the adherence to the wall in the previous work was in some parts defective, for on cutting into the plaster in these places, it was seen that the failure was in the first layer. It was first supposed that this arose from the wall not having been sufficiently wetted, or the mortar scraped sufficiently out of the joints, to give a good key to the plaster; and it is not improbable that in the long interval that elapsed between the erection of the carcase and the completion of the building, the walls may have become so dry that they required much more wetting than would have been the case with walls just built.

"However, be that as it may,* an experiment with the second, or black layer, proved its expansive powers when setting to be so great, that it may possibly have bowed out with sufficient force to have dragged up the first coat with it. Accordingly, in future work it was determined to reduce its thickness to a minimum. Soap lime was also substituted for selenitic lime in the composition of the black layer.

A change was also made in the first or floating layer, which in future consisted of 1 part selenitic, 2 parts Barra clay, 5 parts coarse sand, but without complete success, as testing the work with a hammer will betray parts that are evidently hollow.

The adherence between the three coats was invariably found to be complete: it was impossible to

* The selenitic mortar was made by hand, which is stated to be an inferior mode to preparing it in a mill.

separate them; indeed, the strength and solidity of the whole slabs or panels were so obvious, that it was thought quite unnecessary to cut them away, although their adherence to the wall was in some places imperfect.

The following details, without reference to a plan, may, perhaps, seem uninteresting. They will, however, serve to inform those who come to South Kensington and inspect the façade now spoken of.

"The small panels in the upper part of the decoration above the windows of the first floor are painted in fresco. Some of the more delicate shadows of the ornament were also painted with a little manganese and water on the coat of plaster, and in some parts, more especially in one of the spaces between the arches on the ground floor, a whole bay was entirely painted instead of cut. In the centre plaques of the decoration, between the windows, are figures in relief. There are five of these, beginning on the left. The first is modelled entirely in selenitic, sand and whitening in equal proportions. The ground was mixed with yellow ochre; but as this was found to be too soft, the grounds of the other figures were painted with raw sienna in fresco; the second and third figures were modelled in the same material as the first; the fourth was roughed out with Beasley's cement, and coated with $\frac{1}{4}$-inch selenitic; the fifth, the same as No. 4. The above figures are roughly modelled by Mr. Gibbons; their execution did not occupy more than two hours each. The pilasters, with volute capitals, were made of Beasley's cement."

The great mass of the ornament on the ground floor was executed throughout in the way I have already described. There was, however, a slight modification in the figure subjects which fill the principal panels.

"Of these panels (counting the half panels at each end) there are seven. The two half panels and the centre panel are modelled; one to the left is entirely in Portland cement; another to the left, and also the centre one, are entirely in selenitic and sand. The panels next to the centre are executed in *sgraffito*, with shadows in lines, similar to the rest of the work; but in the two panels next to the end ones, three instead of two layers have been laid, namely, first the ordinary black layer, then a grey layer, and last the ordinary finishing coat. To obtain the shadow we cut through the upper coat only; but when we want to come to the background we cut through both that and the shadow coat. In this way we have produced the appearance of a drawing with tinted shadows, and in this way no doubt still great variety and refinement could without much difficulty be produced in *sgraffito;* for this work, however, it is necessary to devote very considerable care to the preparation of the design, the exact form of the shadow must be clearly defined, and for this reason the preparation of such designs is a most useful and instructive study, but necessarily adds to the expense of the work."

This latter piece of work closely resembles the *chiaroscuro* which was frequently adopted in the sixteenth century in Italy, for decoration of façades, &c. In concluding this description of the South Kensington experiment, I may mention particularly a successful modification of sgraffito which was tried.

"Having prepared a maroon ground instead of a finishing coat, scarcely more than 1-16th of an inch thick, a layer was laid of light cement one-half of an inch thick, and having traced the drawing, upon it, the outline of the figure was cut straight down to the ground; after clearing away the waste, a projecting slab of the exact figure wished for remained. The face was then carved after the manner of cameo cutting; and in this way a relief was obtained, in some respects better perhaps than if it had been modelled; for the degree of relief in this experiment is more uniform and sculpturesque, while the figures come more satisfactorily off the ground than they would if they were painted upon it."

I think it is apparent, therefore, that Mr. Moody has more or less availed himself of precedents which exist for the various uses of stucco supplied by Italian artists of the sixteenth and seventeenth centuries, and by the Tuscan architects and decorators especially.

Of the origin of *sgraffito* I believe it is difficult to speak with anything like accuracy. Vasari and Bossi both describe the working of *sgraffito*, but they throw no light upon its antecedents. The Italian artists employed stucco considerably in the decoration of the Vatican, both for modelling and for painting upon. Hence from this latter use of plaster were revived the various methods, more or less similar, which went by the names of "painting in fresco," "intonaco," "terrata," &c., which, as the earliest examples of wall decoration indicate—the wall paintings of Pompeii, for instance—were known to artists practising thousands of years ago. It is not unlikely that *sgraffito* is an offspring of cameo cutting. They both are arts having limits analogous one to the other. The artist who designed and executed a cameo limited himself in materials and colours. He depended solely upon the variations of layer which a stone possessed. In the same way the *sgraffito* worker, relieved certainly of the trouble of finding a suitable combination of layers, since each combination is under his control, limits himself to the variations he can obtain from the two layers of oppositely coloured plasters.

In the South Kensington Museum there are specimens of stucco ornamental panels which date from 200 B.C. These panels came from Pozzuoli, near Naples, a village known in centuries past for its abundant examples of stucco work. Some of these panels are unmistakeable bits of *sgraffito*, the marks of the hatcher being quite apparent.

And here I may interpose that *sgraffito*, as an art applied to other materials, is well known in India. Metal *sgraffito* is, I believe, of ancient origin. I have not, however, pursued my inquiries as to the archæology of this particular work. It is interesting, however, to note that from Moradabad we have specimens of a leaden ornamentation upon a ground of copper, which are executed precisely after the manner of *sgraffito* in stucco. Then, again, from Kashmir come silver-gilt works, in which the gilding is scratched away to reveal the background of pure silver, while the gilt ornament remains on its surface. In like manner, a ground of lac applied to pottery is scratched into ornamental forms, of which the pottery in *puris naturalibus* is the ground. At South Kensington Museum there is a case entirely occupied by specimens of *sgraffito* pottery, Italian in origin and of the fifteenth century. From this ware the Italian artist of the fifteenth and sixteenth centuries possibly obtained the suggestion for the revival of *sgraffiito* as a means of decorating façades of houses.

In the course of my researches, which I regret are slight, though I hope they may be sufficient to arouse some interest in this rather forgotten art, I have remembered the plaster work to be found in Northern Germany. The examples I particularly allude to are those at Hildesheim and Halberstadt, and date from the eleventh century. These works are not *sgraffito;* they are low relief stucco figures. Having recently seen those at Hildesheim in the Michælis Kirche, I may be permitted to mention their existence as an evidence of the lasting powers of the material when fairly protected, and also as a species of connecting link between the stucco of Pozzuoli and the revived use of it by the Italians in the fifteenth and sixteenth centuries.

During this period great quantities of decoration were executed in plaster. Perino del Vaga, Domenico Beccafumi, and Giovanni da Udine, produced works of this kind. But none of these appear to have executed *sgraffito* decorations. The artist who turned his attention, and, from the works I have consulted, seems to me to have really instigated a revival of *sgraffito*, was Morto da Feltro. The especial bent of his art was the invention of arabesques and "grotesche." He was a recluse, and apparently imbued with strong conservative principles. He devoted himself to discovering examples of the style of art he affected, and his devotion caused him to spend a good deal of his time in the subterraneous passages at Rome, where he gratified his fancy by the study of the arabesques and such like, which were painted on the walls.

From Rome he went to Naples; and at Pozzuoli, ten miles from that city, he found numerous

examples of his favourite decorations executed in stucco, some modelled, others done in *sgraffito*. Of these identical works, as I have already stated, the South Kensington Museum possesses specimens. After his visit to Naples, there is reason to think that, in his solitude, he occasionally worked in sgraffito. His disciple and pupil, Andrea Feltrini, called di Cosimo, undoubtedly worked in *sgraffito;* and it is in consequence of these works of *sgraffito* by Andrea, executed before the death of Morto da Feltro, that Vasari hints at that art having been practised by Morto. The first important work of Andrea di Cosimo was the decoration in *sgraffito* of the façade of the Gondi Palace in the Borgo Ognissanti. It may be interesting to mention that Vasari, in describing the mode employed by Andrea di Cosimo for this façade, says that the first layer of plaster was mixed with burnt straw or ground charcoal, and, while fresh, a second layer of white plaster was applied. Upon the white was transferred from the cartoon the ornament; and this was "hatched" with an iron graving tool, so that the white ornament remained upon the black ground. The white was then toned down with a wash of colour. It will be observed that the present mode of *sgraffito* is identical with this, excepting the tinting of the upper layer, which, in the experiments recently tried, being naturally grey, and likely by the usage of time to become darker, requires no tinting. Baldassarre, the great Siennese artist, worked in sgraffito as well. I regret to say, however, that he occasionally painted imitations of it and of stucco ornament. So successful were these imitations, or I think I may say deceptions, that the best connoisseurs were entrapped by them.

Vasari mentions that "Cavalier Tizzian" was himself misled by some of Baldasarre's handiwork, mistaking the painting for the genuine hatched and modelled stucco. Polidoro da Carravaggio was another *sgraffito* and stucco artist, besides being an imitator.

In closely following the footsteps of the Italian masters, Mr. Moody has allowed himself to be tempted into painting the arabesques upon the plaster, instead of hatching them. The result of this is, in effect, as good at first sight as the real work. But in a short time the accumulation of blacks—soot soaked into the flat surface by rain—reveals the disadvantages arising from such a method of decoration, which cannot, I think, compete with the real work. I humbly submit that *sgraffito* should be *sgraffito*, and an imitation of it not be encouraged. I may add that the painted work at South Kensington will shortly give place to the real art.

I believe for internal decorations, *sgraffito* might be suitably adopted, especially in some of our very bare brick churches. Various colours, as I have mentioned, may be used in *sgraffito* work. One of the most recent works of this kind at South Kensington has been executed in coloured plasters of some permanent Indian architectural diagrams. These are not yet finished; but when they are, I trust some useful suggestions may be gained from an inspection of them. I have not, in these brief remarks on the subject, gone into the question of the composition of the clays. When properly mixed, these cements will, I believe, last for a long time. The specimen I have here has been knocked about a great deal, and the damages done to it are those arising from its having been stowed away in the waste stores at South Kensington. It is a very rude experiment tried some ten years ago, and the undamaged portions are now very hard, and seem likely to remain as they are for any length of time. There is every reason to hope that, with the progress which marks at the present time the scientific production of varieties of cement, plaster, etc., fresh discoveries will be made in rendering them more impervious to dirt and atmospheric effects than they are now.

And if this comes to pass, by a combination of science and art, a decorative process will have been evolved, which is suitable for general use in this country, both for decorations internal and external, and which comes within the desirable limits of moderate cost, without being "cheap and nasty."

The PRESIDENT said: I am sure our best thanks are due to Mr. Cole for calling our attention to this beautiful and interesting mode of decoration; and at a later period it will be a gratification to us to pass a cordial vote of thanks to him. In the meantime I see many gentlemen present who are capable of speaking on this subject, and we shall be glad to hear their remarks.

Mr. F. P. COCKERELL, Hon. Sec.: I shall be most glad, when the proper time comes, to second a proposal of thanks to Mr. Cole, who has given us this description of an interesting art, which—though we owe thanks to the South Kensington Museum and Mr. Cole's coadjutors for the revival of its practice—has not altogether escaped the attention of architects; for, when I was in Italy with Mr. Arthur Blomfield, we were struck with it, and we both directed our aspirations to the reproduction of it. The first attempt was in a small way, by Mr. Blomfield, in a chapel at Bedfordbury, in the form of little diaper ornaments. After that, I tried it myself in a house at Norwood; but my client, when he saw it for the first time in execution, was dissatisfied with the effect, and it was taken down. I then tried it again in 1866 in a house at Ascot. It was executed in a crude, imperfect way. I could not succeed in producing the lines for the shadows, because the thin stuff I used for setting was so gritty that in cutting out the lines little lumps were brought away. It requires to be extremely fine stuff, and to be very carefully laid on, in even thicknesses. I did not, therefore, get beyond plain white forms without any shading, upon a black ground,—a result far inferior to that which you now see illustrated. It has stood since 1867, and is sound now. The material used for the setting was nothing but ordinary fine stuff. After that I did two or three specimens in my back yard: they were done about two years and a half ago. These have stood perfectly well, though done in an imperfect way. This fact leads me to make a remark upon the observation of Mr. Cole that the dirt of London might soon obliterate this kind of decoration. I have not found this to be the case with those in my yard. The plasterer brought a prepared ground for me to work upon, but it was not black: so I blacked it with common ink; and, having laid my white setting upon it, I executed a little sketch. I need hardly say that in two years the ink has disappeared. But though the ground, where exposed, and the white setting coat, have become of an uniform dirt colour, the drawing has not suffered in distinctness, as the soot has taken the place of the stain which has faded, and by partly filling the lines brings them out as perfect as possible. I would ask Mr. Cole whether Mr. Moody has found his present mode of cutting out the plaster with a sharp instrument the only practical and effective method, or whether he has tried free sketching with a point, in the same way that one would draw with a pencil or chalk? I cannot but think that some such method must have been used by the Italian masters, because the method which you see here illustrated is not sufficiently elastic to produce such a work (for instance) as the great frieze by Polidoro da Caravaggio (the engraving of which is well known), which consists of some 70 figures grouped in perspective, and with a considerable variety of light and shade.

Mr. COLE.—I do not think Mr. Moody has tried any of these experiments. He has hitherto contented himself with leaving the white on with black ground; nor do I think he has gone so far as to attempt any pictures in sgraffito,—his designs having been confined to mere decorative ornament.

Mr. COCKERELL.—The chief difficulty in carrying out the method which I have mentioned, would, I apprehend, lie in the thickness and texture of the setting coat. It cannot be too thin or too uniform in thickness, and it should be very smooth and soft in texture. The thickness should be, if possible, less than 1-16th of an inch; the thicker the plaster the thicker will be the line, and the greater the burr left upon edges of it, and the less distinctly will the black ground be exposed. The difficulty of laying this very thin film would consist in the liability to rub up the black ground in the process, and so to stain and smear the white. It might, however, be within the compass of skill to overcome this

difficulty. Then, again, there is the question of the stability of so thin a setting. I imagine that there would not be much difficulty about this. My own experience has shown that for two years a very thin setting has remained perfectly solid, and appears to be absolutely incorporated with the ground. What I used was nothing but hot lime. I got some white marble chips burnt, and used the lime hot. Theoretically this would seem a mistake; but it answered. I tried it again; and the second specimen did not answer. I made the acquaintance of Mr. Wormleighton, who is now making the illustration before us, and he explained to me the Kensington method. It answered extremely well; and, in a very exposed situation, has stood the test of several nights this winter on which a driving rain turned suddenly to frost. This was at a large mansion in Essex, which is decorated to a large extent with sgraffito. For safety against frost, I think it very desirable that the black ground should be at least as non-absorbent as the white setting; otherwise, the wet soaking behind the white would, in case of frost, inevitably throw off the setting coat.

Sir M. Digby Wyatt, Fellow, said,—I have taken the liberty of bringing down some few drawings from the old masters, of designs for decoration, of an analogous kind to that which has been executed at South Kensington by means of "sgraffito." All of these exhibit a style of cinque cento surface-treatment of great beauty. Although no one can be certain whether it was definitively intended to execute such designs as these by "sgraffito" or by painting, it is quite clear that they were open to execution by either process. Amongst the important collections of original sketches by great artists preserved in Italy, none fail to attest that this process, or others analogous to it, were in constant use and daily demand in that country. When the student examines the condition of what remains of sgraffito in Italy, he cannot but feel that a great deal of the evidence of durability he may encounter must have been due, in the first place, to a climate of peculiar dryness, and in the second to the excellent quality of the lime habitually used. Mr. Cockerell appears to have hit exactly upon the best kind of lime, and indeed of mortar, to use in connection with this sort of work. His employment of marble dust especially corresponded with the best traditions of Vitruvius and Alberti for finishing off the "setting" coat. He was also right, I conceive, not to make the "floated" coat, which comes upon the rough rendering of the wall, dead black. The Florentine "sgraffitisti" made it of grey (not black) by mixing it with straw or burnt wood; and by using only a thin coat of white, through which they scratched their drawing, they got a half tint, heightened by white. To intensify the chiaroscuro, and to get vigorous blacks, they ran in dark lines in parts where the point of the scratcher had already removed the white. By this means they get a style of treatment something like that of the noble wood engravings of the period of the sixteenth century, such as some of those of Ugo da Carpi, Titian, Andreani, &c. Thus they employed three tints, and obtained a rotundity and softness which give a very beautiful effect to their work, and is a little wanting in some of the specimens to be seen at South Kensington. An active revival of cinque cento "sgraffito" took place in Italy, dating from about five-and-twenty years ago. I regret, however, that most of the earliest specimens of this kind of revived work in that country have suddenly failed. I observed some very good attempts in Florence in 1859, particularly those specimens in the street leading to the Baptistery, which were nearly opposite the Or-San-Michele, where they at that time stood well; but on looking at them again last autumn I found that there and elsewhere many had nearly disappeared. I do not know whether that had resulted from imperfection in the working of the modern as compared with the old process, but I attributed it mainly to imperfection in the lime used to give the white, which was neither as white nor as hard as that of the older specimens of cinque cento work. These were no doubt due to the two distinguished artists, referred to briefly by Mr. Alan Cole, and in detail by Vasari, Morto da Feltro, and Andrea di Cosimo dei Feltrini. The first of these was a contemporary of Pinturicchio's, and the earliest

painter who devotedly studied the "grotesque." Having drawn all the classical "grotte" at Rome, he went to Naples, where he worked equally carefully at Baïa, Pozzuoli, &c. In fact, he studied from top to bottom the whole system of ancient stucco work, and the composition of painting and ornament, in connection with stucco work. In the course of his investigations, Morto da Feltro must have found that the ancients habitually scratched and scraped their plastering free-handedly, much after the process of what remains in the Baths and other parts of Pompeii, the Villa of Hadrian, &c. In such free-hand works the Romans often got curious results analogous to sgraffito, but in one tint; and by running floating colours and wiping them off, they rubbed in dark and tints into the lines they sketched, and the surfaces they "sank." I have no doubt that Morto da Feltro in his investigations had picked up some such process of executing white ornaments upon a coloured ground—(analogous to the frequent cutting away by the ancients of superimposed layers of contrasting colours in glass working and cutting, as in the Auldjo and Portland vases, to form "camei")—as it is certain that the ancients sketched in plaster work, and then introduced different colours and probably different coloured plasters, rescraping and scratching both plastic and hardened plaster so as to approximate to real sgraffito upon their cement works. Some such knowledge, no doubt, Morto da Feltro picked up in the course of his studies in Rome and Naples. Vasari does not positively state that he kept the secret to himself, after he got back to Rome, although he passes under silence the authorship of some few peculiarly early relics of cinque cento sgraffito which remained there, not far from the Massimi Palace thirty years ago. Morto subsequently went to Florence and sought to improve himself in figure painting, profiting by study of the famous competition between Leonardo da Vinci and Michael Angelo, which attracted artists from all parts of Italy. Being a stranger there himself, he sought naturally such of his own "paesani" as had come to Florence from Feltro, that being a district of the Venetian Republic which had acquired some little distinction in art. Amongst these Feltrine was one Andrea, who placed himself as a pupil with Cosimo Roselli, a painter of moderate merit in Florence, in order to learn to paint as a figure painter. When Andrea, Vasari tells us, found that his countryman had come to Florence, he received him very kindly, took him into his house, and there is no doubt that, in gratitude for the kindness he received, and for the fact of Andrea's obtaining employment for him under the Signora Morto, taught Andrea the art and mystery of imitating ancient decoration and stucco work in different ways, and executing ornamental arabesques, in which the former had so fully qualified himself. I think I am justified in saying, from Vasari's text, that Morto was the first to learn, and Andrea to introduce, the use of sgraffito. There is no doubt that Morto picked up the process from his close study of the antique in Rome; and there seems equally little doubt that Andrea carried it to full perfection by means of the training he got under Morto (who himself turned soldier), while practising the art of arabesque painting. Vasari distinctly tells us that Andrea for a time gave himself up almost entirely to "sgraffito," which he—"comincio a dar principio," literally—"began to begin," to use for decorating the façade of palaces and other buildings at Florence. His first work was that of the Gondi Palace in Borgo Ogni Santi; his second, that of the Lanfredini, on the Lung 'Arno; his third, that of the house of Andrea Sertini, in the Piazza Padella. Of three interesting drawings by the hand of Andrea preserved in the Uffizii, I am happy to be able to produce copies of two, of especial interest to us this evening, as confidently believed to have been made by the man who was the very originator of this process, in, at any rate, its extended application. I would ask you to look at them carefully, and you will recognise, on comparing these sketches with several others by later men of the greatest merit—such as Giovanni da Udine, Perino del Vaga, &c., which for outline and the spirit in which they are designed are of the first order of art—that Andrea dei Feltrini's skill was at least equal to theirs. Though there may be more knowledge of nature in the arabesque of the men I have mentioned, you

will find more command over antique style in the "grotesque" of Andrea, and a spirit of free conventional design, which has not been excelled by that shown by any other artist of his time. After the example set by Andrea, "sgraffito" was taken up generally by different artists in other cities than Florence, where examples of their works may yet be met with. At Spoleto, near the cathedral, there is a large palace, covered with splendid designs, attributed to Julio Romano. In 1845 I went to that town, in company with a French artist, specially sent by the editor of the *Magasin Pittoresque*, to make drawings of the works executed in sgraffito "by Julio Romano," on this very palace, which affords the largest and finest examples of the process I have seen. There is but little of the old work now to be seen in Florence or Rome, but much of modern, upon a great scale, in different Italian cities. The *cinque cento* revival did not last long, but as what was done was almost all of an early period, all the specimens of it I have ever seen are artistic; and I have never seen an inferior design executed in any good period of sgraffito. It was mainly ruined by the great facility with which, at less trouble, its effect could be for a time imitated by perishable paint. In fact, the Italians seem to have fallen upon the "shibboleth" of Mr. Moody. His experiments are of unquestionable interest and importance, not only for their artistic merit. No one can question that any process of a permanent nature which enriches our vocabulary of art, may enable us to speak to posterity in better language than we habitually use. "*Sgraffito*" may lead us to enrich architecture with more graceful forms than are as yet common in this country, because the facilities of the process are such, that they help to engender a bold and free style of mural decoration. There is especial interest in this technical accessory to the architect, as forming a judicious combination with his simply formative or constructional architecture. One cannot but observe, in some of the drawings Mr. Cole has been so good as to exhibit to us to-night, that association of pictorial art with architecture, through the medium of a facile decorated process which is generally wanting to the full success of beautiful architecture. This, under discussion, is a process which opens itself now easily to our national practice; and I hail with satisfaction the fair success and the noble scale on which these experiments have been tried, I may almost say, for our special benefit as architects, at South Kensington.

Mr. GAMBIER PARRY.—The paper we have heard from Mr. Cole and the speech of Sir Digby Wyatt have been so full of matter that the result is one more to think about than to speak about. The amount of art which those two addresses have covered is the only thing I quarrel with. There can be no doubt that Mr. Cole, with a modesty very commendable in a young man who stands before gentlemen of great experience and of some age, evidently kept himself within the strictest lines of his original proposition, and spoke to you merely in the simplest way of sgraffito work. It was natural in Sir Digby Wyatt, with his head so full and his tongue so delightfully facile, to completely bewilder one, and leave one much to think about. I am afraid I shall be repeating myself if I say that art is in itself as inexhaustible as the alphabet, and I conceive such an idea as that will not only apply to it generally, but specially. There is in every phase of it, the more we consider it, an utter inexhaustibleness of expression. Mr. Cole has restricted his remarks very much to material: he has said very little about the development of the art. It was evident that Sir Digby Wyatt had one extreme difficulty to contend against, viz., the excess of his information, and that he wanted to say a great deal more than he did; but there is not time this evening to open this subject with advantage, to its full extent. I will, however, venture to offer a slight sketch as it occurs to my mind now, although I came here unprepared to do so, and rather to learn than to teach. If we consider what this sgraffito work is, we must see it applies to more than the time of the Renaissance of the past, and of South Kensington of the future. It is a work capable of being developed in every possible style; and I venture to suggest, if you look upon art even from its earliest days till now, you will

see that sgraffito work is an element which has intruded into it in all directions, and that has been so in all the best periods of the arts where design has received its impulse rather from architectural than pictorial inspiration. While the spirit of man is self restrained, you feel respect for it, which you could not do in its boastful liberty; and thus the old idea of familiarity breeding contempt is true in art, as it is in all other matters. There can be nothing more severe than outline illustration. If you look at what has been done in it, you will see, in all those styles and objects of art which received their original inspiration from architecture—such as Greek, Gothic or Roman ornamentation—that there has been, in their best periods, an attention to completeness, founded on construction as a characteristic totally distinct from the modern libertinism of picturesqueness or the sensuous ideal of beauty. If you take the best period of art of almost any place or period, such as is illustrated by the vases and wall paintings of Athens, Pompeii or Herculaneum, or even in times and countries far more distant, you find sgraffito work in perfection; and nearer to our own date you find that Byzantine and Gothic paintings were essentially things of outline, with colour put in to fill up the spaces. Then, again, if you look to the different arts of enamel painting, especially that of translucent enamel, done upon silver, you find the basis of the design to be essentially sgraffito work. So it is also from the prehistoric scratching of the forms of extinct animals on bones to the backs of classic mirrors, and that refined kind of art upon "Henri Deux" ware and painted glass, the principle of sgraffito rules supreme, and the bulk of Oriental ornamentation on metals owes its entire charm to it. In whatever style and at whatever period you find that the simplicity of studied outline gives a dignity to art, which at once makes you respect and admire it. Now, what is sgraffito? It is simply a method of expressing an idea by abstract form. You have boundless materials at disposal, and you can use colour if you will; thus we see how wide all the opportunities in art for doing what we want to raise the ideas and command the feelings of the people. When Mr. Cole went into the subject of sgraffito as a cheap ornament I congratulated myself that we were going to obtain a thing that was cheap, which would not end by being worthless. And so it has proved to be. He has given us that illustration of a house front which might be a house out of a street where I had the misfortune to live in my early days, viz. Harley Street, about which, I believe, one of our members has said, "All things have an end; happily, even Harley Street." I confess, if it had been ornamented with this cheap sgraffito the end might not have been so immediately desired; but I do not myself go in for what is cheap. I think the sketch I suggested of all these different processes and materials and means of producing these outline effects, shows how we may produce the highest effects of art by this principle of sgraffito; and I venture to say it is essentially the right architectural mode of surface decoration, and I say so not only in reference to the remarks this evening or to the specimens before you, but on a general principle, because it is, more than any other style of art that can be conceived, essentially conventional. There is no such thing as outline in nature, and art is not necessarily the copy of nature, but rather the expression of ideas. The forms of art expressed by outline are of necessity more conventional than any other, and the harmonious application of it to architecture is perfectly harmonious, because architecture is the most completely conventional art that ever was conceived by man. I feel we are much indebted to the gentleman who has read the paper on this subject this evening, and also to Sir Digby Wyatt for his admirable speech and the beautiful drawings he has brought; and all I have to say in conclusion is that the study of this art, by all that has been thus brought before us, is just that which is most needed in our time, because, if an art apparently so simple as mere outline is to be good at all, it can only be so by consummate study. It is altogether a study worth its pains; for it is in the right direction, to which those who have most studied art have been for a long time endeavouring to attract attention. I trust that it will now receive its impulse beyond much else that is going on around us.

Mr. HENRY COLE, C.B. (responding to the President's invitation), said: I am not at all prepared to make a speech on this occasion, but with reference to the durability of this particular kind of process I may state that it has been tried at Kensington Museum for fifteen years. Mr. Sheepshanks made it a condition that we should have a suitable building to hold his pictures, and insisted that he would see the building himself, before he gave up his pictures. A building therefore was erected, a modest and humble affair at the time. Upon the outside of these walls in 1858-9, some crude experiments were tried of this sgraffito. I had seen in Italy some of the buildings Sir Digby Wyatt has spoken of, and I was struck with the facility of this process, and Mr. MacCallum, now celebrated for his landscapes, made the designs for the Sheepshanks Gallery. Although I did not go through the train of ideas—or if I did I was not conscious of it—which Mr. Gambier Parry has expressed, and in which I concur, sgraffito certainly did strike me that it was a method which might make our houses a little less unsightly than we find them generally. Like Mr. Gambier Parry, I hate things cheap. You cannot have a good thing without its costing a good deal of money. In this country there is a great tendency in all we do to insist upon cheapness as a first condition. We do not say, "let us have a good thing, or the best thing, and let us pay for it like gentlemen," but we cut the work down, and it must not cost above a certain sum. We do that in this country too much, and we shall no doubt continue to do so till we get wiser. If a public building is to be executed, you begin with a preliminary *dictum* that, whatever the size or for whatever purpose it may be, it is to cost only a certain sum of money. The country, through Parliament, pledges itself that it shall cost only a certain sum. We do not begin by saying it shall be good and cost a reasonable sum, but that it is to come down to a certain contract price, and people think they can keep to it. My experience is that they cannot. We have plenty of cases in which Parliament makes a contract and another breaks it. It must be borne in mind that the contract made to-day is not the contract fulfilled five years afterwards. I hate cheapness as cheapness, and never take it as the first consideration for anything I am responsible for. As far as my lights go I advocate having the right thing. But this sgraffito process is one comparatively cheap in material and one that would rather commend itself to enterprising builders who want to make fifteen or twenty per cent. on building houses. Of course, as long as the State does not build houses, and as long as the individual builds his own house, and is only controlled by some kind of municipal and vestry law, so long will people build houses as cheap as possible, and so it is that from Bethnal Green to Belgravia houses are built to cost as little money as possible. It does seem to me that, if the outside of houses instead of being of ugly stock brick, could be somewhat decorated, and if as Mr. Parry says, you can get the highest art with these simple lines and materials, you would make it more pleasant to walk through the streets. To return to the Sheepshanks building. The sgraffito is outside the Sheepshanks Gallery, and for the most part remains good. You will see it has defied the London smoke and dirt, and after fourteen years it remains nearly as distinct as it was originally. There is a large building which Parliament in its wisdom has erected for teaching science, in the Exhibition Road, which, like all things has a back, and this back not being much seen and being constructed cheaply is without the terra cotta decoration on its front. General Scott, who presided over the design, was persuaded to have the common stock brick work treated with sgraffito, and the Lord President approved. Thus we have scratched a great deal of plaster on the Science School at South Kensington. You have heard how the early practitioners of this art were reduced into painting forms instead of cutting good lines. My friend, Mr. Moody, has been reduced in like manner to paint, and the painting wont last, still he has scratched some beautiful lines which will probably last one hundred years. As my son has said, this is not a very good situation for the public to see it; indeed, the whole thing must be regarded as an experiment. People say it is a pity this treatment was not brought forward into the street. I

think it is well it is in the background. I hope something better may come out of it. I am pleased to have had the opportunity of coming here this evening, and I am happy to have heard the discussion of a question which may eventually make it even the interest of enterprising builders to make Sloane Street and Harley Street a little more attractive than they are now.

Professor KERR, Fellow,—It is suggested that this process might be adopted for the duration of ordinary houses. Of course it is possible, but I cannot say I think it very probable, that it might be used for ordinary purposes in London, exactly as proposed by Mr. Cole, but it has occurred to me whether something of the kind judiciously modified, might not be attempted in London buildings with more likelihood of success. I think, first, that the sgraffito work should be designed on a larger scale; then that it should be executed with greater breadth and by deeper incision; then lastly, this being done in cement of one colour, my question is whether the sunk decoration might not be floated in flush with cement of another colour and a more weather proof surface thus accomplished. [Mr. COCKERELL:—I have done that myself.] [Sir DIGBY WYATT:—It was done in the early days of Parker's cement to a large extent.] Professor KERR:—Suppose they may have used Parker's or Roman or black cement for the one colour and then filled in the sunk parts with cement of another colour like Portland. (Keene's cement was suggested.) But I have my suspicions of the durability of Keene's cement. I have always understood that it would not stand for external use. As regards Roman cement, and Portland also, there is some chemical difficulty. At any rate, if we could introduce something of this kind into London, it might no doubt be a great advantage; and I feel that the public are much indebted to Mr. Cole, and to the several gentlemen his subordinates, who have devoted so much attention to the development of this art as far as it has gone. But how we could induce the mere speculative builders of London to adopt anything of the kind I do not know. Those again who build houses for themselves are too much afraid of making themselves conspicuous. Although, therefore, I fear there is but little to be done in the matter at present, there can be no doubt as to the importance of the subject, and looking at the claim these gentlemen have established upon our consideration in having laid the whole scheme of their work so well before us, if I may be allowed the honour, I shall be most happy to propose most sincerely the formal vote of thanks to the author of the paper and to the other strangers who have so ably assisted in discussing it, not forgetting the gentleman whose practical manipulation of the process in the room has been so charmingly successful.

Mr. C. BARRY, Fellow (responding to the President's call) said.—Although I have had no experience myself in this style of decoration, I have admired the effects of it, which I have seen in other countries, and I look with interest upon its introduction here. We have good reason, I think, to be grateful to Mr. Cole, who has rendered himself conspicuous for many years in making experiments and failures which he has not been afraid of, because they teach more than anything else, and in this particular direction may possibly lead to some good; at the same time I am not prepared to give unhesitating admiration to this style of art. I think Mr. Gambier Parry really touched the bottom of the whole consideration: it is that of art—that art which we understand to consist in harmony of proportion of outline, attended by colour, without which no kind of decoration can be called artistic. With respect to the alleged cheapness of this process, I do not think that is a matter which ought to be overlooked. Though abstractly as artists we like the best thing, yet, having to deal with the difficulties of the world, we must necessarily address ourselves to the question of economy. It runs through all considerations, and must do so through works of art; therefore I say, if this is a cheap mode of obtaining beauty of outline and harmony of form it is to be welcomed and fostered. I do not, however, think a façade treated only in this way is so beautiful as to supersede our practice hitherto, wherein we have trusted almost entirely to effects of light and shade, produced by projecting and receding surfaces,

which no less require the outline to be good to make the detail effective. Outline thus produced in plaster, with resulting good light and shade, is better than outline, in my opinion, however good that outline on surfaces only. That sgraffito may help where flat surfaces exist in the effect of decoration I quite admit, but it should, I think, be used in due subordination to the projections, and to that limited extent, and subordinated to such principles of composition, I think it may be a most useful adjunct to our means of decoration. I have great pleasure in seconding the vote of thanks which has been proposed to the gentleman who has brought this interesting subject before us this evening.

Mr. THOMAS MORRIS, Associate.—It occurs to me, and I have paid some attention to English architecture of the date to which the designs before us have reference, that they are closely allied in point of style to our *Elizabethan*, a name we are all familiar with, though less so perhaps with the Italian term for work executed in the way just demonstrated. In many ceilings and other parts the decoration consists of two planes as here shown. With regard to material, I have reason to know that Portland cement will bear a very good polish. It might therefore be applicable for external work, and cements of different colours could readily be made hard enough for the purpose. I would beg to express my regret (and it will no doubt be shared by many) that Mr. Moody has been unable to attend. His remarks, as a scholar and an artist, could not have failed to prove a valuable supplement to the admirable paper for which we are so much indebted to Mr. Cole.

Mr. G. T. ROBINSON, Fellow, said,—With regard to the introduction of colours, having tried it myself, I found it a failure. Some years ago, in restoring the old Castle of Maxtoke, I found a quantity of colour embedded in white, and I endeavoured to reproduce it in one of the outer courts of the castle, but I found that while the old colours remained, those which I attempted to reproduce washed out. The practical effect was, that whatever colour we mixed was soluble, and the rain washed it out. The inference I drew from this was, that the colour destroyed the setting quality of the material. With regard to sgraffito, I have tried it on a staircase in Devon, and in that case I put a thin coating of white lime upon the black ground of cement and cut out the lines with a modelling tool, and by that means I got a greyish tint which was very pleasing. The figures were shaded by cross hatching, done after the fashion of the old engravings. For internal decoration, such as staircases, I do not know anything which produces a better coloured effect. The material just took sufficient polish or half glaze: no particles of dust remained upon it, and the ordinary means used in a house were sufficient to clean it down. It was a decoration of a highly pleasing character, and on the whole gave great satisfaction to my client and to myself.

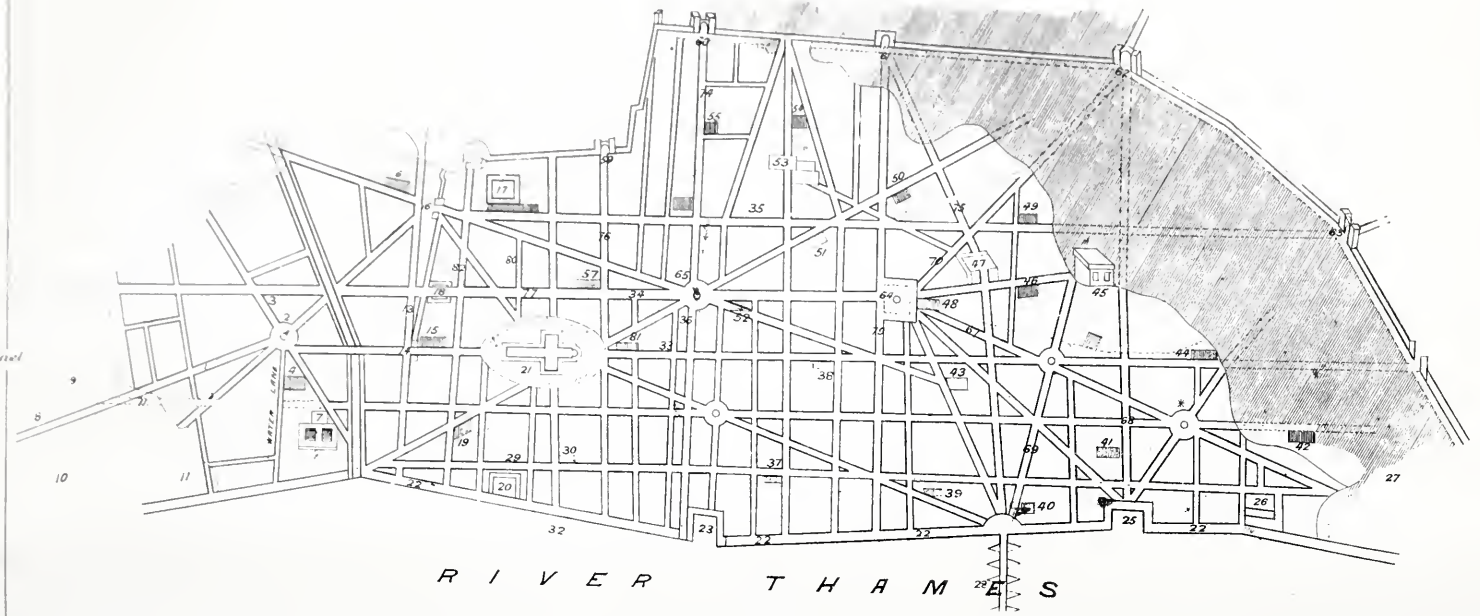
Sir DIGBY WYATT observed that in 1849 Mr. Alfred Stephens, whose nine years studentship in Florence, previous to that date, had specially qualified him for the dexterous revival of decorative arts, once popular in Italy, offered to execute any quantity of *sgraffito* for him at prices which, over an extensive surface, would have averaged about £3. per yard superficial.

The PRESIDENT.—We have had a most agreeable and interesting evening. It was hardly likely it should be otherwise with a paper so thoroughly practical and given with such good taste and modesty. The paper and discussion must have interested us all. Whatever doubts there may be as to the applicability of this process for external decoration, there can be no doubt as to its adaptability to internal work; and I venture to think it is in that way it can be most usefully employed. I beg to say I very cordially concur with the proposition of thanks to Mr. Cole for a paper of so much interest, and which has led to so valuable and practical a discussion.

The vote of thanks having been unanimously passed, the meeting adjourned.

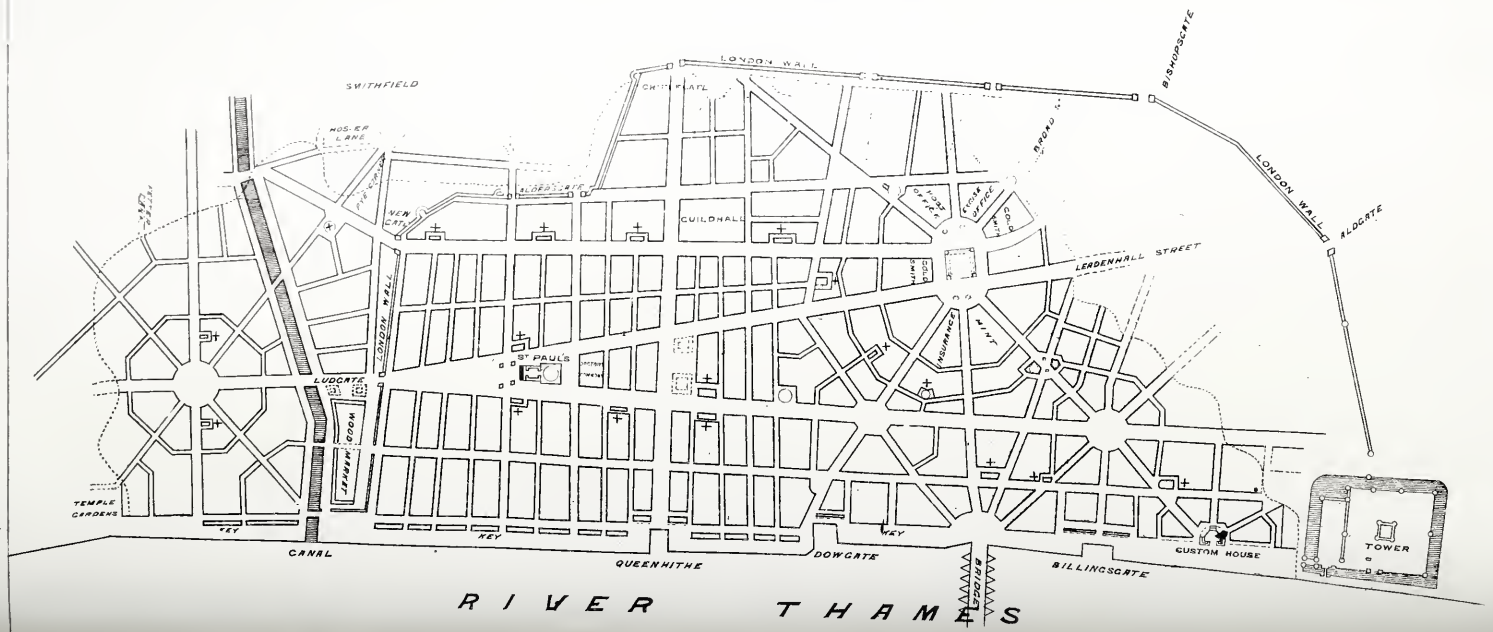
PLAN OF LONDON,

BY J. EVELYN.



PLAN OF LONDON,

BY SIR CHRISTOPHER WREN.



REFERENCE

1 Fleet Street
2 Fleet Conduit
3 Shoe Lane
4 St Brides
5 Ludgate Hill
6 St Sepulchres
7 Bridewell
8 Temple Bar
9 St Dunstans West
10 Temple Lane
11 Temple
12 Fleet Bridge & Channel
13 Old Bailey
14 Ludgate
15 Newgate
16 Christs Church
17 Christs Church
18 Physicians College
19 St Andrews
20 Bayards Castle
21 St Pauls
22 The Wharf or Key
23 Queen Hyth
24 Bridge Market
25 Billingsgate
26 Custom House
27 The Tower
28 The Bridge
29 Thames Street
30 St Peters
31 Pauls Wharf
32 Old Fish Street
33 Watling Street
34 Cheapside
35 Lothbury
36 Bread Street
37 St Martins
38 St Atholines
39 Alhallows the Less
40 St Magnus

REFERENCE.

41 St Mary at Hill
42 Alhallows Barking
43 St Marys Abchurch
44 Alhallows Fenchurch St
45 Leaden Hall
46 St Michaels
47 Royal Exchange
48 St Marys Woolnoth
49 French Church
50 St Margarets & New Throgmorton St
51 St Claves
52 Bow Church
53 Guild Hall
54 St John Evangelist
55 St Albans Wood St
56 St Michaels Wood St
57 St Michaels by Paternoster Row
58 Sion College
59 Aldersgate
60 Criplegate
61 Moorgate
62 Bishopsgate
63 Aldgate
64 Market where stood the Stocks
65 Cheapside Market
66 Gracechurch Street and Market
67 Lombard Street
68 Tower Street
69 Fish Street Hill
70 Threadneedle St
71 Bassinghall St
72 Aldermanbury
73 Colman Street
74 Wood Street
75 Bartholomew Lane
76 St Martins Lane
77 Paternoster Row
78 Bow Lane
79 Walbrook
80 Ivy Lane
81 St Austins
82 Warwick Lane
* Piazzas

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, the 31st of March, 1873, the following Paper was read, A. WATERHOUSE, Vice-President, in the Chair:—

ON THE LAYING OUT OF CITIES.

By J. B. WARING, Fellow.

WHEN we turn our thoughts to the antique past, stimulated by the fact that from the earliest ages, various large cities have existed, we must expect to be disappointed in obtaining any complete idea of their formation and arrangement, because their remains are so small, and cotemporary notices of them so vague; indeed, it is almost a waste of time to seek satisfactory information concerning them. That they were enclosed by walls, and possessed fine public buildings ranged principally around a large open space, a campus, agora, or forum, is about all that we can with certainty assert. Pompeii, which bore somewhat the same relation to Rome and Naples that Brighton does to London at present, remains in a partly perfect state, and affords us some idea of what a populous and fashionable sea-side town was under the earlier Roman emperors, and in the most civilized country of Europe, and certainly the impression is not a very favourable one. It is a very suggestive fact, and one that we should bear well in mind, that not a single city remains at the present day to give us the model of what a city was some two thousand years ago. Will the same remark hold good some two thousand years hence? We have every reason to think so; and the cities of the future will be as different to the cities of the present as the cities of the present day are to those of the past. Is that difference great? We can answer at once and with certainty, it is enormous, it is almost incredible! One great cause of that difference is, that there was in ancient times no middle class, but two only, viz.:—masters and slaves. Amongst the ancient Romans, even the liberal professions were held fit only to be practised by slaves. There was a grand priestly and aristocratic luxury: a mean, squalid, general poverty.

With the advance of the later Roman empire came also an advance in the conveniences of life; but art itself declined, and with the fall of the empire, the art of building cities fell also; then the dark ages settled over Europe. Throughout this period, or from about the fifth to the eleventh century, many new cities and towns arose throughout Europe, of which the royal residence, the church, or the castle formed the nucleus, surrounded by walls, within which all was narrowness and filth: nor is this to be wondered at, when we remember that the greatest people of Europe during this period used their fingers to eat with, and thought it no mean accomplishment to be able to write their own names. Luxury, sanitary provisions, and even comfort were unknown, except amongst the great nobles and the higher clergy. But why did the dark age people build such close pent up towns? Land was not dear, as it is now; and they might have had spacious streets, tree-planted areas, parks, and so on. The reply is, that they had no idea that system and art ought to enter into the arrangement of a town: they probably did not think about it at all; they did what their fathers had done before them; they followed precedent, and the principal precedents of the West were derived from the East. The Mahomedans of the eighth and succeeding centuries were to the world, what the Christians became at a later period, the first in arts and arms. Europe was their pupil, and followed closely their example. Life with Orientals was, then, an incessant warfare against two enemies, the sun and their fellow creatures; so that when men congregated together, they sought to keep out both in the best way they could, raising strong walls against the one, and forming narrow streets against the other: thus they enjoyed the comfort of coolness, or at least of shade, and the comfort of a sense of security; beyond

that they appear to have had no particular ideas. The plan of many such towns is preserved even to our own day, of which Albenga, on the Riviera, is an interesting example; a sort of large prison, intersected by narrow and tortuous passages, tending to keep out sunshine and fresh air. Life must have been very dreary within so dark and confined a space. So things went on in the same fashion, over and over again, into the semi-opaque or middle ages, and Mr. Hudson Turner, in his most valuable work on the "Domestic Architecture of England," speaking of London in the thirteenth century, when its population was under twenty thousand, remarks that, "as to the appearance of the city, we shall not, perhaps, be far wrong in assuming that it presented the aspect of a mass of low whitewashed tenements; the plasterer's brush appears to have been unsparingly employed, to give a cleanly exterior to the dwellings of the Londoners;" but if the outsides were clean to the eye, the interiors of the cities must have been often filthy.

"In the principal thoroughfares," says Mr. Turner, "it is evident there was some kind of foot pavement, though the roadway appears to have been frequently left to its chance; and the streets leading down to the river, which offered the means of a natural drainage from the upper and more level parts of the city, had usually open drains flowing through them, the effect of which was to maintain them in a continual state of mud." Even in the great hall itself at Westminster, the refuse and dirty water flowed in an open kennel through it, until "the foul odours arising therefrom" led Henry II. to order the construction of a "subterranean conduit" to convey the "offensive matters into the Thames;" and this, Mr. Turner thinks, is perhaps the earliest instance of underground drainage in this country. But to return to the more immediate subject in hand, we come at last to a glimpse of a better state of things in the reign of Edward I, who, from one cause or another, founded completely new towns, which were often called in France "Villeneuves" (New Towns) or "Villefranches" (Free Towns). Mr. Turner informs us that "the inhabitants were all made free men, exempt from the power and jurisdiction of the neighbouring barons or bishops; their tenure was direct from the Crown, and they were granted the important privilege of free trade." Here, for the first time, so far as we know, in the history of cities,* we come to a clear and definite system of arrangement; and it appears probable that this system is due to Englishmen, since Mr. Turner gives an extract from an original document in French, wherein Edward I, anno 1298, wrote from Bordeaux (then the capital of the English provinces in France) to London, "desiring the authorities there to send him out four persons competent to lay out the plans of towns, who best know how to divide, order, and arrange a new town in the manner that will be most beneficial to us and for the merchants." Alfonso, of Poitiers, coming to the Duchy of Guienne, about the same period, finding the nobles and higher clergy quite independent of him, also founded free towns, such as Rovergne and Agen, the last of which is still in a pretty perfect state. Edward founded Sauveterre, Monsegur, La Linde, Saint Foix, Libourne and Montpazier in France; and Kingston-on-Hull and Winchelsea in England, all formed on a general plan, of which Montpazier will serve as a good example, as seen by the diagram exhibited, and fully described by Mr. Turner, from whose work the following extracts are quoted:—"These towns are more regular and symmetrical than most modern towns, and are built on an excellent and scientific plan. . . . There are always two parallel streets at a short distance from each other, and connected by short streets at frequent intervals; between these principal streets, and also in parallel lines, are narrow streets or lanes, corresponding to the modern mews, and employed for the same purpose. By this means each plot of ground for building on is of an uniform size and shape, a parallelogram, with one end facing a principal street and another a lane. . . . . The principal streets were twenty-four feet wide, the

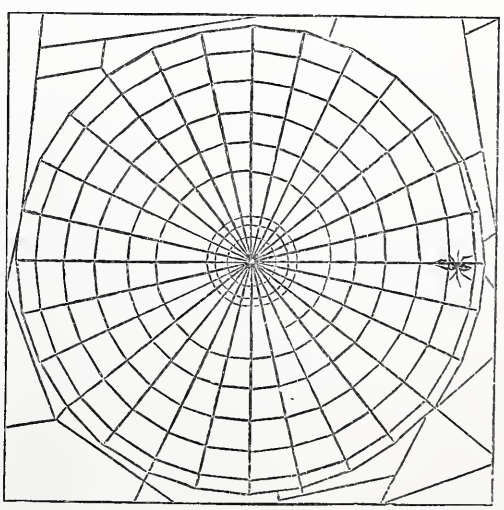
* This remark applies to Mediæval cities in Europe. Marco Polo, writing in the 13th Century, describes Pekin as formed in a regular plan of squares, like a chess board, a plan of ancient adoption in China.

lanes sixteen feet, and the passages only six feet. . . . . Near the centre of the town was a large market place, at one corner of which was usually the church; and it should be observed that the principal streets do not cross each other in the centre of the market place, but run in a line with its four sides. . . . . so that the traffic did not interfere with the central space." My own opinion is, that this plan of rectangular divisions, which is also that adopted in the United States of America, is *not* a good one, for reasons which we shall presently state; nevertheless it is a great improvement on old customs, and has no doubt some special advantages.

The foundation of new towns seems to have ceased shortly after the thirteenth century, and the principal cities of Europe appear to have been built up from time to time in a haphazard manner, whilst their internal condition was of the worst description, of which an idea may be formed by reading the article "Paving of Streets," in Beckman's "History of Inventions," volume 1. In the seventeenth century, however, the great fire of London (1666) produced two plans for systematic arrangement of new streets, etc., which present some new and noticeable features. They were designed by Sir C. Wren and John Evelyn, and both are engraved in Strype. (*See* frontispiece.)

The fire destroyed buildings estimated at about thirteen thousand two hundred houses, covering an area of four hundred and thirty-six acres, and both in form and extent very closely corresponded with the great fire of Chicago in 1871; besides dwelling houses, St. Paul's Cathedral, eighty-seven parish churches, the Exchange, and other public buildings were burnt, and an opportunity was afforded of designing, as it were, a new city. Sir C. Wren's is shown on the wall. Leaving out details, he proposed to form three kinds of streets, ninety feet, sixty feet, and thirty feet wide respectively; to form a canal of Fleet Ditch, to be one hundred and twenty feet wide; a quay along the river side forty feet wide; the principal public buildings to be massed together round the Royal Exchange, on a large area of octagonal form, from which radiated the main streets, and in which, at stated intervals, were to be placed the various churches, whilst all churchyards and "unnecessary vacuities, and all trades that use great fires or yield noisome smells" were to be outside the town. This plan of Wren's is a great advance on the old system or rather no-system, and indeed, in some respects, could scarcely be improved upon. I need hardly say, however, that neither his nor Evelyn's plan was adopted, much to our loss at this day.

When the great fire took place at Chicago, it occurred to me that an opportunity presented itself of laying out the new city on an entirely new plan. I had not at that time seen Wren's plan for re-building London; but it required only some consideration to be convinced that the rectangular plan common in the States was open to many objections, and that an entirely different principle should be adopted. That principle I found in the spider's web, especially in the web of the "geometrical spider," of which I present a diagram, taken from "The Museum of Animated Nature," volume II, page 329, in which the quickest way of reaching the centre from any given point is clearly obtained; and time is, we know, money, which all men now seek after so earnestly. My further ideas on the subject will perhaps be best understood by the papers I sent to the Mayor and municipality of Chicago on the subject, and from which I give the following extracts:—



The main plan is to be on concentric circles, or rather semi-circles, divided into sections by radiating streets and subdivided into wards, to be provided with means against fire, and sanitary arrangements complete in each section respectively, corresponding to our old system of wards or guards. In rebuilding the city advantage might be taken of a combination of squares, crescents, terraces, boulevards and streets, so as to produce the greatest pictorial effect. The houses might have colonnades on the lower story, as at Bologna, forming comfortable walks in summer or winter, whilst arcades, like those of Milan and Paris, should connect the principal points of interest. All buildings should be constructed as nearly fireproof as possible, and permanent sites for fire escapes should be established at stated distances throughout the city. To avoid the monotony which characterises the new portions of Paris, Lyons and other French cities (in which large blocks of new buildings have been lately erected, and one street so closely resembles another that sometimes you can hardly say in what street you are), I propose that various styles should be assigned to various blocks of buildings, so that all styles of architecture may be represented—Greek, Italian, Gothic, Lombard, etc.—as may be found consistent with good taste. Moreover, we should thus avoid the unsightliness common in England, of buildings widely different in style, out of all harmony, and sometimes painfully incongruous, placed in juxtaposition and mutually destructive of each other's effect. I would suggest that all buildings wherein large masses of persons congregate, such as theatres, churches, assembly halls, &c., should be provided with numerous ways of speedy egress, not only for safety's sake in case of sudden panic, but for the ordinary convenience of the crowd; whilst the ways of ingress may still be few in number. Public baths and laundries, and public kitchens and bakeries for the poor, should be established in the poorer quarters of the town, as well as a regular system of public drinking fountains for men and cattle. There should be a large public park, gymnasium and baths, and a public garden with terraces and fountains, laid out on the model of the old Italian gardens, such as, for instance, that of the Pitti Palace at Florence; these should be connected with the boulevards, which might consist of a central paved promenade lined with trees, having a road and tramway on each side, furnished with a handsome paved way next to the houses for foot passengers. I have seen an example of this kind at Toulon, which produced an excellent effect, and might be carried out on a larger scale.

A few good canals, crossed by ornamental swing bridges, as in Holland, might serve to connect the traffic of Lake Michigan with the principal railway stations and the Illinois canal. Spacious markets should be erected in central positions; those for fish being furnished with troughs to each stall, filled with water, in which fish can be kept alive, as in the "Halles" at Paris. Abattoirs, cattle markets, and all offensive or dangerous manufactures should be kept outside the city precincts, and finally, not only should a system of sewerage be carefully prepared, for the purification of the city, but the sewage matter should be utilised as manure, which might prove of incalculable service on the cleared prairie land of the State; and in all cases, it should be borne in mind, that as Chicago has grown so rapidly in the past, there is every reason to believe that it will increase still further in the future; therefore, whatever is done, an eye should be kept to the requirements of an increased population.

It may appear fanciful, and yet in many respects, a large city appears to me to resemble a human being. It has arteries and veins, or large and small thoroughfares, through which the blood corpuscules, in the shape of men and women, continually circulate. It has a heart; its centre, where all meet, and where the great business of life is mainly carried on. Lungs, or parks and open spaces in which the air is purified: it requires water reservoirs and apparatuses for receiving and discharging solid and liquid secretions, by means of drainage and sewage, outside the body corporate; moreover, to complete the resemblance, the surface of the city, its skin, so to speak, requires constant cleansing by water and friction, to insure that cleanliness which is essential to health; whilst the municipality

may be regarded as the brain, which brings experience and science to bear on the regulation of the entire body, having an equal regard to the convenience, health and external appearance of the whole city.

As regards the figures adaptable for the block plan of a city, with its thoroughfares, it will be seen that the choice lies almost entirely between a square, a parallelogram or a circle; and my own opinion is all in favour of the last named, both for beauty and convenience.

Space, air and trees should enter into all plans for new towns or new quarters, and I would propose that instead of the old system of gardens at the back of town houses, the garden should be in front of the house, then the pavement and road for ordinary traffic, with a double tramway in the centre for the carriage of trains and cattle, not by steam but by horse power; for there seems to me no valid reason why railway trains should not be carried right through a city without changing. This of course would necessitate a much wider roadway than is common at present. All streets, terraces, etc., should be provided with back roadways for house service, coals, dust, and the carting away of refuse or sewage matter; and in a well arranged city a back road to each street will be as necessary as a back staircase in a well arranged house.

In addition to these general remarks on the laying out of a city, I trust that it may not be considered out of place if I append the principles which I laid down for myself in designing particular buildings.

THE TRUE PRIMARY OBJECTS AND PRINCIPLES OF DESIGN IN ARCHITECTURE.

The following objects and principles of design ought to be attended to systematically by all engaged in the practice of architecture; they are arranged here in sequence according to their importance to the general welfare as well as to the occupants.

1st. Health.
2nd. Security.
3rd. Convenience and utility.
4th. Proportion and beauty.
5th. Decoration.

(All these relate to the plan and interior of the building alone.)

6th. Composition.
7th. Proportion.
8th. Light and shade.
9th. Detail.

The Plan and Interior of a Building.

No. 1. The first subject, "Health," demands primary attention to the site of the proposed building, and a well considered system of getting rid of all refuse matter from the building itself, its proper ventilation and the manner of warming it, and a proper supply of pure water for drinking, as well as an ample supply of water for cleansing purposes.

No. 2. The second object, "Security," requires that particular attention be given to the best methods of fireproof construction; ample provision for water available in case of fire; staircases attached to the main building, and as nearly separate from it as possible, combined with a solidity of construction intended to resist any accident within the range of ordinary likelihood.

No. 3. "Convenience and utility" depend mainly on the plan of the whole block of building and include attention to comfort, facility of access to various parts, sound and light.

No. 4. "Proportion and beauty." This relates to the scientifically arranged dimensions of rooms, and the application of purely architectural features, such as columns, arches, etc., in the combination of which the *art* of the architect is best shewn.

No. 5. "Decoration." This consists in the application of sculpture, or of coloured ornament; the last in every kind of material is most adapted to the purposes of internal decoration, but should never be excessive.

The Exterior.

No. 6. "Composition." This regards the entire external mass of the building, and must vary according to the subject, but in all large works simplicity of mass and largeness of parts are essential to grandeur of effect.

No. 7. "Proportion and beauty." These include not only the due proportion of one part to another, but the proper proportions of each single member, such as a column, etc., the proportion of regularity consistent with a pleasing variety of form; indeed, the application of scientific art in architecture, and the subordination of all mere ornament.

No. 8. "Light and shade." This requires a due consideration of the aspect as regards the sun of each external façade of the building, and includes not only the shadows cast by it from the projection and recession of masses, and from particular features, but also the application and effect of sculpture, whether as effected by light from the sun or as receiving and holding the ordinary light of a sunless day.

No. 9. "Detail" demands studied consideration of position, delicacy of outline, capacity for effect by shadow, and the employment of colour, which in Great Britain should be very sparingly employed, but may be used legitimately for the relief of ornamental designs.

Such are the requirements which every building demands from its designer, not only to be carried out in the order I have placed, as being according to their importance, but when each subject has been separately considered they have then all to be combined in the production of one harmonious and effective mass, effective not only in an artistic but in an utilitarian sense, and with a due regard to the wealth of its raisers and the importance of its use: it is this must regulate its external splendour, and not only this, but it should be carefully adapted to its surroundings, so as to be in harmony with them as far as possible, or at least, not absolutely discordant; and, finally, it should be considered as an ornamental feature by itself to the city or place where it stands, and be fitted to please and impress with a sense of beauty the general public, to whom some consideration also is due from those who are entrusted with the erection of buildings.

As it may not be convenient for many members to refer to Bleckman's paper on "the Paving and Cleansing of Streets," to which we have alluded, and as it seems to illustrate in an amusing and instructive manner the difficulty communities meet with in originating and enforcing new measures for improvement, we will give a resumé of his remarks on the subject.

Without entering into the paving of cities in the pre-Christian ages, we will proceed at once to the earliest examples of our own era. Beckman says, "of modern cities, the oldest pavement is commonly ascribed to Paris, but it is certain that Cordova, in Spain, was paved so early as the middle of the 9th century, or about the year 850, by Abderrahman II." In the 12th century Paris was not paved, and the stench arising from the filthy state of the streets was so intolerable that Phillip Augustus determined to introduce pavements. "Orders for this purpose were issued by the government in the year 1184, and upon that occasion, as is said, the name of the city, which was then called, 'Lutetia,' on account of its dirtiness, was changed to that of Paris." It appears that a certain income

was allowed to the city for defraying the expense, for in 1285, a hundred years after, when it was proposed that the pavement should be carried outside the gate of St. Martin, the citizens excused themselves from the work by saying that the funds assigned to them were not sufficient for that purpose. "Some centuries after Paris was paved, every citizen was obliged to repair the street before his house, and to clean it at his own expense," an order was issued to this effect in 1285.

"The public however are often careless and negligent respecting the most beneficial regulations, when the maintaining of them is attended with trouble and expense, be it ever so small." So the streets gradually fell into their old state of filth, until a very severe edict in the 14th century obliged the inhabitants to attend to their duties, the nobility and clergy however claiming immunity, but without effect. Now a curious result arose from this severe edict, for no provision having been made as regards open spaces, "the markets and public squares remained therefore uncleaned, and became still dirtier, as those who resided in the neighbourhood began to throw filth into them privately in the night time, in order to avoid the expense of having it carried away, till at length these places were rendered so impassable that the toymen who frequented them with their wares wished to abandon them." But the government again intervened, and decided that the toymen and the dwellers in the open spaces should clean them at their joint expense, and this led to the first instance we meet with of dirt contractors. "Many now," says Beckman, "made the removing of dirt a trade, and entered into contracts for that purpose; but they as well as the paviours turned so extravagant in their demands, that a price was set upon the labour of the former in 1396, and the latter, in 1501, were united into a company, every member of which was obliged to subscribe to certain conditions."

When the city increased in dimensions, the care and cleaning of the streets became too burdensome and expensive for individual action, and in 1609 it was resolved that "the streets should be cleaned at the public expense, under the inspection of the police, and a certain revenue in wine was set apart for that purpose. The first person with whom a contract was entered into for this service was allowed yearly for cleaning the whole city, 70,000 livres, which sum was raised in 1628 to 80,000. In 1704 the Parisians were obliged to collect 300,000 livres, for which government undertook to maintain the lamps and clean the streets, and in 1742 this contribution was increased to 450,000." The amount, of course, went on increasing with the increase of population, but how little the populace cared itself about the matter may be judged of by the fact that even during the last century, people persisted in throwing their refuse out into the street at night, merely crying out "gare l'eau," whilst at Edinburgh, even as late as 1760, the greatest want of appliances for domestic cleanliness still existed, and the same practice of emptying pails of dirt into the street was usual, in which case, however, it appears to have been left to the passer by to keep his eyes open and take care of himself, by shouting out "Haud your haunde."

Dijon appears to have been well attended to, under its dukes, and its streets were paved as early as the year 1391. Phillip the Bold contributing 2,000 livres for that purpose, and it is stated that 1,424 paviors were employed on the various streets, and the effect was such as might have been expected in the better health of the inhabitants' and "historians remark, that after this period, dangerous diseases, such as the dysentery, spotted fever and others, became less frequent in that city." The smaller cities and towns in France however, remained for a long period in a very bad state as to paving, sewerage and cleansing, and indeed cry aloud for improvement even at this day. In Germany, the rich trading city of Augsburg was not paved till the 15th century, although from an early period, it appears to have been possessed of a system of "small subterranean passages under the streets, for conveying away filth." Berlin was not paved till the 17th century, and as to its drainage, it was in so bad a state, even so late as 1846, that when Laing visited it, he remarks on the open drains

running along the sides of even the chief streets, boarded over only at intervals. The odour arising from them was so offensive that he says, "If bronze and marble could smell, Blucher and Bülow and Schwerin and Zicthen, would be found on their pedestals holding their noses instead of grasping their swords." "Use," he very justly adds, "reconciles people to nuisances which might be easily removed." In Hamburg and in Paris also the cleansing of the streets was considered a dishonourable employment, and in the former city, before the present regulations came into force, they forced the Jews to carry out the operation. But the Berliners appear to have been the most difficult to deal with, and although their city is now, I believe, as clean as any in Europe, "in the beginning of the 17th century the streets were never swept, and the swine belonging to the citizens wallowed in the increasing dirt the whole day, as well as in the tunnels, which were choked up with mud."

In 1624, the Elector ordered the streets to be cleaned, but the Town Council objected to it, and he had to use threats before he could get the inhabitants to remove refuse, and the new market became so filled with accumulated dirt, that in 1671, every countryman who came to market was forced to carry back with him a load of dirt. I give these particulars to show how difficult it is to induce people to take ordinary precautions for the preservation of even their own health, if it involves trouble and expense; they will do anything to shirk the performance of their duties. But civilization means trouble and expense, and the more we become civilized in our domestic and civic arrangements, the greater trouble and expense we shall necessarily incur. In a barbarous state, there is no trouble and no expense, but if we want to be comfortable, and decent, and enjoy all the advantages and improvements of modern life, we must expect to pay for them. Imagine, what the feelings of a Phillip Augustus would have been or Henry II., who according to Hudson Turner made the first subterrancau conduit in London to carry away offensive matters into the Thames, if they had been told that in a few hundred years, sums of money entirely beyond their very conception, would be expended in London and Paris in these subterranean conduits alone. They certainly would not have credited it. But there is something more than trouble and expense required to make our cities decent and healthy, and that is legal power on the part of the proper authorities to enforce the observance of their duty on the inhabitants. In my opinion, there ought to be a printed list of all that a housekeeper is required to do, in respect of keeping his house and its surroundings in proper order, and this should be given to him by the parish authorities, whose regular inspector ought to be furnished with power to see that those duties are properly carried out, and the neglect of so doing, should be subject to penalties. Interfering with the liberty of the subject, is we are aware, a favourite outcry amongst us, but the liberty of the individual is justly curtailed if the object in view is the interest of the public, and I trust that in the course of time a proper and regular system of house to house sanitary inspection will be instituted, each inspector being responsible to the parochial authorities for the proper discharge of his duties. Moreover, in future, when opportunities occur for the re-arrangement of new quarters in cities, or for the planning of new towns, as might have been the case at Birkenhead, in 1845, I am not without hopes that a wider view of the subject will be taken than has yet been customary, and that space, air and health will be as much regarded as convenience and beauty. Indeed, all these considerations might be embraced in one general code of rules, to which, all who propose building should conform, and in the spirit of that excellent motto which our Institute has adopted, viz.:—"usui civium, decori urbium."

The CHAIRMAN,—We shall be glad to hear observations from those present on this interesting paper; but I should first like to ask Mr. Waring if he can explain one thing which I missed, and probably others did. I did not understand how he would apply the principle of the spider's web to the rebuilding of that portion of Chicago which has been burnt down.

Mr. WARING, Fellow,—My plan is of course merely suggestive: there is no attempt to enter into detail; the general idea is, if you want to reach the centre of a large space, the easiest way of doing so is to follow the example of the spider, who has great interest in getting to any part of his web in the quickest manner. Laying it out in the form of a parallelogram involves a very great number of turnings, which in case of fires and engines going at great speed is objectionable and also dangerous.

Mr. C. BARRY, Fellow,—Of course we are indebted to Mr. Waring for bringing so important a subject before us. When I first saw the announcement of it I thought it was taking a very high flight indeed, and seemed to open up notions of grandeur and vastness with which few of us could hope to be conversant. The paper, I confess, has in some respects disappointed me, inasmuch as the author has not dwelt so largely as from my knowledge of him he might have done, on the principle suggested by the title of the paper. He has put before us the familiar plan—familiar, alas! only on paper—of Sir Christopher Wren for replacing our own City of London after the great fire, and also one which is less well known, that of Evelyn; and he has drawn a spider's web and applied that to Chicago. But Mr. Waring, we know, is a great traveller, and could have interested us by giving his experience of the great cities of the Continent, many of which have been undergoing a system not entirely of replanning, for that is, perhaps, too much to expect, but of great improvements, and new principles are being laid down in the direction of their thoroughfares and in the building of their edifices. Mr. Waring seems to have assumed one point on which I can hardly agree with him, viz., that the great object is to get to one central point in a city, and that all other arrangements should be made subservient to that. I think in large cities like London and those I have referred to abroad there must be many centres, each devoted to different objects, such as commerce, law, administration, markets, public meetings, popular recreation and others, and therefore it is hardly to be wished for or expected that all those various objects should be closely associated. The principle of the spider's web, which enables you to reach only one centre, therefore hardly meets the requirements of the case. Taking the great works in Paris as examples of what I mean, the object has been to *organize* certain centres, and approach each by certain main routes, and then to connect those centres by main streets. In the laying out of the streets of Paris there is one practice which we must have observed and admired—I mean the great care taken that where public buildings of importance are concerned, all the adjacent streets and approaches shall have reference to them, and enable them to be seen to the best advantage—a great contrast we must feel to what takes place in this country, where we try often successfully to make fine buildings and then as studiously try to hide them, or rather we do nothing to enable them to be seen as their importance deserves. Then again, in Paris and Vienna, and more recently in Florence, the important question of surrounding the city with a zone of boulevards outside has attracted a good deal of attention, and deserves to receive discussion amongst us, but Mr. Waring has not referred to it. To a certain extent the application of boulevards in connection with the city by radial lines does follow out more or less correctly the idea of the spider's web. Mr. Waring's appreciation of this has possibly had some effect on his mind when he referred to the web as the natural way of laying out cities; but it applies of course only to one surrounding line. I shall be happy at a later period of the evening, if permitted to do so, to propose a vote of thanks to Mr. Waring for the interesting paper he has given us.

Mr. C. FOWLER, Fellow,—I beg personally to thank Mr. Waring for bringing this matter before us, though I regret that he has confined the scope of his observations within such narrow limits. It is not, however, often that an architect is called upon to lay out a city, or even a portion of one; but a friend of mine told me, a day or two ago, that he is next month going to America to lay out a town for a client of his in that country. I can only hope he will do so successfully, and that we

may on a future occasion have a description of it. One is glad to be reminded of the charming plan of Wren for laying out the City of London after the fire, and one can only regret more and more every day that his plan was not adopted. It has always seemed to me a most admirable plan for dealing with the space. The contrast with Evelyn's plan shows at once the superiority of the master mind of Wren. As an instance of the successful way of dealing with such an opportunity, I may mention what was done after the great fire at Hamburgh. It was (though with great difficulty) then decided to expropriate the whole of the site and lay out that portion of the town afresh, and eventually that was done, and on the whole effectually done, under a commission composed chiefly of architects and engineers, and, to the best of my recollection, the president of the commission was an architect. I confess that I think Mr. Waring's idea of the circular plan for a city is, to my mind, and from a practical point of view, about the worst that could be adopted. Milan is to a certain extent on that plan, and I remember the inconvenience one experiences in finding a particular street. You lose yourself, and after a considerable time you find yourself almost at the spot from which you started. To a stranger that kind of plan is excessively puzzling. The plan of Chicago, as it appears here, I think admits of great improvements, and I regret that such a large city should be so laid out. The only advantage seems to me to be that the plots are all rectangular. The great merit of Wren's plan I consider to be the difference that is maintained and kept in view throughout, between the importance of main thoroughfares and side streets. Wren laid out the important thoroughfares of great width, and divided the spaces between them, as nearly as possible, into rectangular plots, which is generally most convenient. Here and there you get an irregular plot to deal with, but if skilfully taken advantage of by the architect, it gives opportunity for a nice arrangement, which one would be sorry to miss. I may be allowed to refer for a moment to the question which came before us at the beginning of the meeting, and which appears to me to bear upon this subject.* It seems to me that the vagueness of that memorial is extremely objectionable, and that it is extremely undesirable for the members of the Institute in any way to connect themselves with it. I think it might be possible for the Council to suggest to Lord Elcho that, instead of putting it in that general manner, which is so objectionable for the reasons which have been pointed out, he should confine it to cases of public improvements, and not include individual buildings. When the Victoria Embankment was laid out and made, you will remember it was proposed to cut up that fine space, which is now laid out as a garden, by carrying diagonally across it a hideous viaduct, which was to connect the embankment with the streets on a high level, but at the last moment, when it was on the point of being done, somebody pointed out that it would be a very ugly thing, and, happily, it was not carried out: but the public ought not to be allowed to go to sleep till the last moment, and perhaps wake up to find themselves saddled with some abortion which everybody dislikes. If some commission of professional men were appointed such things as these would not occur, and there would frequently be an advantage to the public from previous consideration and discussion of any proposed matters of that kind.

Dr. BARLOW, Visitor, said,—It is not always that the plan of a city or town which looks the most regular and symmetrical upon paper is in reality the most convenient and desirable. The capital of Baden, Carlsruhe, is an illustration of this. Carlsruhe upon paper looks most inviting. The streets all radiate, not from a centre like the spokes of a wheel (and the plan appears to be perfection), but it is in fact the very reverse, and when the wind blows, which it often does, Carlsruhe is a very purgatory, suggesting *la bufera infernále* of the Divina Commedia. The wind catches you and blows you about in all manner of ways, and there is no possibility of finding protection from it anywhere. I

* See the paragraph headed "Northumberland House" in the Institute Notice Paper, No. 12.

would also remark, that in cities of the olden time, the rich and the poor lived together in the same locality, without any distinction of an aristocratic from a more humble neighbourhood. This was the case probably in ancient Rome; it is so in the modern city, where the most sumptuous and costly palaces are often found in the poorest quarters. In Pompei this was also the case. The noble mansions of the influential and the affluent are found side by side with the humble habitations of the poorest citizens. In our London the same thing occurred in early times. The palaces of the nobles and of great citizens did not disdain to stand along with the dwellings of the poorer classes. So in Edinburgh also, where the dwellings of the great ones of former days (now become the dwellings of the poorest of the poor), are found not unfrequently in the lowest and most thickly populated parts of the old city. This intermingling of the houses or palaces of the rich and potent with the habitations of the poor, had, I think, a material influence in promoting the health of the district, as well as keeping it respectable and in good order; and I would suggest that, in laying out plans for cities and towns this principle should not be lost sight of, especially from a sanatory point of view.

Mr. A. PAYNE, Associate,—It seems to me most desirable that as members of this Institute we should not omit to give our countenance to the principle of Lord Elcho's memorial, which has been brought before our notice this evening. In modern times towns and houses grow up haphazard, and the reason seems to be that it is nobody's business to look after them. Supposing, for instance, such a Board or Committee as has been suggested had been appointed in Wren's time, who can conceive it possible that that magnificent plan of his would have been neglected, and that the City of London would have been reinstated with its present confused and tangled plan? Through the want of such supervision a rare opportunity of making splendid boulevards throughout London at a nominal expense is rapidly passing away. There are numerous broad roads, such as Kennington Lane, Euston and Pentonville Roads, consisting of houses which *have* been suburban, with gardens in front. As the town increases, these houses are being gradually adapted for business purposes, and shops are being built out to the line of the pavement, dispensing with the gardens: in the course of time the occupiers, one by one, build out their houses to the line of their shops, as is the case in Edgeware and Euston Roads. If the matter were *now* taken up by a competent authority, the shops might be made under the houses at the old frontage, the gardens replaced by wide pavements and roads of trees, and London would possess a magnificent system of boulevards at a small expense, the opportunity for which is year by year passing away.

Professor KERR, Fellow,—I desire also to express my thanks to Mr. Waring for bringing this subject before us. It seems to me, with regard to his spider web theory, that he is right. Every town of any importance has its centre, which in one sense or another may be called the market place. In London the Bank of England or the Royal Exchange is the great centre of all business, and the neighbourhood around it is, on a grand scale, the market place of London. To that centre all the great thoroughfares converge; and in all schemes proposed for the improvement of London, as a general rule, unless the principle of general convergence be kept strictly in view, the line which is laid down may be abortive. This is one chief reason why the proposed line of street from the Nelson Monument to the Thames Embankment is, in my opinion, a mistake. It leads nowhere, except from Trafalgar Square to the Embankment. But people do not want to go from the Embankment to the monument, nor from the monument to the Embankment; they want to go from the east end to the west, or from the Pall Mall quarter to the Bank quarter; and if you take the line of Pall Mall straight forward past the National Gallery and along Duncannon Street, and then continue it almost absolutely straight, you pass Charing Cross Hotel on the right and Adelphi Terrace on the left, and reach the Embankment at an angle which gives you a direct alternative line to the Bank. This is a route which possesses all the characteristics

of a main line of thoroughfare converging systematically with others to the central market place of the town. Now, in Sir Christopher Wren's plan this principle is followed out universally. His lines converge upon what I presume is the Royal Exchange, excepting one great line which I cannot identify. [Mr. WARING.—That is Cannon Street.] At all events, the arrangement of Wren's plan, with the exception of that one line,* makes all the great thoroughfares converge directly to the Royal Exchange; and that is not at all the case in Evelyn's plan. Looking, therefore, at Mr. Waring's diagram of the spider's web (which is a geometrical illustration of an abstract idea, and not a form on which he would actually propose to build a city) you will see the best possible proof of what I say. The lines all converge upon the centre, and the cross lines, which happen to be circular as regards the *ensemble* of the plan, are obviously rectangular with regard to their relation to the converging lines. In laying out a new city, I cannot conceive a worse plan than the American. It is curious enough that it was carried out in so many instances during the Middle Ages; and indeed it is to be remarked that mediæval architects were more rectangular and symmetrical in their ideas than many people seem to suppose. My friend beside me, Mr. Seddon, will no doubt tell you presently not only that he prefers irregularity to symmetry of general effect, but that he prefers straggling streets to straight streets. The reason for that is his love of the picturesque. My friend will no doubt be of opinion that when the mind of the passenger is presented with agreeable alternations of spectacular prospects, he obtains by means of this irregularity of arrangement a succession of architectural tit-bits, which serve the purpose of charming his sense of the picturesque. This, however, does not in my opinion seem to be what mediæval builders actually thought of; and I would ask Mr. Seddon to account for the circumstance that in the laying out of their cities they adopted the rectangular system, which I have no doubt he thinks so entirely at variance with his general conclusions with regard to mediæval art. We shall all agree, at any rate, that the American system of rectangular streets is about the worst that can be devised. It is impossible to get from one end of the town to the other in a cross direction; and another thing is that it often happens the only means of informing yourself where you are in such a town is to reckon up the consecutive numbering of the streets as you go along; but for which you may be quite unable to find your way about. This is the case with the streets in such towns as Chicago (according to the plan on the wall) and New York, and Philadelphia none the less. The streets are numbered Thirtieth Street, Fortieth Street, and so on, and Fourth and Fifth Avenues crosswise; and thus it is that you know at the corners of the streets for certain exactly where you are even when you cannot otherwise identify the streets; but the plan is an exceedingly bad one on other accounts, because there are no means of arriving directly at your destination by radiating routes to the centres of business. In the transactions of the Institute you will find papers on this subject, in which Mr. Haywood, of the City of London, takes a leading part, and you will find, I think, that he had a notion of his own with regard to the spider's web plan—not the same as Mr. Waring's, but very ingenious, as all Mr. Haywood's theories are.† I should recommend you to look up those papers: the discussion extended over two or more evenings, and a very interesting discussion it was. We have heard that one of our colleagues is about to go out to America to lay out a new town there; his name was not stated, and Mr. Fowler might as well tell us. [Mr. FOWLER.—Mr. Edis.] Well, I hope he will not follow the plan of American towns generally; for if he does he will make a mistake. The laying out of new streets in London is a thing which ought to be properly studied. It has been handled in a particularly loose, hap-hazard way

* No doubt intended to be a special line of thoroughfare for the Docks.

† See the Discussion which took place at the Institute, on "Metropolitan improvements, as affected by the Bills now before Parliament," March 7th, 1859.

for some years past. Perhaps the only man of our generation who took real pains to study the subject was the late Sir James Pennethorne. He was a man of great skill, and of higher powers in many ways than most men were aware, and he made it his special business to understand thoroughly the general idea of what ought to be done; and it is to be remarked that many of the plans he proposed were prepared entirely at his own expense. The subject is one which should engage our very best attention; the more so because one sees at the present time a desire on the part of the public that London should be improved in a systematic manner.

Mr. JOHN P. SEDDON, Fellow,—I think there is a little misunderstanding on the part of my friend who has just addressed you, in thinking that my views and those of true Mediævalists are in favour of irregularity in everything. Certainly the architects of the great works of olden days appreciated and sought after symmetry, but as a reasonable master, and not as a tyrant, whose rules wholesome in general, should be made to give way to other considerations of still greater importance. If we had the good fortune, or otherwise, of seeing half a town like Chicago burnt down every few years, we might exercise our ingenuity, and come to some good understanding on the best way of re-building it. But the truth is such chances are rare, and cities grow up by small degrees; and I imagine it is almost impossible for any one to lay it down as a fact that a large city will be required in a particular place, and therefore to start to plan it with full consideration of its future requirements. I was rather inclined to support Mr. Waring's spider's-web plan with some conditions: that is, given a city already grown up irregularly: when it has become an ascertained fact that it will increase largely, you may then deal with it after this fashion in laying out its suburbs. The worst part of such a plan is the centre, which is cut up into small and inconvenient wedges; in this portion it will be preferable to leave the primitive arrangement that was dictated by other circumstances and views. Thus in the case of a city like London, it might be possible to treat the suburbs somewhat in this manner, and it is a question whether it should not now be entertained. We have seen in our time London doubled in extent, and the grand boulevard spoken of might have been run with advantage as a girdle round London; and I am not sure that it cannot be done yet. We should then get villas with plenty of ground round them, and a beautiful spacious boulevard might be carried out, instead of the higgledy-piggledy present style of accretion. I once had an opportunity, which I now look back upon as a dream; in fact I had a commission to lay out a town on the Coast of Wales. I gave my best attention to this subject under consideration, and to a certain extent I introduced into my design the web-like feature of the plan. I first laid out a wide road parallel with the sea-board, and then, to catch a grand mountain view at the back, I devised a quadrant arrangement; I also paid attention to what seemed to me is not often sufficiently thought of, viz:—the advantage when you come to the frontage of a river, the sea, or any grand open view, of getting a broken outline there, instead of adopting straight parallel blocks throughout. In the plan by Sir Christopher Wren, you have that idea partly carried out towards the Thames, were there is a fine crescent proposed. In order to secure as much frontage as possible, and at the same time to prevent the wind from driving directly into the houses, I laid them out in a varied succession of concave and convex crescents, more particularly the latter; which gave me a more pleasing outline than a straight line of buildings, with cross streets abutting upon it. At suitable parts in all towns, the sharp angles of streets might be broken by the introduction of fountains, monuments, or any similar embellishments, with excellent effect and good practical purpose as well.

Mr. THOMAS MORRIS, Associate,—In reference to what has been said by Mr. Barry, I am inclined to agree with him entirely, as he has taken up this subject in the way in which I think it ought to be viewed. Otherwise, it strikes me very forcibly, that if a town were to be laid out, the authorities would

say it should be done by an engineer. It has been somewhere suggested that we have much reason to thank Providence for having caused *the greatest rivers to pass through the greatest cities.* That is an idea we all ought to catch: but whether we assume it or the reverse to be the true order of events, there is always a close connection between the river and the city. I do not intend to enlarge upon the notion, but it shews that local circumstances have ever had and ought to have the first consideration in laying out a town. They are hardly sufficiently recognised in the paper. As far as London is concerned, we know perfectly well the great labour of the present generation of Londoners has been to obviate the effect of the old block of traffic at the Bank of England. If you wanted to go to *London Bridge* formerly, the first thing was to go to the *Bank;* but Cannon Street was made to relieve Cheapside, and now you can go to London Bridge without going to the Bank. They found they wanted yet more side ways, and that led to the Thames Embankment, as a relief to the Strand and the other ways into the city. Consider the block you would have if all these were to cross at one central point. I would beg to impress therefore upon those who lay out cities, that they must attend to local circumstances.

Mr. WARING,—I wish to say I merely speak in a very general and abstract manner regarding principles. There has been no attempt on my part to enter into details, and I have only given my ideas in a general form.

Mr. C. BARRY,—I asked permission at an earlier period of the evening, to propose in a more formal manner, a vote of thanks to Mr. Waring, but I will take the opportunity of mentioning a circumstance extremely interesting to the Institute, and illustrative of the remarks I made. There seems in this country to exist a kind of perversity which prevents us from laying out great works so that they may be well seen, and making the adjuncts subservient to the main object, as they ought to be. You will remember when the Thames Embankment and Mansion House Street were projected, the matter was considered by this Institute to be of such public interest, that a committee was appointed, of which I was a member, to take into consideration and report upon the plans then before Parliament. That committee drew up a report which I think is very valuable. Reference to it will show that it dealt in the beginning with almost all the questions which had arisen, in an architectural sense, and still will continue to arise before the Embankment will be the perfect work it will be no doubt one day. That report pointed out that the Embankment in itself was most admirable, but it needed approaches; that those approaches should have some reference to the existing monuments of the metropolis along its course; that for instance the areaded lower story and terrace of Somerset House, should not be half blocked it up as is, but be connected with its new ground level, instead of its old water line, with a sort of sunk area or pit in front of it. It also suggests that the line of roadway at the Westminster end of the Embankment, instead of running as it now does in so extraordinary a way on to the haunches of the bridge, should have had the Clock Tower at the end of its vista. It suggested as a rule that existing or intended public buildings should be the objects towards which new communications should tend and old ones be adapted where possible; and in particular it suggested a communication with Trafalgar Square, very much superior to that which is now put before the public by the Metropolitan Board of Works; but so great is our national prejudice against allowing any one corporate body in this country to interfere with any other, even to their mutual advantage, that the Report of the Institute was disregarded, and has been entirely inoperative. I wish also to say a word to prevent misunderstanding on the subject of Lord Elcho's memorial. We must, I am sure, all sympathise with the object which his lordship has in view; but sympathy with the object and sympathy with the memorial we prepare or sign for the purpose of carrying it out is a different thing. Nobody sympathises more than I do myself with a desire for some accredited tribunal to prevent bills from being carried through Parliament

which have the effect of defacing the metropolis; and if Lord Elcho had confined his memorial to this object, I cannot imagine for a moment the Institute as a body would hesitate to support it to the best of its power; but his lordship has worded his memorial in such vague and wide terms that I for one feel I cannot accept it, and I apprehend it is not likely to receive the support of this Institute as it stands; but I wish his lordship to understand that we have the same object as he has in view, and that we only differ from him as to the particular mode in which it shall be carried out. We have heard some remarks about engineers being called in instead of architects for the embellishment of London. I confess I cannot call to mind any one of their works which would lead me to approve such a course. They have had enormous opportunities for good, and they have used them nearly always for evil, in an æsthetic sense. They have had the largest funds at their disposal, the largest works, and the largest opportunities for grandeur, and I know no instance in which they have contributed beauty or taste to the great works of our city; and while recognising their valuable services in many other respects, I should be sorry to allow them to form even a part of the tribunal wherein questions of art have to be considered. Apologising for trespassing so long on your attention, I beg to propose a vote of thanks to Mr. Waring for the paper he has favoured us with.

Professor Kerr, Fellow.—I ask leave to mention that Mr. Haywood's theory which I alluded to before, was, as I now remember, this. His idea with regard to an ordinary town, was that a market was originally established in a certain suitable position; that in course of time there came to be certain routes or paths which converged to that spot in nearly straight lines, and that those come eventually to be the great thoroughfares of a town. With reference to works of this kind being handed over to engineers, as proposed by some one, I may also take leave to mention, that not long ago I delivered a lecture before an assembly of engineers on the application of architectural art to engineering, and that I took the greatest pains to explain to my audience—an extremely intelligent audience of young engineers—how the principle of architectural design could, in my opinion, be applied in their works. To my surprise, I found by the subsequent discussion, that scarcely one of them had understood a word of what I said. I never was more surprised. I could not have believed it possible that a number of engineers could have had such a total vacuity of mind with regard to the primary idea of architecture as an art. They told me amongst other things, that I was much mistaken if I supposed engineers were not artistic designers, and that they bestowed a great deal of attention to the artistic part of their work: In support of which they quoted a bridge—a particularly unartistic one I am told—the Saltash Bridge, and they declared that work to be the very perfection of architectural beauty. Under such circumstances, therefore, I fear it is hopeless to expect good out of engineers with regard to the architectural embellishment of London.

The vote of thanks having been seconded was carried unanimously, and the meeting then adjourned.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, the 7th of April, 1873, the following Paper was read, THOMAS H. WYATT, President, in the Chair:—

ON CLASSIC ARCHITECTURE,

AS PRINCIPALLY EXEMPLIFIED IN THE BUILDINGS OF ROME.

By GEORGE L. TAYLOR, Hon. Member.

My dear Friends,

I have caused you to be invited to take a ramble with me through the principal ruins of ancient buildings at Rome, that is the greatest number of interesting objects on one spot, extending from the Colosseum to the Forum and Column of Trajan, in the centre of which stood the ROMAN FORUM.

When I was in Rome in 1818 I made acquaintance with Pinelli, a clever and enthusiastic artist, who, treading this sacred spot was, in imagination, encountered by the Goddess of Rome, who urged him to exert his talent in depicting the events of Roman history. He says, "In mezzo del Foro, Roma me apparve nella sua maestosa Dignità e Grandezza." He responded to the call, and produced a fine work drawn and engraved by himself, the frontispiece of which I have placed "in mezzo del Foro," as you see.

Without invoking the Goddess ourselves, I hope we may have a portion of Pinelli's enthusiasm and admiration imparted to us as we proceed.

We will enter on the arena of our labours from the east, following the line of the ancient sacred or triumphal way under the Arch of Constantine, with the Colosseum on our right hand, round the north-east angle of the Palatine Hill, past the Temples of Venus and Rome, through the Arch of Titus, on to the Basilica of Constantine and the Temple of Remus, after which we find the Temple of Antoninus and Faustina still to the right. On our left hand we encounter the three beautiful columns originally supposed (erroneously) to have belonged to the Temple of Jupiter Stator, but now found to be those of the temple dedicated to the Dioscuri—Castor and Pollux. Then we shall be in the midst of the veritable *Forum Romanum*, where, as you see, the Goddess is supposed to have appeared to Pinelli.

The southern side of the Forum Romanum is clearly defined by the pavement still left and disinterred of the *Basilica Julia*, erected by Augustus in honour of his daughter Julia, and in his will he directs that if it is not completed at his death it is to be, remarking that it extends between the Temple of the *Dioscuri* and that of *Saturn*, which used formerly to be called the Temple of Concord. This settles the *locale* of these two temples.

We now approach the sacred *Clivus Capitolinus*, which is fully occupied by the Temples of the Dii Consentes, the Temple of Jupiter Tonans, and the real and true Temple of *Concord*, whose magnificent marble cornice I have drawn for you full size. The depth for these temples is so restricted that the usual rule of *double* the number of columns in front to be allowed for the returns could not be

followed out. These temples extend the whole length under the ancient *Tabularium*, the date of which is defined in an inscription.

The Sacred Way passes under the arch of Septimius Severus, ascending rapidly and winding round in a double curve to the entrance of the Tabularium at the side, and on at the rear of the same, to the Temple of Jupiter Feretrius, where the *Spolia Opima* were deposited, at present the site of the church *Ara Cœli*. We are on Mons Capitolinus, approaching the Tarpeian Rock. That defines the general route of the Sacred Way.

We shall have now to diverge to the northward and westward, and thread our way through modern streets to discover among the modern buildings the ruins of the Fora and Temple which once adorned that space up to Trajan's Column, and lay them out as I have done by actual measurement in their various situations, tracing from them, with the aid of history, the probable extent and disposition of the principal *Fora* of Trajan, Augustus Cæsar, Nerva and the Temple of Peace.

This is the general description of the ancient buildings I have to bring to your notice in detail, and I hope to be excused if, for the benefit of younger members and students, I proceed to define them more minutely than is required by the elder members and those who have visited and know the spot. The scale of the drawing enables us to pause and look around us at any point and almost fancy ourselves there.

I will now enter on a recapitulation of the Course, giving some explanation and detail of each building as we come to it.

Colosseum.

First of the *Colosseum*. This is probably the *largest* building of the ancient world. Its extent in *length* is 620 ft., the half columns of each pier projecting 2 ft. 10 in. beyond that, and in breadth 513 ft. 8 in., and 2 ft. 10 in. beyond oval in form; the external wall being 157 ft. 6 in. in height. This outer wall is 10 ft. thick, including the half column on its face at the ground line, and 6 ft. 8 in. thick on the upper story.

The exterior circumference of this immense pile is 1,800 feet, divided into eighty widths of about 22 ft. 3 in. each by so many half columns, with eighty arched openings, having semicircular arches 14 ft. wide; making 240 arched openings in the three lower stories; all the arches are 14 ft. wide.

The height of the outer wall is divided in four stories. The *first* 34 ft. 3 in. high, including the entablature of the Doric order; then a stylobate of 6 ft. 7 in. The *second* 32 ft. high, including the entablature of the Ionic order; then a stylobate of 6 ft. 2 in. The *third* 32 ft. high, including the entablature. All these have arched openings to each division, 240 in all.

The upper story has a stylobate of 7 ft. 9 in. and pilasters to each division, and is 38 ft. 2 in. high, including cornice; making the total height of 157 ft. 6 in. This story has square openings to every other division, and corbels which receive the masts of the *velarium*.

The arches were all numbered. Some of the numbers remain on the north side, as you see on the plan. It is stated that these numbers enabled the spectators to find their seats readily, according to their different classes, and to communicate throughout the building by the means of two corridors, one 16 ft. wide, one 14 ft. There were also two other corridors of communication near the Podium, where the places of distinction were situated. Eighty-four thousand spectators are said to have been congregated at one time. The arena is 287 feet by 186 feet.

It is not known who was the architect of this stupendous pile, but he must have been a man of consummate skill to erect such a building on a spot which had been a marsh or formed by Nero into an artificial lake. Its outer wall is 157 ft. 6 in. high, and seems to have shown no symptoms of settlement. From an inscription found on the spot with the name *Gaudentius*, a Christian, some have

imagined that he was the architect, others that it recorded his martyrdom. It was commenced by Vespasian and finished by Titus, and is said to have been opened A.D. 81.

The demolition of this magnificent building has been effected at various times; fires and earthquakes have assisted therein, but the main quantity of Travertine stone was carried away and used in the Cancellaria, Palazzo Farnese, Palazzo di Venetia, &c.

Passing to the westward we have the site of the famous golden *statue of Nero*, the foundation of which still appears. Proceeding southward we have the remains of the *Meta Sudans*.

Arch of Constantine.

Dropping a little to the south, we find the Arch of *Constantine*, which exhibits a lamentable instance of spoliation and mis-appropriation,—the fine triumphal arch, erected to the honour of Trajan, having been demolished and the best parts used by Constantine. This is evident in the cornices, which (except the salient ones) are very finely executed, while the latter are rough. An attempt was made to convert the fine bas-reliefs representing the events of Trajan's life into illustrations of the life of Constantine, but without success. The outlines are on the walls.

The details of this arch are all shown in my work on Rome, which is in the Library of this Institute, and my original elevation is on the walls. The opening of the central arch is 21 ft. 8 in., and its length 37 ft. 8 in. The extent of the mass is 83 ft. 2 in. and the height 67 ft. 7 in.

Temple of Venvs and Rome.

We now come to the Temple of Venus and Rome, built by Adrian. The extent of these temples can be accurately traced by the parts remaining. They were surrounded by columns 6 ft. in diameter, ten in front and twenty on the return; and the peribolus wall was to the extent of 500 ft. by 350 ft., which was ornamented with columns of granite 4 ft. in diameter, of which several blocks are lying about. The Temples themselves are small, placed back to back. It is recorded that Adrian, desiring to have the opinion of Apollodorus, his architect, on his design, was informed by him that if the goddesses wished to rise from their seats they would hit their heads against the top of the niches on which they sat. This opinion cost the architect his life.

Arch of Titus.

Passing the Arch of Titus, which is too well known to require description, we reach the Basilica of Constantine, a massive construction with tiles and concrete. The length of the body of the building is 280 feet; the central division 85 feet in width. The side divisions had on each side three arched openings, the soffits being divided into immense panels, ornamented, moulded, and probably gilt. The centre was covered by arches and cross springers, springing from eight columns 100 ft. high with their pedestals, one of which is set up in front of Santa Maria Maggiore.

We next pass the little Temple of Remus and the *Temple of Antoninus and Faustina*, then on the left we find the *Temple of the Dioscuri* or Castor and Pollux.

This used to be erroneously called the Temple of *Jupiter Stator*, but as I have before observed, the will of Augustus sets us right on this subject, and determines also that the other temple west of the Basilica Julia was dedicated to Saturn, and is not the Temple of Concord, as previously supposed.

The temple of the Dioscuri must have been one of the most beautiful of its time, three columns only remain of the eastern flank, but by excavation we were able to discern clearly its original extent, and to find that it was a fine octastyle temple with a grand flight of steps for the entrance. The

style of the sculpture of the capitals of the columns, and of the architrave frieze and cornice, are shown on the walls by two drawings, and may thus be compared with those of the real Temple of Concord.

It is most wonderful how these three columns have been preserved in place, for they seem to be what is vulgarly called *top heavy*. They probably derive their strength from the very fine and true construction of the joints of the marble, of which the shafts are composed.

Of the *Basilica Julia* which ranges between these two temples, to an extent of above 300 feet, the pavement only remains, every marble of which you see laid down. The outer range is composed of marble in three widths, 6 inches thick each block, 6 feet by 3 feet 10 inches, of which there are 79 remaining in the length. The next range of blocks is 6 feet 7 inches by 3 feet 10 inches, 3 inches thick in 2 widths, 79 of which remain in the length. There are indications also of piers, by which and the thinner marble, we may gather that the covering of the Basilica extended over them. We also may conclude that the central opening was 80 feet in width. How this may have been covered in is a matter of speculation.

We now approach the Clivus Capitolinus, the temples of which are described at the commencement of this paper. I have particularly to draw your attention to a full size drawing of the noble cornice of the Temple of Concord, which was collected in fragments and set up in the Tabularium by Canina. It may safely be said to be the finest example extant of a Corinthian cornice, and will speak for itself. I also exhibit the drawing of a modillion from the same cornice, drawings of the respective entablatures of the Temples of Concord and of the Dioscuri, and studies of leaf enrichment from the Temples of the Dioscuri and Mars Ultor,—a quarter their real size.

I must now travel northward and westward among the modern streets to find remnants of the antient buildings over that extensive space between the Basilica of Constantine and the Column of Trajan. They are laid out on the smaller plan, and enable us to see how it was appropriated to the several Fora of Trajan, Augustus, Cæsar, Nerva, and the Temple of Peace. I wish to call your attention to the marvellous fine workmanship and the immense blocks of marble used in some of these structures. We will take the Column of Trajan, which with its pedestal is composed of 30 blocks of marble. The pedestal has 2 blocks 18 feet long, 9 feet wide, and 5 feet 7 inches high. The *toro* or cornice of the pedestal is in one block 20 feet square, 6 feet 7 inches high. The *fuso*, or shaft, has 19 blocks of marble 5 feet high each, and the capital is 14 feet square, five feet high in one piece, all the joints true to a hair. Now how could this fine block be got up into its place? Vitruvius, in his tenth Book, treats on raising large blocks. I recommend my young friends to study him carefully, and to calculate the weight of these several masses from their dimensions.

A careful inquiry into the restorations of these buildings, will be found in the second volume of my Autobiography, lately published, and now in your library.

As regards the walls of Servius Tullius, and those of Aurelian, I have to explain that the former are composed of large blocks of tufo, generally 1 braccia, or 1 foot 11 inches square, and 2 braccie, or 3 feet 10 inches long. In those of Aurelian, the outer half of the wall, about 12 feet, is solid, while the inner part has cross walls about every 15 feet carrying arches and having passages communicating through the whole extent. Over them was a terrace with parapet wall, and at unequal distances, towers with staircases, in which the warders were placed to give notice of the approach of any enemy, when the whole army could be brought together on any spot.

It only remains for me to point out Michael Angelo's design for St. Peter's, copied from a fresco painting in the wall of one of the libraries of the Vatican; a view of the west end of St. Peter's; and a copy which I was permitted to make of the original design by Arnolfo di Lapo for the east

end of Siena Cathedral. The latter will serve to show how the architects of that day did their drawings.

And now, my dear friends, I feel I have most inadequately performed my intention. When I proposed to your President to prepare a Paper on this subject, with illustrations, I felt quite equal to it, though very doubtful of being able to do so next Session.

It has since pleased God to visit me with serious illness, which utterly prevents my travelling to London and delivering my Paper personally.* My friend Mr. Eastlake or Mr. Seddon will kindly read it.

I have to acknowledge, with my best thanks, the honour you have done me in electing me as an Honorary Member; and am, yours truly, G. L. TAYLOR.

The PRESIDENT,—We have been deprived of the pleasure which we should have felt in hearing Mr. Taylor describe in person the scenes which have been brought before us; but there are many gentlemen present who know Rome so well, and who take so much interest in this subject, that I feel sure we shall not lack discussion upon it. Canon Burgess, whom we also expected, has expressed his regret at not being able to attend, and I should have been glad to have seen here some of those gentlemen who have been concerned in the recent excavations at Rome, but I believe I may state that next Session we shall be favoured with a paper on that subject.

Mr. E. I'ANSON, Fellow,—I feel ashamed that I do not feel more competent to offer useful remarks upon this paper. I desire however to say that it is highly gratifying to find a gentleman of the age of Mr. Taylor, still actively giving his mind to a subject which is so interesting to us all. I recollect very well the time when Mr. Taylor's work was published. My father's name will be found amongst the list of subscribers, and as this is rather a personal occasion, I may state that I used to sit at the same board, as a commissioner, with Mr. Taylor himself. I have had what I shall always consider the great privilege and advantage of visiting Rome, but as I have never been either an archæologist or an antiquary, I am unable to do justice to this paper. I know of no city—and I have been in all the great cities of architectural renown in Europe—which impresses the mind—not even Athens—so much with the grandeur of architecture as Rome does; and within the short limits represented by the diagram before us, crowded as that diagram shows it to have been with magnificent buildings, which now only remain in fragments, we are forcibly reminded that there must have been a time when the buildings of Rome were infinitely more impressive than they possibly can be in their scanty ruins. Still, even in their ruins, there is no place in the world, of which I am aware, which so impresses the mind with the dignity and grandeur of the works of man as Rome does. It is perfectly well known that the architecture of Rome is not so refined, so delicate, or the result of so much careful study as the great works of Greece, from which they are all derived; nor are they in constructive skill so wonderful as the works of mediæval times. In my young days nothing was thought of but the grandeur and beauty of classic architecture. We now take a wider range, and I think with great success; but still we like to examine these ancient monuments, and be so agreeably reminded of them; and we must gladly avail ourselves of the opportunity of thanking Mr. Taylor for his present communication and for making the architecture of Rome known to us in the two remarkable volumes of his work, in which he has shown himself to be an able expositor of Roman art and an admirer of classic art. I beg to propose a cordial vote of thanks to Mr. Taylor for his very interesting communication, and for the exhibition of his drawings with which he has favoured us.

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* It was at first hoped that Mr. Taylor's illness would be of no dangerous nature, and, indeed, he rallied sufficiently to write several letters on the subject of his Paper; but the attack was unfortunately too severe for his great age, and he died on the 1st of May.

Mr. HEBB, Fellow,—As I have partaken of Mr. Taylor's hospitality in Rome and accompanied him in some of the explorations of which we see the result in the drawings before us, I will venture on a few remarks. I remember more particularly Mr. Taylor's investigation of the basement of the Capitol, in which he took great interest, and some fourteen years ago I and my fellow students used to hold the candle for him, explore dark passages or make our way through apertures which he could not pass. It is a matter for congratulation that Mr. Taylor, although unfortunately he is himself unable to be present, has succeeded in carrying out his intention of delivering a paper here. The passion for classic art has to a great extent passed away, and another style has become popular, but there can be no doubt that however useful the study of mediæval architecture may be, we cannot dispense with the study also of classical remains. We see before us the evidences of the existence of a style which flourished in Rome, as it had before in Greece, and which was as perfect in itself as any style can be, and we cannot shut our eyes to that fact. Now-a-days classic art is considered obsolete, but there can be no question that it contains elements of refinement, composition and grandeur worthy of imitation, and if only the details were studied, we should not see a repetition of the extraordinary mouldings which are now employed under the name of eclecticism in art.

Mr. SEDDON, Fellow, in responding to the invitation of the Chairman, said he regretted that he had never been to Rome, and, consequently, was unable to offer any remarks upon the subject of the interesting paper they had just heard read. He felt sure that all present would deplore, as he did, the absence of its venerable author, more particularly as ill health was the cause. He had himself come to listen, as he had often before had valued opportunities of doing, to Mr. Taylor's lucid and enthusiastic descriptions of the topography and antiquities of Rome, when enjoying the hospitality of that gentleman, always offered to members of the profession who might happen to visit him in his charming retreat at Broadstairs. Upon such occasions he (Mr. Seddon) had often been struck by the power and beauty of Mr. Taylor's drawings, many of which were among those exhibited in illustration of this paper. In these days much was said and urged as to the desirability of architects being artistic, as if that were a new idea; but here was one of the veterans of the profession, whose works showed that he could claim to have attained that goal at which younger men were aiming; and when it was considered that several of the largest drawings placed before them had been only recently executed by Mr. Taylor with his own hands, he thought the meeting would gladly tender their thanks for, as they could not refuse their tribute of admiration to, the energy and taste which had been exercised in their behalf by a gentleman whose years already so far exceeded the limits usually allotted to men. That many more might still be in store for him, without abatement of the ability to take interest in these and similar pursuits, would be the earnest desire of all who had listened to the interesting paper they had heard, as it was his own.

Mr. C. F. HAYWARD, Fellow,—As no one has risen to second formally the vote of thanks to Mr. Taylor for his interesting Paper, I beg to do so; having perhaps a certain amount of right, seeing I am old enough to speak of having been in Rome nearly twenty years ago. What strikes one on a visit to Rome is, not so much the architectural detail of base, entablature and pediment, and the details which one has so generally studied, but rather the immense masses of buildings which now have no special architectural detail to adorn them,—no remains, even, of architrave, frieze or cornice, such as are seen in the great mass of the Basilica of Constantine, the Baths of Caracalla, and others, where the immense extent of vaulting, the fine constructive arches, and the vast area of ground covered, are things to be seen in order to be well understood. Speaking of Rome, we must not forget that some of the finest and most beautiful works which we admire are later than the period referred to in the paper. When I was in Rome, under the influence of strong Mediæval predilections, I searched every hole and

corner for relics of Mediæval Art; and the prevailing taste of twenty years ago was to pick out every bit of Gothic architecture we could find, and very much to ignore classic detail. I beg to express my deep regret that we have not the pleasure of Mr. Taylor's presence amongst us this evening.

Mr. C. L. EASTLAKE, Secretary,—Although my experience of Rome does not date from a period quite so remote as that mentioned by Mr. Hayward, it is now many years since I visited it, and it was there I first had the pleasure of meeting Mr. Taylor. I remember being much impressed by the extraordinary zeal and industry with which he followed his architectural studies, and by the large scale on which they were carried out. I once found him, I believe, mounted on a ladder in the apartment which he used as his studio, engaged in completing a huge drawing that nearly covered one side of the room and illustrated some portion of the Colosseum or other monument of classic architecture. It was in such work that he was constantly engaged, while I with other students of my own age found, I confess, more attractions in such buildings as the Cloisters of St. John Lateran or the Church of the Ara Cœli than in the Forum which he was always planning and illustrating, with an energy surprising in a man of his advanced years. It happened however, that during my stay in Rome, some fresh excavations were being made a few miles outside the Porta San Giovanni. A portion of the Via Latina had then just been unearthed, and together with it the remains of an ancient *paga*, including houses and tombs, the latter decorated with mural paintings and low relief plaster work of a Pompeian character. I was much interested in these discoveries; and, having obtained permission of Sigr. Fortunati, under whose directions they were carried on, I sent to England I believe the first illustrations of them which were published.* Since then of course much more has been disinterred; and, indeed, Rome and its neighbourhood form an inexhaustible store of archæological interest, as we may learn from the researches of our Hon. Member Mr. J. H. Parker. I take this opportunity of reminding the members that, among other facts significant of the changes which have recently taken place in Rome, we have to hail the appearance of a *Roman Times*, an English newspaper, printed and circulated in the Eternal City. In some numbers of this journal, which Mr. Parker has been good enough to send to the Institute library, will be found recorded the result of his late investigations, which can scarcely fail to be interesting to architects and antiquaries. I have great pleasure in adding my thanks to Mr. Taylor for his paper; but I think we must all sincerely regret the cause of his absence to night, which has deprived it of its chief interest.

Mr. THOMAS MORRIS, Associate,—As this is a kind of ovation to one of the veterans of our profession, I shall be happy to say a word or two. Mr. Taylor was among the original members of the Council of this Institute, and his name will be found in the first volume of its Transactions. He was the colleague not only of our general friend Professor Donaldson, but of Mr. Charles Fowler, who showed me most kind attention when preparing one or two of the early papers I had the honour of submitting to the Institute. The drawings displayed to-night remind me of a period when the ample illustrations with which the lectures were accompanied, would form a striking contrast to those we sometimes see; and one could wish that gentlemen who prepare papers for this Institute would follow Mr. Taylor's good example, and give illustrations on this scale. To show the versatile nature of his mind, it may be remarked that, Mr. Taylor not only engaged in the poetry of the profession, as instanced in his magnificent folios, but was also a good practical architect. He was employed on, and carried out with great skill, some underpinning of the warehouses at Chatham Dockyard. One of the large storehouses there had been built in the manner which prevailed a hundred years ago, with one set of baulks of timber laid longitudinally, and another series laid transversely. In course of time these baulks

* Engravings and a description of these tombs were inserted in the 'Builder' of September 4, 1858.

began to perish and the walls to sink. Mr. Taylor introduced concrete prepared by the patent process of Mr. Ranger, and devised a very effective method of compressing it beneath the brickwork. He thus raised and sustained the walls in a very economical and successful way. Then we may go from works of that practical character to such as 'The Stones of Etruria,' showing how intent he was upon the antiquities and earliest memorials of architectural art in Italy. In that and his other publications there is a great store of interest for the student and all who are concerned in the art. It seems scarcely possible, indeed, to over-estimate the amount of utility such a man as Mr. Taylor accomplished in the course of a long life. We must, I am sure, regret that we have not the pleasure of seeing him, and of testifying to him personally the gratification it has afforded us all to see conferred upon him one of the highest honours which it is in the power of the Institute to bestow.

Professor KERR, Fellow,—If I have not joined in the discussion earlier, it is because I am one of those who have not had the advantage of visiting Rome. At the same time one may know something about Rome without having been there, and it is to be expected of every one who has studied architecture to acknowledge being profoundly impressed by the grandeur of the Roman remains, even as seen on paper to-night. It does strike me as a remarkable thing that at this time of day it should be possible for a short paper on the ruins of Rome, and a number of such drawings as we now see on the walls, to be laid before this Institute of Architects with all the charm of novelty! What the infatuation can be that possesses us whereby such a circumstance comes to be possible I will not say; but at all events I will remark that in my own young days Roman architecture was studied with minuteness. My first recollection of it, however, is that the study of it turned upon its becoming then somewhat an unpopular style. The researches into the Greek remains had at that time been carried so far as to throw the Roman into the shade; and we were taught to understand that although the architecture of the Romans deserved our recognition on account of its magnificence both of intention and execution, yet as matter of art it was to a great extent unworthy of our imitation on account of its æsthetic impurity of detail. I think now that we have lived longer and seen more of various fashions of architectural taste, and have varied and extended our curriculum of study, we may conclude this was practically very much of a mistake; because in studying Roman architecture and in studying Greek architecture we never perceived we were studying the self-same thing. We see that Roman architecture was merely Greek architecture pursued upon another field, under that law of intellectual development which prevents the possibility of the human race ever being intellectually at rest; and therefore it is scarcely fair to throw upon the Romans, as Romans, the discredit of inferiority to their predecessors the Greeks, and to assign to the Greeks, as Greeks, a superiority in direct competition with their followers, the Romans, who merely did, as the Greeks had done, their very best, according to the circumstances in which they found themselves placed, to carry on the great classic principle of design.

Passing now from the question of taste, it seems one of the most remarkable considerations involved in the contemplation of ancient Rome to account for the raising of the funds, to speak plainly, for the execution of all these numerous and splendid works. Where did the money come from? We read that some of the Emperors impoverished the public treasury by building these great structures. We read also that certain ambitious men impoverished themselves by building grand structures for the public service, in the hope of obtaining thereby, as they generally did, public recognition and power. We also hear of the application of the spoils of conquest in the same way. But this is not exactly the question. By what sort of financial calculation did the public opinion of the Roman people arrive at that state of acquiescence on the part of common sense which admitted of the laying out of such large sums of money upon these public buildings? That is what to Englishmen of the 19th century seems so amazing. The only thing in Europe which can be compared to this case is the enormous expendi-

ture effected upon the cathedrals of Mediæval Christianity; but there the conditions of the calculation were entirely different. Those enormous works were built without calculating the cost; they were done piecemeal by the contributions of the faithful as they happened to come in; and, moreover, the clergy of that day had certain particularly ingenious ways of providing funds by applying the screw to the consciences of the people, and more particularly upon the death-bed, in a manner which we should consider in the present day to be scarcely fair. But we read of nothing, as far as I understand, in connection with the history of Rome which leads us to suspect that there was anything otherwise than a straightforward expenditure of what was actually public money, for what was considered to be palpably the public interest in those great buildings—great not only in magnitude generally, bnt in costliness of detail. Why do we exhibit in our own modern Roman empire, England, such excessive stinginess in respect of outlay upon public buildings? We hear a great deal about the pockets of the rate-payers, and about every penny being squeezed out of the necessities of the poor, and so on; but I generally find such arguments to be neither ingenuous nor disinterested; and I think, if the political economist went into the question seriously he would come ultimately to advise us that if we adopted the same theories of liberality that the Romans appear to have acted upon, it would be a profitable investment of the public money. I contend that the expenditure of a large sum of money—judiciously, of course—in the erection of a public building is a profitable investment in the public interest, because what are our investments universally but merely the expenditure of the surplus money of the community, whether collectively or individually, upon that which shall produce profit or advantage, but not necessarily such profit in only one form; otherwise we should never improve our very dwellings; never furnish them better than we have done before; tradesmen would never put in their new shop fronts and build their new warehouses; and our Metropolitan Board would never lay out new lines of streets. There must therefore be something more than the one utilitarian form of dividends in the law which ought to govern the investment of public money in architecture; and what I noticed is that the Romans, in laying out the public money as they did on these expensive building investments, must be considered to have acted judiciously; and this, I submit, is a principle which we should be prepared to enlarge upon before the public. We are not disposed to grudge our expenditure upon experimental guns and ships and forts; the Army and Navy are liberally supported; we are not disposed as a nation to hold the purse-strings too tight if we see an advantage—sometimes a problematical one—to be derived from the proposed expenditure, and therefore I say if we architects, as the custodians of an enlightened cause, would only dare to lay it down as an economical principle in the abstract that it is quite as desirable to spend the public money liberally on artistic buildings as upon various other things, it is possible we might obtain from the public at large, sooner or later, a recognition of the common sense of the matter. I think, in all I have ever heard or read with reference to the expenditure of public money in buildings, I have never heard that principle fairly enunciated; but I have heard the sordid and vulgar opposite principle argued *ad nauseam*. We have been told, and are in fact told every day, that the only way of dealing with public buildings is to spend the smallest sum possible, and always to consider the investment in the light of a dead loss, to be forgotten, like a lawyer's bill, as soon as we can forget it. This is, I think, a great mistake, and we can only hope that the people of this great and rich country will before long be brought to understand, as they do in France, that the judicious erection of magnificent buildings is a judicious employment of the public money.

Mr. C. F. HAYWARD.—I would ask one question, viz.: What is Mr. Taylor's theory with regard to the roadway passing under the Arch of Titus, and also with regard to the road going under the Arch of Septimus Severus, and leading up to the Capitol? You observe, it wends round to the right as you go along, and then turns to the left to go to the Capitol. The difficulty is, how that road would get

to the Arch of Septimus Severus, and then lead to another part. That road is now open all the way, without going to the arch. In what way was that road connected with the Arch?

The Rev. A. TAYLOR, Visitor.—It probably led up to the Capitol.

Mr. H. NEWTON, Fellow.—We have it recorded that the Via Sacra went through the middle of the Forum; but I am not aware of any road there. I believe the Forum was larger originally, but has been gradually encroached upon by buildings at various periods. It was a vast open space. As Rome got more populated, it was in the public gardens the people were accustomed in those days to assemble for the purpose of hearing individual orators; and it was the aim of everybody in a high state of life to get large audiences. At one period, I believe, the whole space between those two arches, right up to the Capitol and the Colosseum, was one vast Forum.

The PRESIDENT.—I am in hopes that in the course of next year a great deal of what is conjectural with regard to Ancient Rome will be cleared up. I never had a doubt that the paper promised by Mr. Taylor would be a very interesting one; but I confess I had not anticipated the extremely interesting suggestions on political economy which have emanated from my friend Professor Kerr. I think they have come at an opportune moment, for if the Professor had heard the speech of the Chancellor of the Exchequer at the recent dinner of the Institution of Civil Engineers, I think he would have found in it but little encouragement of his idea of the application of the public money in the direction pointed out. I would repeat the expression of the great regret we feel at Mr. Taylor's absence, more particularly on account of the deep interest which we all feel on this subject, and the only consolation I have is, that our feelings towards Mr. Taylor have been perhaps more warmly expressed in his absence than they could well have been in his presence; and this, I repeat, is the only mitigation of my regret that he is not here to-night. On your behalf, Gentlemen, I now beg to tender to our esteemed friend Mr. Taylor our cordial thanks for the pains he has taken to prepare the Paper and to send us these drawings, which have afforded us so much gratification.

The Rev. A. TAYLOR.—I am sure if anything can afford my father support under his illness, it will be to hear of the warm reception that has been given to his Paper; and I beg to tender you, on his behalf, my cordial thanks. It is a comfort to him, I have no doubt, to look back upon the achievements of his youth, and the energy of mind and body which he has so well employed. The later specimens of his drawings show what a man can do who has kept alive the natural abilities he possesses, and it may be an incentive to the younger members here to look forward to an equally long and equally successful career. I am sorry that—from not having given sufficient attention to my father's works—I have not been able to answer some of the questions put to me. I hope on a future occasion he may yet come amongst you once more to speak for himself, with more completeness than I can do, and to thank you for the very cordial reception which has been given to his Paper to-night.

The vote of thanks to Mr. Taylor having been carried by acclamation, the Meeting adjourned.

Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, the 21st of April, 1873, the following Paper was read, Professor KERR, Fellow, in the Chair:—

ON THE CHURCHES OF BRITTANY (NORTH COAST).

By H. W. BREWER, Esq.

GENTLEMEN,—

When I first received the flattering invitation of your Secretary to read a paper before you upon the "Architecture of Brittany," I feared that I possessed scarcely sufficient information upon the subject to warrant my undertaking that very agreeable task, as my entire knowledge of Brittany was confined to a few sketches and notes made last year during a month's tour in the Ille et Villain Cotes-du-Nord and Finisterre. However, fortunately my friend Mr. Goldie (who is a member of your learned Society) kindly placed at my service his sketches and notes upon the same subject, and with their assistance I have prepared this paper, which I hope may be of some interest to the members of this Institute, though owing to my want of *practical* knowledge of architecture, and my rather limited acquaintance with the subject I have to treat, I must request you to deal very leniently with me, and to overlook any mistakes into which I may fall.

It is not my intention to occupy your time by a general description of the architecture of Brittany, but rather to give you some account of the most interesting churches and buildings in a single district, and that is the part of Finisterre round and about the ancient episcopal city of St. Pol de Leon. I shall confine my remarks to this comparatively small district for two reasons. In the first place I think it will be far more interesting for you to give your attention to the peculiarities of a few buildings of a certain class than to have to listen to a kind of *guide-book* survey of a large province crowded with antiquities; and in the second place, the buildings in the district, which I am about to describe, possess the peculiarities of Breton Architecture more strongly marked than those in any other part of the province.

As Morlaix is the best starting point from which to commence an exploration of this most interesting neighbourhood, I shall begin with a description of that quaint old town. It would be nearly impossible for any town (except perhaps a modern English one) to look ugly in such a beautiful position as that occupied by Morlaix, and in the middle ages its appearance must have been wonderfully interesting. Situated upon a small navigable river, at a distance of six miles from the sea, the town is confined within three deep valleys, and the great market place occurs at their junction. Lofty and nearly precipitous rocks rise up immediately to the rear of the singularly quaint and picturesque gabled houses, and in some places winding lanes ascend the heights in a zig zag manner. Unfortunately the ecclesiastical buildings at Morlaix suffered terribly at the hands of the French revolutionists. The magnificent collegiate church of St. Maria du Mur was entirely destroyed—the noble church of the Dominicans desecrated and turned into a military storehouse. The nave of the church of Mathieu (the principal parish church of the town) was either destroyed or so injured as to render its rebuilding necessary; and this was done in the meanest possible way, and all the conventual chapels,

except one, were either destroyed or desecrated. Of the two remaining parish churches one is a hideous building, erected by one of Talleyrand's bishops, and the other, dedicated to St. Melaine, is a small but rather interesting third pointed building, consisting of a nave and aisles, a tower at the west end of the north aisle and a south porch. The nave is separated from the aisles by arcades of very obtusely pointed arches, the mouldings of which consist of a series of flat hollows, and die into cylindrical columns, which possess neither capitals nor bases. There is no clerestory, and immediately above the arches is a heavy cornice of wood, adorned with some very rude carving, supporting a Gothic barrel vault of the same material, and of very ugly form. The windows have fair Flamboyant tracery, and contain some remains of painted glass of the same date. There is a beautiful Flamboyant porch on the south side, with an inscription above the doorway, asking you to pray for the donor, but unfortunately both his name and the date, which probably followed it, have been erased. The west front of this church, which is situated at the top of a broad and lofty flight of steps, is a pleasing composition, and inscribed upon it is the date of its erection (and probably that of the greater portion of the church) "Anno Domini 1489." The tower, which is fairly lofty, is of mixed third pointed and French Renaissance work, and was commenced, as we are informed by an inscription upon it, in the year 1574. The only other objects worthy of notice in this church are a very elaborately and delicately carved canopy over the font, in the Renaissance style. Upon it is a small tablet inscribed with the date 1660. It is a very pure and beautiful piece of work, quite free from the vulgarities and absurdities which so often disfigure sculpture of that period. The other is the western organ gallery, which is composed of the remains of the ancient rood loft, and ornamented with some well carved tracery panels. As I have before mentioned, this is not a large church, but it looks much smaller than it really is, from the fact of its standing close to the new railway viaduct, which is a gigantic work, consisting of a double series of arches, super imposed, and is nearly 200 feet high; it is one of the few modern engineering works of large size, which are not repulsively hideous. Crossing the deep valley, with its lofty and graceful arches, perfectly simple, and without the slightest attempt at ornament, it has a noble and striking effect, and shows what grand things our engineers can do in the nineteenth century if they will only confine themselves to their own profession, and not attempt to practice that of the architect.

The destruction of the churches at Morlaix, during the Revolution, is a matter of the greatest possible regret, as the great collegiate church of St. Maria du Mur would, without doubt, have thrown great light upon the history of Gothic architecture in Brittany. This church was erected between the years 1295 and 1408, and is said to have possessed a tower of the same type as that of the church of Kreisker at St. Pol de Leon, which I shall presently describe, only the tower, or rather spire, of St. Maria du Mur rose to the height of 313 feet, which is 53 feet more than the Kreisker spire. Not a single stone of this great church now remains, nor do I know of the existence of any drawing or view of it. The now desecrated Dominican church is a most interesting building, consisting of a long nave and one aisle under a single external roof, and a transept on one side, which originally formed the Lady Chapel. The architecture is very pure and beautiful, but cannot be, I think, of the date ascribed to it, *i. e.* 1237, as the tracery of the windows is thoroughly developed, second pointed, and the ogee is to be found amongst the mouldings. The east and west windows (the church is square ended) have both of them had large roses, of very elaborate design in their heads, but both are now blocked up and so mutilated, that it is impossible to trace them out exactly. Internally the nave is separated from the aisle by a row of equilateral arches, supported upon tall and rather slender columns. The roof of the nave is a barrel vault of wood, but with a very pretty piece of "lien vaulting" introduced where the transept cuts into it, the whole shows extensive remains of colour and gilding. That this beautiful building should be left in its present condition is a disgrace to the French Government. It

is cut in half by a floor, and the tower part seems to be used as a forage magazine for cavalry. The upper portion is let out as a concert room; most of the windows are blocked up, and the whole is falling rapidly to decay. Opposite this church is a singularly picturesque gateway, which may have formed a part of the conventual buildings; it dates from the sixteenth century. The walls are partially covered with slate, arranged in patterns; the centre slate in each composition is pierced with a delicate geometrical ornament. This treatment is not uncommon in Brittany, but this is the most elaborate example I know.

Of the Church of St. Mathieu the tower alone is old, and dates probably from the end of the sixteenth century, it is an odd jumble of Gothic and Renaissance architecture; the great peculiarity about it is that the various stages seem to have no connexion with one another, although they are evidently of the same date, and the only cause I can suggest for this singularity is by supposing that, while the work was in progress, the architect must have been changed every month, and each new architect must have started upon an entirely fresh plan, thoroughly disregarding the work of his predecessor. The church to which this tower is attached is the ugliest I have ever seen in France.

The domestic architecture of Morlaix has fortunately suffered far less than the ecclesiastical, and some of the streets in the older portion of the town retain all their ancient gabled houses. The most perfect are the Rue des Nobles and the Grand Rue. Many of the houses in these streets date from the fifteenth century, and are wonderfully fine examples of "timber framed" buildings of that date. The imposts, the bressumer, and the corbels supporting the projecting stories, and the barge boards are richly carved and adorned with little statuettes of saints and angels, animals, foliage, &c. The bagpipe is a very common device, and is frequently represented as being played by animals. The interiors of some of these houses are even more remarkable than the exterior; this is especially the case with two which I examined, the first is situated in the "Butcher's Market," and is used as a baker's shop. There is a fine large chimney-piece on the ground floor, and a well moulded ceiling; nearly all the doors are old, and there is a beautifully carved staircase; the newel is terminated with a statue of St. Michael. Unfortunately the whole is yellow washed, and the hall in which this staircase stands has been cut in half by division of lath and canvas, so that it is impossible to see the whole staircase at once, in addition to which the whole house is in a state of the greatest filth. The other house, No. 14, Rue des Nobles, however, contains a still more magnificent entrance hall and staircase, which are quite in their original condition, and have been most carefully preserved; the carving here is really superb. The newel is composed of a single piece of timber, about sixty feet high, and the whole is covered with carving, the various stages being marked by large statues of saints standing under rich canopies. The saints represented are St. Margaret, St. Catherine, St. Barbara, and St. Dominic at the top. The galleries, which are carried along one side of the hall, have their parapets adorned with linen panels, separated by small pinnacled buttresses elaborately carved, and the junctions of the galleries with the staircase are still further accentuated by the introduction of small statuettes seated under canopies. The lower portion of this fine work consists of a very large cupboard or closet, ornamented with the most elaborate tracery panels I ever remember to have seen, and containing within it a stone lavatory or sink, with a finely moulded ogee canopy over it. A portion of the hall is screened off with ancient panelling, and serves the purpose of a kitchen; the mantel-piece is old and richly moulded, the old benches and a kind of crane for hanging up meat and game exists. The timber framing is visible over the whole of this hall, and it has a roof supported by two arched principals, resting on carved corbels. This is the most elaborate piece of Gothic domestic work I have ever seen, and it probably dates from the end of the fifteenth century. I believe there are several other staircases of the same description at Morlaix, but this is said to be the finest and the best preserved.

Leaving Morlaix by the road, which passes under the great viaduct at about a mile distance from the town, is the Hospital of Notre Dame des Victoires. The chapel alone is ancient, it is Flamboyant in style, it consists of a nave and one aisle, separated by an arcade of pointed arches resting upon octagonal piers; the choir is formed by a screen wall, some fifteen feet high, which divides the church into two nearly equal portions, the eastern of which forms the choir for the nuns who serve the hospital, and an altar for the laity stands against the screen wall; there is no rood, and the face of the wall has been *ornamented* (?) with some terribly bad sham tracery. Along the side walls are a number of arched recesses and aumbries, and I am inclined to think that these must have been intended originally for altars, as there are no marks of their having been tombs: no monumental inscriptions for instance. I shall have presently to allude to the same peculiarity in other Breton churches. The great beauty, however, of this church is its glorious stained glass; the east and west windows are full of it, and nearly all the side windows contain large fragments. It is all Flamboyant in style, and is remarkably brilliant; the east and west windows have small subjects placed in rich tabernacles. On a lofty hill to the rear of this hospital is a new pilgrimage church. It is built in the second pointed style, but is cold and bald in design; the view from it, however, is charming in the extreme. Pursuing this road for a few miles one passes an extraordinary number of ancient Calvary crosses, some of which may date as far back as the fourteenth century. This part of Brittany possesses a greater number of ancient churches than any other district on the continent; they are as numerous and as near together as the churches in Northamptonshire and some parts of Norfolk. It would be absurd for me to attempt to give you even a list of the names of the places where they are to be found. I must, however, give you a description of some of the most remarkable ones, and for that purpose I shall select the following: St. Jean du Doigt, Plougasnou, Roscoff, St. Thegonec, Guimellieu, Lauderneau, and the cathedral and church of Kreisker at St. Pol de Leon. The villages in which many of these churches are situated are also exceedingly interesting.

St. Jean du Doigt is a small village situated in a beautiful dell about a mile from the sea; its church, which attracts a large pilgrimage, takes its name from a finger of St. John the Baptist, preserved over the altar. The building is one of great interest and not a little beauty. It consists of a nave and aisles under one external roof, a transept on the south side, a fine tower surmounted by a lead spire, and four pinnacles of the same material, and a very fine Flamboyant porch. Internally the effect is very fine from the great height of the nave, which is separated from the aisles by two arcades of well moulded arches, resting upon lofty piers, which are alternately octagonal quatrefoil in plan. Some of the capitals are moulded, and others carved with good simple sculpture; above the arches the wall is perfectly blank, and has rather a bald effect; the roof, however, is remarkably good, it is a Gothic barrel vault of wood, supported upon a richly carved cornice, with a carved ridge rib, and well moulded vertical ribs, the tie beams are inserted into the heads of dragons, which project just above the cornice or wall plate, the whole is decorated in brown, blue and white. The east window is of six lights, and the upper part is filled in with a large circle containing tracery forming a star. A heavy transom cuts the lights just below the springing of the arched heads of the tracery; this is a common feature in Brittany, and to my mind a very ugly one, especially when it is used as it is in some of the side windows of this church, where the tracery above it is arranged so as to accommodate itself to a four-light window, but the mullions below the transom only divide the window into three lights, a more eccentric and ugly notion could not be well conceived; when I first saw it I directly put it down as some bungling piece of restoration of the seventeenth or eighteenth century, but I found afterwards that it was far from being an uncommon treatment. There is no chancel arch, but the chancel is marked off from the nave by a rood beam, supporting an ancient rood and attendant figures,

and a modern screen about eight feet high, of very good design, the upper part of which is pierced with tracery, enclosed in triangular compartments; the stalls are also modern, but are well carved. The reredos is a work of the latter part of the seventeenth century, and though in the style of that period it gives a very rich appearance to the interior, and is not without considerable merit in its way. Attached to the second pillar from the west end on either side are large and very richly moulded responds, which were evidently intended to carry an arch, but it is equally evident that the arch was never constructed, as these responds stop abruptly at the height of the capitals, and there are no marks upon the walls to indicate that there has ever been anything above them. At the foot of one of these responds is an ancient stone altar, with three great uncharged shields on the reredos, and the piscina cut into the side of the reredos, a very common plan in Brittany. It is a question in my mind whether originally the church was not intended to have been much larger than at present, and whether this was not intended to have served as a chancel arch. It is true the choir, in that case, would have been very large, five bays in depth, and the idea is only tenable upon the supposition that the church was commenced upon a large scale, and the original plan abandoned. The details of these responds are remarkably like English perpendicular work. The lower story of the tower is vaulted, and forms a baptistery, containing a fine double font of rather peculiar design. There are many old statues attached to the columns and walls, and the practice which is so common in maritime parts of France of hanging up little models of ships as votive offerings, adds greatly to the picturesque effect of this interior. The organ occupies the second arch of the nave on the north side, and has in front of the loft a curious old triptich. The porch is well vaulted, and the inner doorway is subdivided into two ogee-headed openings, with a niche above them, which contains an ancient wooden statue, and is furnished with panelled doors after the manner of a triptich. The tower is a fine example of Flamboyant work, and is ornamented with open galleries marking its various stages; the belfry windows are long and graceful, and the upper story is crowned by a finely carved cornice, bearing up a pierced parapet; the spire, although of lead, is crocketed all the way up, which is a very unusual treatment. An inscription on the porch states that the foundation stone of this church was laid in the year 1440, and that the church was completed and consecrated in 1513. The cemetery in which this interesting church is situated is one of the most remarkable in Brittany; it is entered through a very fine Flamboyant gateway, called here the "Arch of Triumph." This gateway is flanked by pinnacled buttresses and canopied niches containing statues; on one side of it there is a semi-circular headed arch, with an ancient stone stile beneath it; a richly carved cornice runs along the top of the gateway, over which is a high stone coping, with pinnacles at the end. Within the churchyard is a fine lead fountain of Italian workmanship, dating from the commencement of the sixteenth century, and said to have been given by Queen Anne of Brittany; it is in the Renaissance style, adorned with many figures, and is a work of singular elegance and beauty, in fact I don't know that I have ever seen a more beautiful fountain; there is also a calvary, but of small and simple design, consisting only of a crucifix without attendant figures. A curious cemetery chapel, consisting of a small nave, about thirty feet long, terminating in an apse, containing a stone altar, it has openings in the place of windows which have evidently never been glazed, and a little metal turret over the apse, in which originally a light was always kept burning. Between the buttresses of the tower is a very pretty ossuary, ornamented with open tracery work in front; the bones are ranged on shelves. The village of St. Jean du Doigt is composed almost entirely of ancient houses, probably coeval with the church, and they are most interesting examples of the cottage architecture of the middle ages, and show that, while noble cathedrals and lordly castles were being erected, the humble agriculturist built himself his substantial comfortable cottage; nor are these cottages peculiar to St. Jean du Doigt; they are to be seen in all the villages in this part of

Brittany; they are built of granite, and generally have small ogee headed doorways, and square two-light windows, with the heads rounded at the angles, and sometimes pinched up into a kind of ogee form in the centre; the roofs are high pitched, and composed of solid beams of chestnut; they seem to me to be vastly superior to the houses built for agricultural labourers at the present day.

About two miles from St. Jean du Doigt is another wonderfully interesting church and village, called Plougasnou. The church consists of a nave and aisles, chancel and side chapels, and a lofty stone spire at the west end, the church is flamboyant, but the tower and spire are good examples of Breton Renaissance work. There is a small transeptal chapel opening out of the south aisle which bears so remarkable a resemblance to some portions of Rosslyn Chapel, that I am led to believe that it must be by the same architect. There are the same gothic barrel vaults of stone, the same pendents hanging down from the crown of the vault, the same curiously moulded shafts, with the same flat carving in the caps, in fact so great is the similarity, that I feel convinced they had some common origin. The church contains the remains of a wooden rood loft and stalls of the 16th century, and some good stained glass in the east window. The interior has a very English look. The churchyard contains a curious chapel with the sides open to the air, but the apse is pierced with little windows, curiously vaulted in wood, and a cross with a pulpit attached.

The Church of Lanmuir, very near to the last named, contains a very singular Romanesque crypt with rude representations of trees or monsters on the columns. The Church of St. Thegonec, a few miles to the east of this, is perhaps the finest example of Breton Renaissance work to be found, and it stands in a churchyard surrounded with most singular buildings. The triumphal arch by which the cemetery is approached is a most elaborate structure; it is flanked by huge buttresses, carried up to a great height and terminating in open turrets, covered with domes, which are again surmounted by open lanterns, crowned with smaller domes, the whole terminating in large stone orbs and crosses. Between these buttresses is a series of niches above the arched gateway, and these are capped with three singular pediments, behind the centre one of which rises a tall obelisk surmounted by a cross. This "Triumphal arch" has on either side of it a large stone stile about ten feet wide, and these are again flanked with buttresses similar to those already described. Close to the buttress on the left hand rises the remarkable gabled apse of the mortuary chapel, crowned with open pinnacles and a large domical turret in the centre. It is singular that although this chapel is a mixture of Gothic and Renaissance work, the tracery of the windows is perfectly pure third pointed work. Behind these rise up the magnificent square tower of the church, crowned with five domes and a lofty open lantern, and further on still the pierced thirteenth century spire, attached to the west gable of the church. Looking between the great buttress of the "triumphal arch" and the stiles, one sees the great Calvary in the churchyard with its three lofty crosses and crowd of attendant figures, the elaborate entrance porch and the remarkable gabled aisles of the nave. A more extraordinary picture of architectural richness and a more perfect confusion of picturesque forms it is difficult to imagine than that presented to one's view when first coming in sight of this most remarkable church and cemetery. The church itself consists of a nave and aisles, transepts and an apsidal chancel (the latter is rather an uncommon feature in this part of Brittany.) There is a large and very grand square tower of Renaissance work, with a porch beneath it, attached to the south aisle, and an old thirteenth or early fourteenth century tower and spire at the north-west angle of the nave. Internally the church contains a finely carved Renaissance pulpit and three rather striking reredoses of the same date. In the sacristy is a grand processional cross of the same style. The following are the dates which I saw upon some portions of the buildings: Tower, 1605; "Triumphal Arch," 1587; Ossuary, 1677; Calvary, 1610. In a kind of crypt under the chapel in the churchyard, is a finely carved group of the burial of our Lord, carved in wood, the figures

are life size, and the date is 1702. Both the church and the surrounding buildings are of granite. About three miles from St. Thegonec is another equally singular church, that of Guimillieu; it is not so large a building as St. Thegonec, but possesses a still more wonderful calvary and ossuary. The church itself has a pretty little early spire of a very common Breton type; it is a singular compromise between a bell gable and a spire, and is a kind of combination of the two. Within the church there is a magnificent Renaissance canopy over the font, and a superb organ of the same date. The calvary dates from the years 1581 and 1588, the ossuary bears the date 1648, the porch, which is a very fine one, 1605. The priest at Guimillieu, who is an agreeable man and takes the greatest interest in the archæology of the neighbourhood, told us that some years ago the churches in this neighbourhood were full of the most beautiful Renaissance furniture and wood carving, and that just before he was appointed to his cure at Guimillieu the stalls had been removed out of the church and sold by a kind of local commission, who are called the "guardians of the fabrick!!" and are appointed by the government *to take care* of the churches. This good Curé was only appointed just in time to save the font-cover and organ case sharing the same fate, for they had been sold to an English gentleman, and it was only by going to Paris and making a personal representation of the matter to the Minister of Public Works, that this act of barbarity was put a stop to. In a loft in the village this energetic priest discovered a quantity of beautifully carved panelling, and this he has had placed round the chancel of the church in the place where the stalls originally stood. Several other small works of restoration, or rather conservation, were being carried out under his direction. I am indebted to the Curé of Guimillieu for a very valuable piece of information respecting the numerous fine churches, calvaries, &c., erected in Brittany during the latter part of the 16th century, and the first few years of the 17th century. It is remarkable to find ecclesiastical buildings of this date, as it was anything but a church-building age. According to his information and also to local tradition, these buildings were all erected by a confraternity called the "Builders of the House of God," composed of architects, sculptors and masons, bound by vows of poverty, who went about from place to place, and erected churches and religious monuments wherever they were required, upon the condition that the inhabitants of the places where they went should supply them with food and clothing, and certainly without some aid of this kind it would have been impossible for the Bretons, who were a very poor people, to have erected such works as the church, triumphal arch and mortuary chapel at St. Thegonec; the church, calvary and ossuary at Guimillieu; the calvary to church tower of Plougastel-Dowlas; the fine spire of the churches at Laudivisieu; the porch and spire of the church at Lampaul; the church and calvary of Pleyben; and many other monuments of the same date scattered all over the country.

The only place of importance between Guimillieu and Brest, is the market town of Landernau, a picturesque old town with two churches. The smaller and more ancient one dates from the end of the 15th century; it has a good spire, bearing the date 1607, and some very fair Flamboyant stained glass in its east window. There is also an ossuary and a small calvary in the churchyard. This church was originally founded in the 12th century by the Viscount de Leon, and dedicated to St. Thomas of Canterbury, "out of hatred to Henry II. of England." The other and larger church at Landernau is dedicated to St. Houardon, and dates from the year 1589. This building stood originally in a part of the town which is deserted and has fallen into ruin; and in the year 1856 it was taken down and very carefully reconstructed on its present site. The building has suffered far less from this operation than might have been supposed.* The tower and porch are very fine examples of Breton Renaissance work,

* I cannot help regretting that this plan has not been followed with regard to those churches of Sir C. Wren's which have been recently pulled down in "The City."

and as the tower is typical of many in the neighbourhood, I shall attempt to describe it. At the west end of the church are two very deep external buttresses, and two internal ones of the same dimensions; these are carried up and form the lateral, *i.e.* north and south walls, of the tower, and a wall connecting these in the centre is carried upon the gable end of the church, of which it is a continuation. Thus the walls of the tower form the letter H in plan. The lateral walls are left quite solid, but the connecting wall is pierced with rows of arcades one above the other. At the top two immense cornices project from the surface of the connecting wall till they reach rather beyond the angles of the lateral walls, and thus form a stone platform, which is nearly square in plan; upon this is placed a square lantern of similar plan, and the arrangement of cornice and platform are again repeated, but this time they support an elegant octagonal lantern several stories high, and four turrets, all crowned with domes. The effect is very remarkable but decidedly picturesque, the great mass of shadow below the cornices contrasts well with the flat side walls, and gives a great look of lightness and elegance to the crowning lantern and pinnacles. Towers of this description in Brittany are often carried to a great height; the one at Landernau is over 200 feet high.

Not far from Landernau, in a dreary and desolate situation, stands the celebrated church of Notre Dame de Folgoat, it is a fine second pointed building of rather singular plan, and consisting of a nave and aisles under one external roof, with two western towers, a short choir and aisles, and a long and important looking south transept at the extreme east end. The church has three very magnificent porches adorned with sculpture executed in the black Kersanton stone. The north-west tower is crowned by a spire of great beauty 160 feet high. The long double belfry windows are richly shafted and moulded, and above them is a pierced open gallery. The pinnacles at the angles of the spire are octagonal in plan, and are kept well within the square of the tower, so that they do not break the outline too much. The east window consists of a very fine large rose with a pierced arcade beneath it: below this is the holy well, which gave the reason for the erection of this church. The interior is rather disappointing, as it is very dark and low, and the vaulting has either never been constructed or has fallen in. This church, however, is rich in ancient furniture, and possesses one of the finest rood screens in France, it is vaulted in three compartments, two of which contain their original stone altars with richly panelled frontals. The high altar is old and is of great size, nearly 14 feet long; it is ornamented with a series of flat niches with ogee canopies richly cusped and crocketted and divided from one another by pinnacled buttresses. The mensa, which is an immense slab of black Kersanton stone, is supported upon a very richly carved cornice. There are three other altars of very similar design, only not so large, two at the ends of the aisles, and two against the eastern walls of the transepts. I am inclined to think that these altars were never draped, as I could fine no marks of any kind of fastening for antependia or frontals, and in fact I doubt whether it would be easy to attach a frontal to them, on account of the great projection of the base mould, which runs round them. There are no remains of retables or reredoses to any of the altars in this church, and it may be doubted whether they had any. There is a fine double piscina near the high altar. On the whole I confess to having been rather disappointed with this church, for although it is undoubtedly a fine building, it does not deserve the lavish praise bestowed upon it by Murray and other guide books, and I cannot conceive how any one can be enthusiastic, as some of the guide writers appear to be about the Kersanton stone, which is exactly the colour of cast iron, and looks so like that very inartistic material that the rood screen at Folgoat has the appearance of having been just turned out of a Birmingham factory. There are slight indications of colour, and I have no doubt before the recent restoration there were further traces, for the screen has evidently been scraped.

The small port of Roscoff, not far from here, is of interest to Englishmen from the fact that it

was here Mary Stuart landed when she went over to France to marry the Dauphin, afterwards Henry II., in 1548. The chapel dedicated to St. Ninian, which she erected in commemoration of her landing is now in ruins, and is sadly neglected; it is a small building about 46 ft. by 20 ft., and what is so singular about it is the fact that although its architecture is thoroughly English, it is English work of the fourteenth century, and has nothing whatever in common with either English or Scotch work of the sixteenth century. The west doorway is ogee headed, and has mouldings singularly suggestive of Northamptonshire work of the fourteenth century, and the east window is the regular three-light curvilinear network tracery window, exactly similar to that at Tysoe, in Warwickshire, and so common through all the Midland Counties of England. The old altar is still *in situ*, but not a vestage of the roof is to be seen. The small hospital adjoining this chapel, and which is also said to have been founded by Mary Stuart, is quite in the architecture of the time, a mixture of very late Flamboyant and Renaissance work. Were it not that there seems to be documentary evidence clearly establishing the fact that this chapel was built by order of Queen Mary of Scotland, I should feel inclined to dispute the point, and believe the date of the building to be at least two centuries earlier. I cannot attempt to offer any explanation of this architectural puzzle, it has almost shaken my faith in judging the date of a building by the style of its architecture, and I shall not feel quite satisfied until the matter is cleared up. Another object here which will interest Englishmen is the old house in which Prince Charles Edward took refuge after the battle of Culloden.

The Church of Roscoff has a tower of very similar type to that of Landernau, with the date 1550 upon it. Inside the church are seven bas reliefs carved in white alabaster, representing the chief events of our Lord's passion. They are beautiful works, and judging from the costume of the figures and the general style of the carving, I should put them down as works of the fourteenth century. They are all placed together and protected by a large glazed frame. I could find out nothing of their history. They probably formed portions of the reredos of some altar, as very similar bas reliefs exist in that position in the great church of Mont St. Michael.

I cannot better conclude this paper than by an account of the ancient Episcopal City of St. Pol de Leon. This town is of great antiquity. It appears that there was a Roman settlement here as early as the second century, called *Castellum Leonensi*, but it was either abandoned or depopulated at the commencement of the sixth century, for when the St. Pol visited it first in the year 530, he found only the remains of the earth ramparts, and the only inhabitants he could discover were a sow with a litter of young pigs, a swarm of bees in a hollow tree, a bear and a wild bull. St. Pol, who was an Englishman, from Cornwall, founded a monastery here, and died on the Isle of Batz, opposite to Roscoff, in the year 570, after having been previously consecrated bishop. The City of St. Pol de Leon was frequently in the hands of the English during the middle ages, and this may account for some architectural peculiarities which I shall have presently to point out. The Cathedral of St. Pol de Leon is a fine church, consisting of a nave and aisles, western towers, transepts, a long choir and aisles, terminating in a chevet with radiating chapels. The western arch of the crossing carries a large *sanctus* bell cot of stone, and is flanked by two lofty octagonal turrets. The western towers are surmounted with stone spires of dissimilar design, pierced with many cusped openings, the belfry windows are long and shafted, the western end, not a very striking composition, has a gallery for giving the episcopal benediction from. And one of the doorways under the towers is called the "leaper's door." The clerestory of the nave is supported by flying buttresses, and a large chapel dedicated to St. Michael projects from the south side aisle, the south transept end contains one of the most magnificent rose windows I have ever seen; it is of fully developed decorated work, and is said to be composed entirely of granite; the apse is not very striking externally. The effect upon entering this

cathedral quite astonishes one. The nave is like the best English late 13th century work, and very much reminded me of Wells. The length of the church is given in a History of Brittany which I have seen, as 260 feet, and the height to the vaulting only 52 feet, but to judge from the effect produced by the interior, I should have thought that the height was at least 13 feet more, and the length greater by nearly a hundred feet. It is one of the most pleasing interiors I have ever seen, and all the parts seem to harmonize most admirably. The proportions are singularly satisfactory, and although the height is not great, it is sufficient for the general effect. The transepts are rather later than the nave, and the choir again later still; in fact the choir is said not to have been completed before the year 1431; it is a very fine example of late second pointed work, with richly moulded arches; in fact, I think that one of the features which gives this interior such a thoroughly satisfactory effect, is the great richness of the mouldings in every part of it. The arches of the apse are not stilted as is the usual plan in France, but are very acutely pointed. The aisles and chapels are all simply but effectively vaulted. This church is rich in ancient furniture. The choir stalls, which are said to date from the year 1430, are remarkably fine, and rather like very excellent German work than either French or English work. They are in a remarkable state of preservation. There are ancient stone screens surrounding the whole choir, and cutting it off from the aisles, and short and very pretty little altars project at right angles from them; some of these altars are plain, and others are ornamented with areading. The piscinas attached to those on the south side of the church are cut in the side of the altars. Several other ancient altars exist in the transepts; they are remarkably small in size, only about three feet long, and are supported upon brackets. All along under the aisle windows of the nave are ogee headed recesses, intended either for tombs or altars, but as they possess neither inscriptions nor sculpture, and are now quite empty, it is most difficult to conceive what they were intended for; I should have thought that they were tombs, were it not that many of them have aumbries attached to them. This church possesses few of the peculiarities of Breton architecture, and I should be inclined to think that its architects were Normans; its architecture bears some resemblance to that of the cathedral at Constance; another peculiarity is the fact that granite is not much used, and the Kersanton stone not at all; the whole of the interior is of a fine white stone, probably Caen stone, whereas at Dol, which is of pretty much the same date, nothing but granite is used. The apse and chevet, again, are uncommon features in Brittany, and although it is true the choir is later than the nave, there is such a harmony about the whole church, that I think the same general design was carried through from the first, and only the detail varied to suit the taste of the age. A modern monument in the Gothic style covers the remains of William de la Marche, the last bishop of St. Pol de Leon; he died in England shortly after the great Revolution, and was buried in old St. Pancras cemetery; his body was, however, removed to his cathedral church some ten years ago. The diocese of St. Pol de Leon is now united to that of St. Brieuc, where the present bishop resides.

St. Pol de Leon contains another very remarkable church, the collegiate church of Notre Dame de Kreisker. This building consists of a nave and one aisle transepts, a rather shallow choir, and one side chapel. Over the crossing is a lofty tower and spire, 260 feet high, and a large north porch. This church dates from the years 1345 and 1399; and it is said that Mary, the wife of John IV, Duke of Brittany, sent over for an English architect *to construct the spire!* Now, the peculiarity of the matter is that the spire is exactly the part of the church which is entirely unlike English work, whereas the columns and arches which divide the nave from its aisle, and other portions of the interior, bear a strong resemblance to English work. The columns are octagonal, and have octagonal moulded capitals, not of the best English type, but very like what one sees in churches in the north of Kent; the east window, again, bears a strong resemblance to that of Lincoln Cathe-

dral, except that it has only six lights instead of eight, and has an ugly transom cutting it through, about two feet below the springing of the tracery. The tower and spire, about which all the guide books rave, is simply an exaggerated imitation of St. Pierre at Caen, and is, I fancy, the work of a native architect who had seen that fine spire, and thought he could improve upon it, so he lengthened the belfry windows, increased the projection of the cornice over them, and enlarged the proportions of the pinnacles to such an extent that there is not room for them to stand upon the tower, but they overlap it in a most awkward way, and are tied into the spire by huge stone braces, having a most disagreeable appearance. The consequence is that this spire is simply an architectural exaggeration, and although rather striking at first sight, like all such works, after a little study it ceases either to charm the eye or to satisfy the mind. It is far from improbable that if the spire at St. Maria du Mur at Morlaix still existed it would throw some light upon the history of this one, as the spire of that church was erected more than fifty years earlier than the Kreisker one, and it is possible that St. Maria du Mur may have been a copy of St. Pierre at Caen, and this a copy of St. Maria du Mur. There are two other churches in St. Pol de Leon, but I will not occupy your time by describing them, or the many interesting little village churches which abound in this district. Of course the churches which it has been my pleasant task to describe to you cannot be compared to the magnificent edifices of the same class in other parts of France, but they are the modest and earnest works of a pious, industrious and thoughtful people, who, though labouring under great disadvantages, and against nearly insurmountable difficulties, always poor, always a prey to the foreign invader, in a bare, barren and bleak country, and with only coarse materials at hand, managed to stamp a certain character of originality and genuineness upon their work, which must commend them to our respect and admiration.

The CHAIRMAN,—In inviting you to discuss the very interesting paper we have just heard read, I may remind you that this is not the first time that we have heard Mr. Brewer in this room. He is modest enough to say that he is not a practical architect, but we can all say of him that if he be not so, he is certainly a very practical describer of architecture. There are few men who make their appearance here as readers of papers who succeed in fascinating people as Mr. Brewer has done to-night by his description of the works of which the sketches are exhibited on the walls.

Mr. G. H. WEST, Associate,—I should like to ask one question, Sir, with reference to the spire of Notre Dame de Kreisker, which I am sorry to say I have never seen. Baron de Triqueti, the sculptor, a man not likely to speak without some authority, told me that it was built by two French merchants or shipowners, who traded to the east, who had been to India, and who, on returning, had a vivid remembrance of the buildings they had seen, and to some extent tried to copy them. Perhaps Mr. Brewer can tell me whether the style of the architecture gives any support to this very strange story. With regard to the lepers' door at the Cathedral of S. Pol de Leon, I should think it was probably so called because the lepers stood there during the mass, just as at Sopley, in Hants, there is a little squint called the lepers' window, which commanded a view of the high altar. St. Pol de Leon is, I believe, almost the only place where a Breton "Pardon" can still be seen in all its glory. I think it takes place early in August. I have great pleasure in proposing a vote of thanks to Mr. Brewer for his paper.

MR. T. W. BAILEY, Visitor, responding to the Chairman's invitation,—I regret that not having visited the churches described by Mr. Brewer, I am not prepared to offer any remarks on the subject of his paper, though we must all feel interested in it, and in the drawings by which it is illustrated, for Mr. Brewer's sketches certainly are, considered as architectural sketches, second to none. No artist

I know in the present day can produce more beautiful sketches, and I must take this opportunity of thanking him for them as well as for his admirable paper.

Mr. PHENÉ SPIERS, Associate,—I am scarcely in a position to add much to what has already been said, for Brittany is a portion of France which I have yet to visit. There is only one point that strikes me, and that is, on the comparison made by Mr. Brewer between the works of England and France, although perhaps I am not entitled to be considered an authority on the subject; still having during this last year to visit one or two of our English counties, I was extremely disappointed at finding so small a number of ancient houses in the chief towns. I made a tour through Yorkshire this last year, and of course, as far as the abbeys are concerned, one could wish to have no finer ruins than they are; but the architecture of the towns is miserably poor, and nearly all the ancient houses seem to be destroyed, those that remain being so covered over with plaster and paint that we can barely distinguish them. As far as I know, there is not an old town in France where you cannot find old houses of a picturesque character. I have been sure, wherever I have been staying by chance when travelling in France, to find plenty of specimens of domestic work worth sketching; but in England, in such towns as Leeds, Ripon and York, for instance, I have found no domestic subjects at all. I am aware that there are towns here, such as Chester (which I have not visited) which still possess many of their ancient characteristics; but even there, I imagine, that the "civilization" of the present day has caused so many buildings to be pulled down that the artist will find very few attractions left. Such bits of domestic work as Mr. Brewer has described are found all over France, and I think that is one of the reasons why there is an inclination on the part of our students, when they get the opportunity, to go abroad and study the works there.

Mr. THOMAS MORRIS, Associate,—In the hope of provoking discussion among gentlemen who may have travelled both in Brittany and Wales that I wish to make a remark. It appears to me that Mr. Brewer has given us one side of a very interesting parallel. Brittany, the particular district he has treated of, is not only in its physical characteristics, but in its population and their customs, very closely allied to our Principality. We have a Celtic population in Wales. No one, indeed, passing from Lancashire and Cheshire into North Wales, can fail to notice the contrast between the people. It is stated historically, that in the early ages of this country, a part of the Celtic population was either led or driven over to the French district visited by Mr. Brewer, and there is generally supposed to exist so much similitude between the inhabitants of Brittany and Wales, as would be in keeping with their early connection. In passing through Wales, some very beautiful examples of architecture are to be seen. There are cathedrals of great interest, and several grand castles; but when you get away from these larger and finer instances, you come, I think, to a more humble style of ecclesiastical work than is found, generally speaking, in the main country. Now from the mountainous character of Wales, and the similar nature of Brittany, as well as from what Mr. Brewer has said, I rather think we should find the same distribution, as it were, of art in Brittany comparatively to the rest of France, that we do in Wales relatively to England, and this possibly together with some close analogy of style. In other directions the parallel between Brittany and Wales is to be traced. Welsh, for instance, are very superstitious, and so are the people of Brittany. They profess to "give the devil his due" by leaving a corner undisturbed in each ploughed field. It is called "*le part du diable.*" From these general circumstances I am disposed to think that if any gentleman who has travelled both in Brittany and Wales could connect the countries, in their architectural conformities, and give a kind of parallel to Mr. Brewer's researches, it would be a very interesting accompaniment to his paper.

The CHAIRMAN.—In asking you to pass formally the vote of thanks to Mr. Brewer, I may take the opportunity of saying personally how very much pleased I am with what he has laid before us in

this paper, and how much I have been pleased in looking at the sketches. I think better drawings than these of the picturesque kind of architectural work it is impossible to produce. It is a great credit to the architectural profession that we can have attached to its outskirts such men of distinction with the pencil as Mr. Brewer, with such a thoroughly appreciative knowledge of our art as that gentleman possesses. He is modest enough to say that he has no practical knowledge of architecture; but his paper is evidently the result of a more than ordinarily intelligent study of our art. One or two points which occurred to me during the reading of the paper may be mentioned. I was first struck with the remark our friend made about the new engineer's viaduct which carries the railway across a picturesque portion of the country of which he had been speaking, and which, he said, by its remarkable simplicity in design, and the absence of ornament, struck him as being highly satisfactory in its effect. I was going to ask Mr. Brewer whether it was designed by an English engineer or a French one, because to my mind that makes all the difference. I think we cannot recognise the principle that an English engineer is capable just at present of making an artistic building without the aid of the architect, although it is very possible that a French engineer might rise to the occasion.

Mr. BREWER,—I believe it is by a French engineer.

The CHAIRMAN.—The question whether an English engineer is able to make his work artistic without the aid of the architect, is not unworthy of consideration just now. Perhaps it is enough for the present to say that Brunel, and I think, Rendel and Stephenson, certainly took the proper course when they called in the aid of such a man as Sir Digby Wyatt, for the architecture of their great works, as in the case, for instance, of the Paddington Railway Station. There was a very curious observation which Mr. Brewer made, that struck me forcibly, namely, that in one particular mediæval work he found the design so much in confusion that he could only conclude that the architect had been changed once a month. Perhaps this point was slightly exaggerated for the sake of effect, but it must call to our mind the circumstance that, in Gothic work, now that the researches of students are leading them more and more into the recesses and the minutiæ of design, it is more and more seen that there is a good deal of that confusion, which is, indeed, part and parcel of the principle upon which all mediæval work is founded, namely, the picturesque principle. By according full liberty to the accidents of construction, a haphazard kind of design is the result, and its picturesqueness is often only the more charming by reason of its being haphazard. Another thought that struck me was with regard to the allusion Mr. Brewer made to that very beautiful example, Rosslyn Chapel. It appeared to me that there was great interest in tracing the connection between Rosslyn Chapel and certain works of Brittany. When he told us that Mary Queen of Scots landed here before her marriage, and when he also told us that Prince Charles Edward, after the Battle of Culloden, took refuge upon the same shore; putting this and that together, I certainly cannot help feeling interested in the inquiry, as to what was the precise relationship which subsisted between Brittany and Scotland in the middle ages, beyond that which we know to have existed between France generally and Scotland. I think, if I am at all right, that the theory which has been most acceptable with regard to Rosslyn Chapel is, that it has some connection with Spanish work. This is a theory which I, for one, could never understand; but if we could make out that this unique work had a connection with Brittany, then I think, artistic architects would be better satisfied, than with the theory that connects it with Spain. The paper as a whole is, as so many of you have already said, a very admirable one, and commending to your further attention the illustrations on the walls, I ask you formally to accord your very best thanks to Mr. Brewer for the great treat he has afforded us to-night.

Mr. BREWER,—I cannot but feel exceedingly flattered at the kind way in which Professor Kerr and other gentlemen have spoken of my paper, and I am pleased that it has met with such

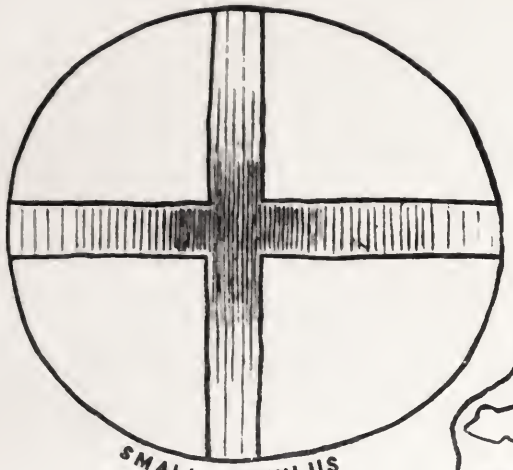
approbation. One or two points have arisen in the course of the discussion on which I should like to say a few words. First of all, there is the very interesting subject to which Professor Kerr has alluded, namely, the great similarity between the side chapel of the Church of Plougasnou and the Chapel of Rosslyn. Unfortunately, I can throw no light whatever upon the subject, nor can I tell which is the earlier work of the two. The side Chapel has no date upon it whatever; and another great difficulty that occurs to me is this: that I know nothing else in Scotland which in the least resembles Rosslyn Chapel, nor do I know anything else in Brittany which resembles the side Chapel at Plougasnou. Whether any buildings resembling them have ever existed I cannot say. Another point to which I wish to allude has reference to the remarks made by one of the gentleman (Mr. West), who spoke respecting the spire at Kreisker; I cannot, after a careful examination of the spire, see anything to induce one to suppose that it was copied from any eastern building. It is thoroughly like a hundred other spires in France that I could point out, except that it is not so clever. There can be no difficulty in supposing it to be a copy from a contemporary spire, probably the spire of the Church of St. Peter at Caen. There is another reason why it could not have been copied from any eastern work, namely, that the date of this spire, and the fact that it was built by Queen Mary of Brittany are authenticated by documentary evidence which there is no reason to doubt; and I really think that a careful examination of the photograph which has been handed round will be quite enough to convince anyone that there is nothing like eastern work at all about the spire in question. With regard to the connection which existed between Wales and Brittany, there certainly are one or two very remarkable things to be considered, and one is the similarity of names in Wales and Brittany. There are several places in Brittany with the termination "Dowlas" to their names, and anything more Welsh in sound than this it would it be difficult to conceive. I think, however, that the connection of Brittany was rather with Cornwall. But I don't think much connection can be found between the *architecture* of Wales and Brittany, inasmuch as the architecture of Brittany only began to develop its peculiarities about the end of the sixteenth century. I think it will be found that by that date all peculiarities of architecture in Wales had entirely died out.

A vote of thanks having been unanimously passed to Mr. Brewer for his paper, the proceedings terminated.

Plate A

EXAMPLES OF ANCIENT SEPULTURE.

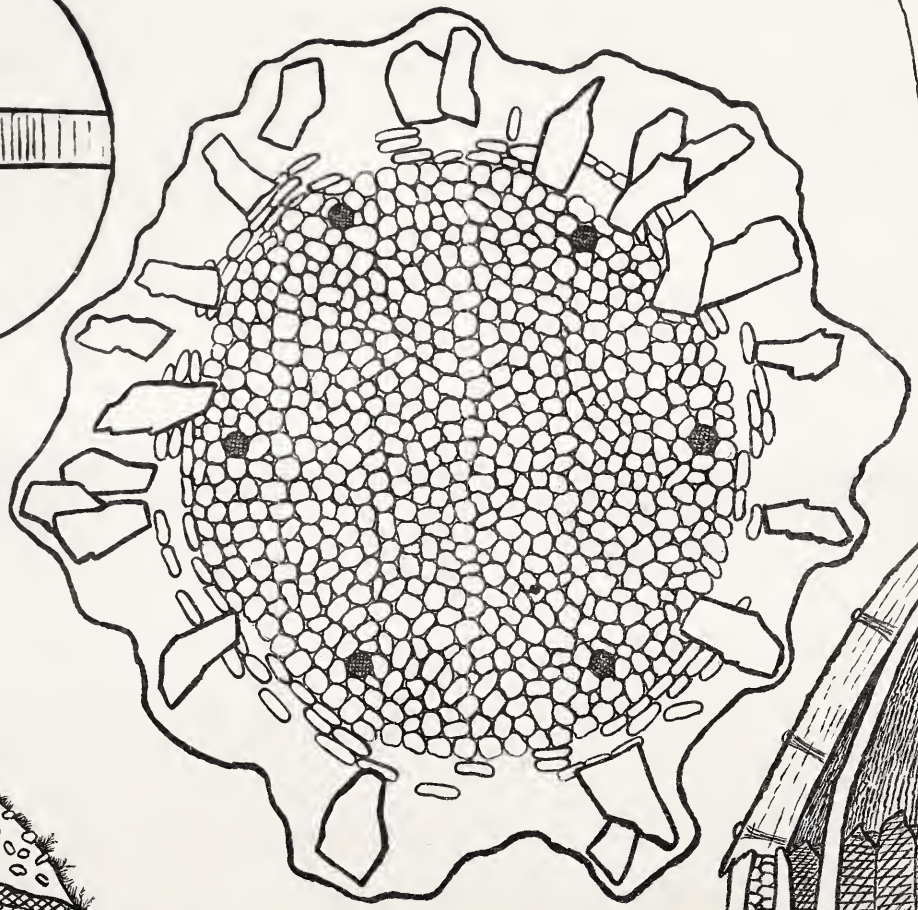
TIMPENDEAN MOOR.



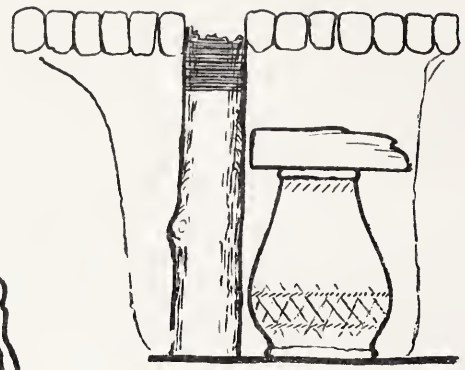
SMALL TUMULUS

WHORL

SECTION OF SMALL TUMULUS



PLAN.



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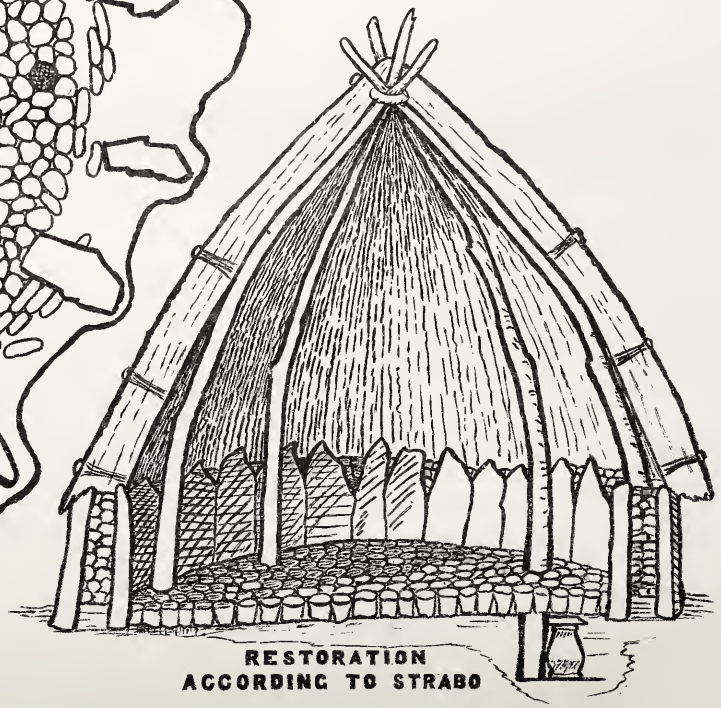

RESTORATION
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Royal Institute of British Architects.

At the Ordinary General Meeting, held on Monday, the 19th of May, 1873, HORACE JONES, Vice-President, in the Chair, the following Paper was read:—

ON RESULTS OF A RECENT INVESTIGATION INTO ANCIENT MONUMENTS AND RELICS.

BY JOHN S. PHENÉ, Fellow, F.S.A., F.G.S., F.R.G.S., &c., and of the Anthropological Institutes of Great Britain, Ireland, and New York.

IN submitting to the Members of this Institute some of the results of labours which have extended over many years, I shall endeavour to do so as concisely as possible, compatibly with a slight delineation of the main features of interest, and to touch only on those monuments which appear to me to be unique, or to have some feature which in themselves, or in similar monuments of the same class, has not, as far as I am aware, been yet described. In taking this course, I shall endeavour to restrict myself to monuments of recent discovery. My observations will be confined almost exclusively to the British Islands, but I may occasionally refer, for the purpose of comparison, to archæological features similar in appearance to those I shall mention, which are also to be found in the monuments of other countries, so far as they serve to elucidate any part of the subject. I may be permitted to point out that, in prosecuting my investigations, I have adopted a different course to that usually pursued, and, instead of devoting attention to those monuments already well known and ably commented on by authors of great standing, I have been content to examine the crumbs neglected by other archæological searchers, and which—in some cases from their remote and secluded positions, and their want of notoriety—have eluded the observation of those who would have gladly sought them. In doing this I have been rewarded by the discovery of features of unusual interest.

I propose to divide my subject into monuments illustrating—1st. public rites of sepulture; 2nd. private interment; 3rd. the performance of ceremonies; and 4th. sacrificial worship.

My investigations on the Earl of Glasgow's estates enable me to lay before you a plan and sections of a tumulus, the principal features in which are: the general construction of the mound; a radial arrangement of the tombs; a mixed species of sepulture by the same operators, and at a common date, the result in short, of a single ceremony; and a rude knowledge of mechanical forces, judiciously applied. The tumulus is in the Great Cumbrae, the larger of two islands east of the southern end of the Isle of Bute, in the Firth of Clyde. The tumulus is at the extreme north of the island on which it is placed,—a position, I think, chosen as having in an easterly direction from it a prominent conical hill; the neighbourhood of such hills having been, as I have elsewhere pointed out,* customary places for interment, and for the exercise of sepulchral and other rites.

Its construction is unusual, and displays labour and intent. The illustration shows the original surface soil in its natural colour, which was very *dark;* each sepulchre stood on a separate mound of

* 'British Archæological Journal,' March, 1873.

bright sea sand; each tomb was also carpeted with a complete layer of fine white quartz pebbles, which time had detached from the red sandstone conglomerate of the coast, and which still abound on the shore of Ayrshire. The mounds of sea sand were almost uniform in extent, and of a common level, and appeared to have been heaped over their sides all round as soon as deposited, having between them and over their lopes a thick layer of the dark-coloured original surface soil, which served to retain all in their positions. The slope of the mounds was almost that taken by sand when heaped up and unmolested by other forces, about 32 deg.; and on the summit of each heap was placed a red sandstone cist, consisting of four stone slabs, which in every case retained a true vertical position.

The dimensions of these cists approximate to each other, except in one case; they are of a size common to sepulchral chambers of this class, which have the characteristic of being hardly able to contain a full-sized human body, even when doubled up and compressed. Each cist was covered with a slab of the same material, reaching considerably over the external dimensions of the wall slabs, and apparently irregularly rubbed or worked so as to discharge rain or moisture from the centre towards the edges, or else selected from an accidental tendency to this form. In one case such economy of labour was clearly shown, by the use of a water-worn slab for the cover, which possessed these general features. These slabs were all in a true horizontal position, but were so adjusted as not to rest on the vertical or wall slabs, from which their weight was discharged by an arrangement of uncemented masonry which carried them. The whole had then been heaped over with a third soil, quite distinct from the other two, the source of which was displayed by an adjoining hollow in similar soil, which on measurement was found to correspond very nearly with the cubical contents of the tumulus, and somewhat resembled it,—an inverted outline of the one tolerably representing the other.

The largest and most important cist was in the centre of the tumulus, and placed nearly due north and south. It contained the unburnt, and apparently uninjured bones of a man of full stature. Due north of this cist was a small one, which contained the also unburnt and perfect bones of a youth, and a few fragments of pottery, all differing in ornamentation.

South-east and south-west from the angles of the centre cist, and at a distance of several feet from it, was, on either side, one cist corresponding with the centre one, but of slightly diminished proportions; these were placed, the western one almost due east and west, and the other in a somewhat less exact position. Both these cists contained burnt human bones, apparently the complete bones of a female in each;* these remains were also, in these two cases, stored in urns, the designs of which differed. From the north-west angle of the centre tomb, at a distance of some feet, was a cist of nearly the same dimensions, and placed with a corresponding appearance of orientation with the latter ones; this contained the carpeting of white quartz pebbles common to all, and a perfectly clean but fractured urn, quite empty; and there was no appearance of bones or any other object in this cist. The space in the north-east portion of the tumulus was unoccupied.

It has been often assumed that orientated sepulture was indicative of Christian rites; but here we find those cists placed towards the east and west containing Pagan cinerary urns, while those north and south show, from their small dimensions—the largest being only three feet in length—that the funereal rites were of a pre-Christian type, while the formation of the several sand tumuli within the area of the one large mound shows a single operation in construction, and that the bones belonged to the same date and people. The urns and some of the bones are figured on the diagram, and they were shown in an illustration in 'The Graphic' in 1870.† Most of the relics are now in the Free Museum and Library at Paisley, the splendid gift of Sir Peter Coats to that town, and were used to illustrate

* See the Report of Professor Allan Thomson and Dr. Young, appended to my Paper read to the British Association at Liverpool in 1870.

† Feb. 26, 1870, p. 309.

the inaugural lecture, which I had the honour of giving, on the first use of that building, under the presidency of the Earl of Glasgow, who had not only greatly facilitated my operations, but also personally inspected my excavations and sections. This monument appears to me one of the most perfect examples we are likely to discover of a species of suttee on the decease of a king or priest, while the clean and empty urn, in the otherwise vacant cist, conveys an idea that the cenotaph was not unknown in these early usages. It is curious that the spot is known as "White Bay," although there is nothing white about it; a name it may have acquired from some tradition of the evident purity aimed at in the act of sepulture, of which the white sand mounds and the ground work of white quartz pebbles in the tombs afford interesting evidence.

There was a good deal of what is called staining in some of the upper soil, but it had in no way penetrated to the light coloured sea sand under the cists, and the lines were as clearly defined as in the diagram, while the different soils are now on the table, for inspection. I am sorry to add that, in spite of Lord Glasgow's positive instructions for its preservation, this monument was to a great extent carted away immediately after my leaving the island; and, on my hearing of this, I at once communicated with the Earl, who at my request summarily stopped the work of demolition.

The peculiarity of the masonry is, its involving probably the earliest style of arrangement which led to the use of the discharging arch. And if we take this as the rudest, and an example of the more finished of the Pictish arches in the Orkneys, we shall find their almost exact counterparts in Mexico, as shown on one of the diagrams, which also includes, for the sake of comparison, a section of the Treasury of Atreus and an example of the Boyne tumuli. I may mention, before quitting this part of the subject, that I have met with similar methods of discharging the superincumbent weight of the cover from the lateral slabs in Argyllshire, and in Roxburghshire, the latter on the estate of J. O. Ruthurford, Esq., where, in a cist, was found the delicate urn illustrated in 'The Graphic,' and called the Jedburgh urn.*

The next class of monuments I propose to illustrate is one, an example of which seems to authorise their description as those of private and domestic modes of sepulture, in contra-distinction to what I have pointed out as evidently public and official ones.

Through the kindness of the Duke of Roxburghe, the Marquis of Lothian, and the Earl of Minto, a large district of Border country was placed under my inspection, and I received from those noblemen valuable suggestions and information. Timpendean Moor was a fruitful field of labour, being a wild though now curtailed tract of moorland, which had evidently been unmolested from the earliest times, as shown by a number of circular British camps or forts, which were characterised by the low uniform earthworks round each, of which many are found in the Cheviot Hills. The illustrations of relics on this Moor, will be found on plate A. An example is given of some small tumuli, which I cut in the form of a cross, and obtained a curious section of three soils, the upper one showing cremation, the next brown, and the third clean light earth; the position almost indicates geological movement since formation, and therefore suggests great antiquity. I will select one monument from this spot.

Observing that some tufts of heather rose above the rest in something of a circular outline, I had the vegetation removed, when a number of slight mounds, like mole-hills, were seen. At about a foot in depth these were found resting on blocks of granite between two and three feet in length, and nearly a foot in breadth and thickness, which were found lying as radii; they were pointing to a common centre, but at some distance from it. Within them was a flat area, of an oval form, the external part of which was also irregular; an appearance which, on removing the soil, was found to arise from a number of loose stones in a tolerably uniform position, but looking as though they had been levelled or fallen down from time. The external measurement of these in the longest direction was about 30 feet

* 'The Graphic,' January 14, 1871.

across, the perfectly smooth area within them being about five feet less. I had all the soil removed from the latter, and found, at about the same depth, a very perfect paving of stones, neatly placed, and having a smooth upper surface; these were laid upon a light coloured, unwrought soil, and from a few inches to nearly two feet below that was the rock. On the pavement being removed in portions, a dark patch was observed in the soil, under which was charcoal, and beneath that black and decayed wood, evidently part of a stake about four inches in diameter, and penetrating into the earth nearly two feet below the underside of the paving. A careful examination of the still undisturbed pavement showed, in several similar positions, deficiencies in the stones, beneath which were corresponding patches of charcoal surmounting the remains of decayed oaken stakes, the holes for which, in more than one case, had perforated the soft rock beneath. These holes were equidistant from each other, and showed an uniform measurement from each to the circumference of the oval.

The Eildon Hills lie to the north-west of this monument, and by the side of the post nearest in their direction, and a foot under the pavement, was found an inverted British urn, about 10 inches high, filled with burnt human bones and charcoal and the mouth resting on the natural rock. At the exactly opposite one was found a small whorl, or it might be an amulet, as the perforation in the centre was small. Nothing else was found here; but it would seem that this was a burial beneath the domestic hearth, or at least within the extent of the house covering. There was an assimilation in the arrangement of the outer stones to dwellings still seen in the most northern of the Hebrides; and it appears to me that the oaken posts would have formed the ribs, or rafters, on which a thatch would have been fixed, the distance across, between the posts, being about 20 feet. A restoration from the description by Strabo is on plate A. Similar buildings are referred to by Professor Wilson, in his *Prehistoric Annals of Scotland*, as being found near Loch Etive, in Argyllshire; but it does not appear that these were searched below the circular paved floor for sepulchral or other relics, though the remains of the oaken stakes were discovered.

Of the class of monuments which seem to me *ceremonial*, I beg to describe the following: I had the privilege of being asked by the Marquess of Lorne to examine the ancient Celtic relics on the Duke of Argyll's estate near Inveraray, amongst which is one of remarkable dimensions and design. It is shown on plate . The major portion of this great monument had been covered with a tumulus, the earth forming which still remained in large quantities where the heavy but disturbed stone work once forming the covering of the chambers lay strewn about, though that more readily reached had been spread on the rather thin soil of an arable field in which the monument stands.

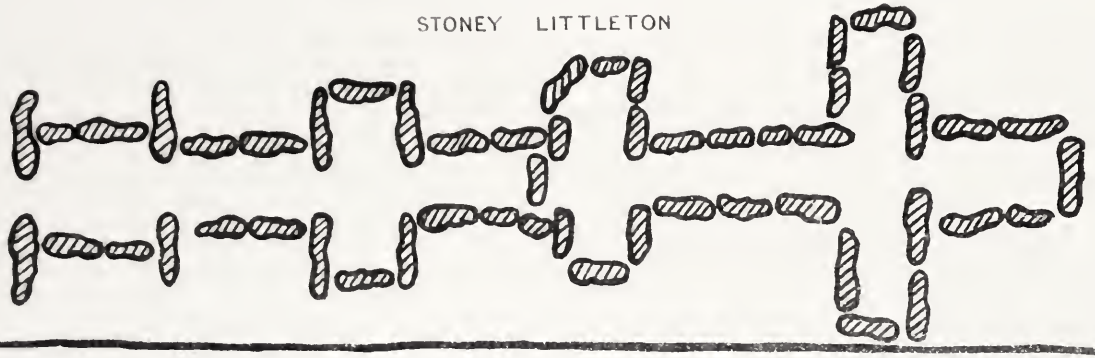
The great entrance was obviously external, from the pent-house form of the large granite slab over the northern chamber, the section of which is almost in exact agreement with that shown of the large terminal stone at the south end of the tumulus. I call this the great entrance, as it had in front of it a much narrower chamber or doorway, against which was rolled a huge rounded stone, which brought forcibly to mind a well-known passage, where we read the stone was sealed. The width of this entrance approximated to several openings found in the obstructing stonework, which had divided the great way into a series of chambers, one of which obstructions separated the first and second chambers, situated at the northern end of the tumulus. At the south end of this second chamber there certainly appears to have been a permanent barrier, but, on excavating down to the foundations, I saw reason to believe that this had either merely covered a secret mode of transit, or that some alteration had taken place at the time of the central and adjoining chamber having been broken up, as it evidently had been, probably by treasure searchers. This central chamber was similarly secured by a solid barrier at the south end, though I have no doubt there was here also a concealed channel of communication, which, not having been discovered by the treasure seekers, was probably the cause of the destruction

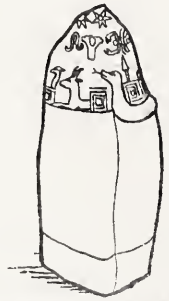
Plate B

EXAMPLES OF ANCIENT SEPULTURE.

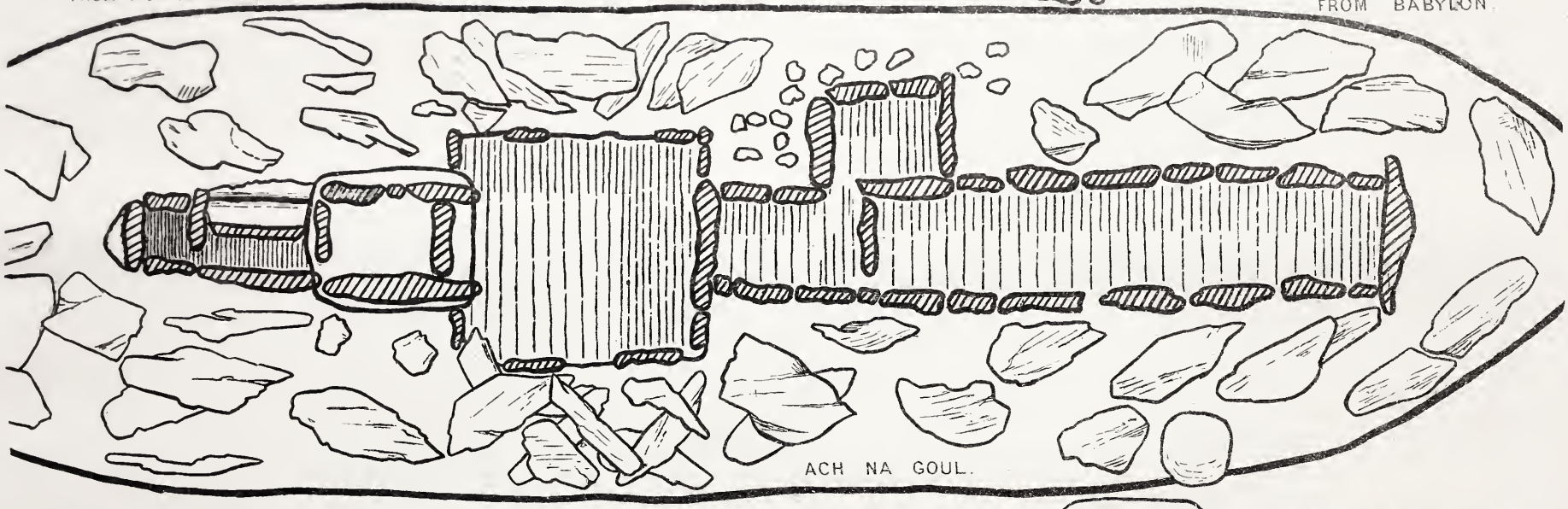
FROM ACN NA GOUL

STONEY LITTLETON



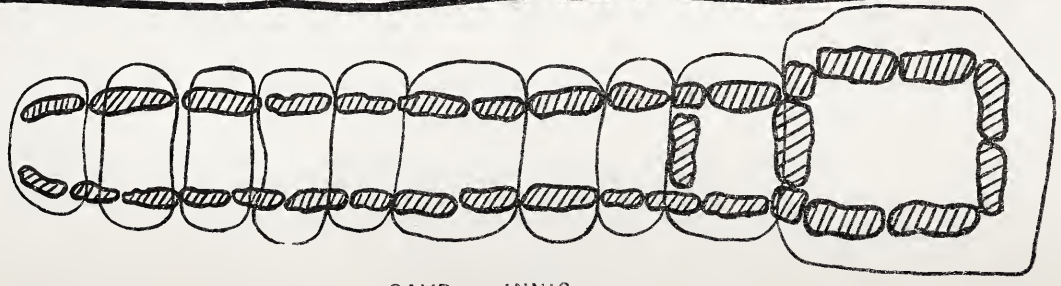


FROM BABYLON.

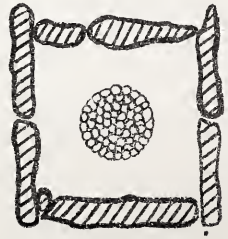


ACH NA GOUL.

ACH NA GOUL.



GAVR INNIS.



ACH NA GOUL.

Photo-Lithog.ª for the R.I.B.A. by Kell Bros London, E.C.

of the side walls of this chamber, the east and west walls of it being only traceable by the slabs which had formed them lying near at hand; and as amongst these stones were others which were somewhat thin, as compared with those agreeing with the lateral stones still in position, these thinner slabs may have formed, as I think they probably did, a domed roof to this chamber, as the position is that in which we find the central and domed chamber in the three chambered tumulus, opened the same year by my friend Dr. R. Angus Smith, in the same county, and which is also the position of the domed chambers at Lough Crew, and in the Boyne tumuli.

This was evidently the sacred spot, or the secret repository, as shown from the greater violence, even to clearance, used in the attack upon it. The chamber, situated immediately to the south of this, had two communicating passages, one leading east from its south end into a distinct eastern chamber, and one at the south-west angle leading to the next southern chamber. The eastern chamber had a different appearance from the rest, because, through the whole extent of chambers to a distance of seventy feet, evidences of a particular occupation were freely distributed in the form of remnants of pottery, charred wood, and earth, which, on careful washing, showed portions of bones, while the flooring of the eastern chamber, was quite destitute of any such appearances. Most of the chambers were small, the areas averaging from 25 to 50 feet super; but the centre chamber appears to have been 15 feet in length by a width which, so far as I could trace it, was about as great; while the south chamber, which was terminated by a very large slab of granite placed vertically, and extending beyond the eastern and western walls, against which it abutted, was 30 feet long by 5 to 6 feet wide.

Various appearances led me to conclude that there was intercommunication with all the chambers, viz.: the chambers, seven in number, were divided by six obstructions, or barriers, four of which had a side space adjoining, sufficiently large for the purpose in question; the remaining two wholly obstructed the passage, but these were on the north and south of the centre, or great chamber, in connection with which, from a difference of levels and other circumstances, I am persuaded there was a concealed exit and entrance, the barriers being used to mislead, and to give an impression on each side that there was no passage. These complete barriers may also have been capable of displacement, as they were adjusted *within* the walls, whereas the actual and permanent barriers overlapped the walls, as did also the large round stone at the entrance on the north. Several of the side stones were of a schistose nature, and, being quite decayed from age, laminated and fell to pieces.

It is a remarkable feature in this chambered tumulus that, while the structure was almost due north and south, a separate chamber on the east gives evidence of a system of orientation. The whole mound appears to have been originally about 130 feet long and 30 feet wide. Its height must have been considerable, from the large quantity of great boulder stones and earth still remaining; and the lithic structure itself extended upwards of 70 feet as before mentioned. It seems to me a complicated and carefully arranged structure, which, though probably a receptacle for the dead, was connected with the celebration of rites. In corroboration of this, in the least damaged chamber was found a conical white quartz stone not dissimilar to the sacred lithoi, sculptured with solar and serpent emblems, which are amongst the Babylonish and Assyrian relics in the British Museum. One of the latter is shown in comparison with the quartz stone in the upper corners of the Diagram B. This quartz pillar had also that peculiar opacity which showed it had been subjected to the influence of fire.

The rites which I venture to assume were carried on in this structure, appear to have been also customary, on a scale of less magnitude, in the adjoining localities. On opening several isolated and square chambers on the top of a hill to the north-west of the large tumulus, each presented, in the centre of its area, a circular paved platform, on which was a mass of burnt material, charred earth, stone and wood; the earth, on being washed, revealing in this case also evidence of calcined bone. These

chambers were each about five feet square (two of them are shown at the lower corners of the diagram) and there appeared to have been no attempt at concealment by covering them over with earth. In one of them was found a smooth stone, much worn by manual friction, which I handed to the Duke of Argyll, who honoured me with his presence, in company with her Grace the Duchess of Argyll, the Hon. Charles Howard, and Mr. William Russell, while I was excavating the large tumulus. The process occupied a considerable time, as it was impossible for the workmen to proceed except by hand and lever labour.

In one of these visits, his Grace obliged me with information, where my knowledge of the Celtic language broke down, and interpreted for me the Gaelic of the native inhabitants of the beautiful Highland village near which the tumulus is. The Duke was soon found to be a better Gaelic scholar than the Gaels; and it was finally agreed on all hands that Ach-na-goul—the name of the large tumulus from which the village is called—means simply "The field of the stranger." This word "goul" also appears equivalent with "foreigner," or "one coming from a foreign country," and for reasons I cannot now give really means, I think, "the place of the wanderer," with the meaning we attach to the word "traveller," from the Gaelic word "Gabhail," pronounced "Gavul." At the same time it is just as probably a corruption of the word *Gabhadhbheil*,* pronounced "Gav'-a-vhell," the name of the Druidical ordeal by fire. The word "ach" is still retained in the most remote Hebrides for "field." This monument is unquestionably of the same class with that of Gavr Innis in Morbihan, and probably with those at Brugh na Boinne, and with that at Stoney Littleton in Somersetshire. The comparisons being given in the plate.

There is a class of monuments in the Hebrides hardly noticed by previous investigators, upon which I have so far arrived at no power of definition; but, as my attention is still engaged on the subject, I venture to enumerate them amongst others, without connecting them with any of those I have undertaken to describe. Their condition, arrangement and appearances are so similar to what are described by Mr. E. H. Palmer, M.A., Fellow of St. John's College, Cambridge, as found by him in the Desert of Tíh, that I adopt his words in describing them, though the description he gives is sometimes applicable only in part to some, and in part to others; but every feature in his description is to be found in one or other of the Hebridian relics, the natural physics of the localities also agreeing in description. After passing a place called Agúlah, he describes the wády he is traversing as finding "its way through a very narrow winding gorge, with grand precipitous sides, into Ain el 'Elyá.' Here is a spring of running water, and the valley opens out into a large plain covered with hills and vegetation. Shortly after leaving this place we came to a group of nawámís, on the hills to the left of the wády, which were more perfect than any we had hitherto seen in the peninsular. They consisted of two detached houses, on separate hills, and a group of five on the side of a higher eminence. At least three out of the five were apparently untouched. Their dimensions averaged seven feet high by eight feet in diameter but one was fully ten feet high and eight feet diameter inside. They were circular, with an oval top. In the centre of each was a cist, and beside that a smaller hole, both roughly lined with stones; these were covered with slabs of stone, over which earth had accumulated. Some human bones which we found in the cists at first led us to the conclusion that they were tombs; but the small size of the cists, and the evident fact that they had never contained perfect skeletons, proved that idea to be erroneous. In the smaller cist the earth showed signs of having undergone the action of fire, and in one or two small pieces of charred bone and wood were found. The country all round is covered with them, every hill-side having some remains of nawámís upon them. Close by the nawámís were

* I give the pronunciation as well as the word, otherwise to an English reader no connection could be traced.

some *stone circles*." Time will not permit a recapitulation of the similar features in North Britain; but the curtailed tomb cist, and the place for cremative operation within a small structure, have been already before you, while the buildings themselves agree exactly in description with some of the detached as well as grouped dwellings in the Hebrides, as shown on the diagrams.

Of what appear to me monuments for *sacrificial* purposes, I beg to draw attention to mounds I have discovered in North Britain, having the distinct outline of animal forms, in some instances, indeed, quite as clearly defined as those in America, of which latter good illustrations will be found in the *Smithsonian Contributions to Knowledge*. In every case, so far, in which I have excavated these mounds, I have found human remains, generally accompanied by evidences of cremation, and in every case also by remarkable stone structures, often of large, or megalithic description. The forms are mostly serpentine, but in some cases fish-like; and, in some, approaching one of the figures of the American mounds, which resembled that of the winged sphere of Egypt. A natural deposit appears to have been generally taken advantage of, and either carved away, leaving the remainder in the form desired, or heaped up and added to for the same purpose. In some cases both these processes have evidently been resorted to. Several of these mounds time has not yet permitted me to examine by excavation, and I have selected the more widely distributed, in order as well for my own comparison of the most distant with each other, as to allow the broadest enquiry. At the same time, on this point, I deprecate opinions formed by any who have only made a partial examination, and who may thus have come to a conclusion from the examination of any one specimen that may affect in their minds the whole question. It must be remembered that Dr. Borlase discovered such a mound on Carnbre' Hill, in Cornwall; and this, together with the custom of planting such elevated spots, gives ground for supposing that others, perhaps not few in number, have existed in England, the features of which have been obliterated by such process, while the habit of altogether levelling is too well known by the recent cases at Stonehenge, and Dorchester, near Oxford, to say nothing of the necessity for the noble preservation of relics in Wiltshire, by the liberality of feeling displayed by Sir John Lubbock, to leave any doubt that invaluable scientific treasure of this class has been destroyed in England. This, indeed, has touched the very remarkable mound near Loch Nell, which is represented in the diagrams, and which is as distinctly in the form of the Egyptian Uræus as any of the sculptures in Egypt, the only deficient portion being that which could have been removed with the greatest facility, from its less important dimensions, which has evidently been done, as the *débris* still lies strewn on the most convenient spot, and the area facing the south-west is thrown open, by such removal, to the agriculturalist, while the marks of the plough upon it are still visible, though betraying many years of disuse.

This mound is situated in one of the most secluded glens of the district around the triple-peaked mountain Cruachan. The well known cry of the Campbells—"It is a far cry to Lochow"—intimating the remoteness and security from incursion of that district, we may naturally infer that here monuments of a Pagan religion might have remained unmolested when even the distant isle of Iona was subjected to spoliation.

The illustration of this mound shows to the west of the head, a great cairn. The west was a direction peculiarly selected for burial with many ancient nations, as indicative of the course of the departed spirit, emblemed by the setting sun. If, as I find reason to assume, mountains were distinctive features of adoration—though, curiously enough, not included in the objects enumerated in a valuable work now publishing, *The Scottish Highlands, Scottish Clans and Regiments*—then the position of the whole figure, which has clearly been connected with sepulchral, if not sacrificial rites, has the same tendency, being west of Cruachan; while a local Gaelic tradition asserts that persons were led to execution walking along the ridge to the head,—that is, east to west. These facts, together with the

extremely important position of the mound, as a theatre the action upon which, of whatever character, could be seen by many thousands, have led me to the conclusion that it was an erection for sacrifice. When I first observed it, there was what appeared to me the remains of an altar on the summit; but the fragments now lie around which show some of the largest stones to have been reduced by blasting. On opening it in company with a party of able, scientific and professional men, we found, as shown in the diagrams, a spacious megalithic chamber within; this was composed of *three* large blocks of granite, placed somewhat in the position of a triangle. In this were remains of bones reduced by cremation to very small dimensions, mixed with charcoal and charred earth, so as to require separation by washing. Amongst the charred vegetable matter were shells of hazel nuts, and some relics. A flint instrument was found here, a flake of chalcedony in an adjoining tomb, and a stone celt in another; the two former not being local materials. I am impressed with the idea that there is still a chamber to the east of the large eastern block of granite, but the great chamber itself was a grand specimen of sepulture and cremation.

The spine of the form appeared to have been distinctly constructed of blocks of granite, and on each side these blocks had rows of smaller blocks, tapering away in reduced size as they receded from the main column. The district for many miles has grand sepulchral remains, extending even beyond Berigonium and through Glen Lonan, towards Cruachan, a feature almost always attendant on the mounds of this class which I have discovered, and which are also in each case accompanied by what are generally called Druidical stones, either as monoliths or circles, or both. This great serpentine form has also a serpentine avenue leading from its head,* as shown in one of the diagrams, while around the head is a *partial* circle of stones of the same kind, which puts beyond all question the connection of the cairn and the reptile form.

The enormous labour displayed in the formation of the great cairn, or disk, formed of large boulders arranged with the greatest symmetry, and covered over with an uniform coating of earth, shows us that the constructors would not have left their labour unfinished for a little work by cutting away the mound, if the latter were no part of their design, so as to continue the circle of stones completely round, as is usual in such monuments; whereas they are complete, except where the disc fits on to the head. If simply a cairn were wanted, like others in the neighbourhood, any spot than the one selected would have been better. But as this is the principal cairn of the district, and all the rest being circular and very symmetrical, it is still less likely that it would have been deficient in that completeness which is a marked feature in the others, and that not from the absence of a finishing detail alone, but from the want of the first operation of clearing the ground, or selecting, as in the case of all the others, a level site, when the whole plain—this mound excepted—is level. In the particular case of this monument, it is remarkable that the locality round Loch Awe abounds in Gaelic legends of mythic serpents, the great Python of the neighbourhood being overcome by one Fraoch, who is also styled "Son of the Light," but who died from the effects of the encounter.

A similar mound was opened by me in the noble park of the Marquis of Lothian at Mon-teviot in Roxburghshire. The form, though clearly shaped into an animal outline, is more that of a fish than a reptile. The plan and elevation of it are shown in one of the diagrams, where it is placed in position for comparison with some of the American mounds. The Marquis kindly gave me permission to inspect it, and also placed some fine Border lads at my disposal, under his intelligent master-forester,

* This avenue was pointed out to me by the proprietor of Glen Frochan, T. W. Murray Allan, Esq. and the measurements and positions of the stones were delineated by his professional factor. A view of this mound appeared in the 'Illustrated London News' of 26th October, 1872.

Mr. Weaver, who took great interest in the proceedings; the Marquis himself giving me information which I was very glad I was in ignorance of before. I was attracted to this mound (which has been shaped out of a natural water deposit) from its evidently manipulated form. When I obtained permission to excavate, the Marquis gave me also some facts which relieved my only difficulty. Here at least there were no Druidical remains; but on my asking for the records of the estate, to be examined in order to ascertain whether there was any mention of the mound having been worked in modern times, it not only appeared to have been unmolested, but a Druidical circle, bearing the name of "Harestanes," was reported as having been near this spot.

On digging beneath what appeared to me to have been the site of an altar, the ground was found to have been disturbed in a vertical direction beneath it, as the natural "walls" of the former excavation were found in their original state in each direction. No relics were found here. But I then adopted a plan I had used at Letcombe Castle in Berkshire, and which was used subsequently at Maiden Castle in Dorsetshire, in which cuttings were made in directions south and east from the centre. The results of my excavations at Letcombe are given in the proceedings of the Oxford Architectural and Historical Society for 1872, pp. 2, 3, and 65; and those of the excavations at Maiden Castle, by the British Archæological Association, were fully reported in *The Times*, and in the 'Journal' of that Association. In this case, nearly equidistant from the spot I had first selected, were found—one to the east and one to the south—a human skeleton; the bones were not burnt, but were in a similar condition to those at Letcombe and Maiden Castles. A mound near this, but on the opposite side of the Teviot, has a curious legend attached to it, as follows:—

"Forty paces from the Stabric mire,*
Sits David Leslie in his golden chair."

David Leslie was a leader in the Battle of Philiphaugh, and much too modern for my inquiries. There is, however, one feature of interest in connection with his history, as we learn from Border minstrelsy, which rather tends to point out the locality I am describing as one retained in the memory of the old inhabitants as sacred, possibly, in connection with the stone circle of Harestanes. David Leslie whose course to the battle was through this district, as we may assume from the legend, held in respect, it would appear, the power of the seer, and it is not improbable that he came here to seek advice, as, further on in his journey, he is represented, when in a dilemma, as accosting an ancient man, who advised him how to operate so as to overcome his enemy, and by following whose advice he was successful. This aged man is clearly a mythic personage, as he is represented as being present throughout the Border district, apparently as a sort of guardian, figuring in fights over a period of more than one hundred and five years,—from the Battle of Solway Flow to that of Dunbar.† No result attended the excavation into this mound, which I opened at the suggestion of the Marquis, to see if any explanation of the legend could be found; but near it, somewhat to the northward, were the remains of a circular tumulus, with evidences of a small cist, like those I have described as in the Cumbrae tumulus.

While mentioning this locality, I can hardly avoid referring to the immense urn exhumed by me as the result of some fragments disturbed in ploughing‡ on a farm on one of the estates of Lord Lothian, in the same county, which is in the occupation of Mr. J. Shiell, who aided my search for the cistvaen. The urn I had the honour to exhibit, together with other British pottery at the Conversazione of this Institute last year. Its unusual proportions, and the large mass of bones which had

* A muddy stream of that name, forty paces from the mound.

† The Chandos Classics. ‡ The origin, also, of several of the investigations referred to.

been subjected to cremation, shows it not to have been the receptacle of the remains of a single person, and its position was so peculiar with respect to the conical hill, the Dunion, which stood between it and the triple-peaked Eildons, that I am impressed with the idea that it was a sacrificial urn.

The last monument I shall mention, and the last I have discovered of its class, has the characteristics of a mound, formed out of a natural hillock distinctly shaped by labour, and an embankment which has been erected by material from the adjacent shore. It is in the woods of Skelmorlie Castle, the seat of John Graham, Esq. on the estate of the Earl of Eglinton and Winton.

The embankment (now severed by a modern roadway) was originally about 400 feet long, and the oval summit of the hillock 110 feet from east to west, and 90 feet from north to south. This, as well as the Great Cumbrae tumulus, lie westward from the grand Druidical station of Cuff Hill, near Beith, and the district had formerly a very ominous name—"The dead man's yett," *i. e.*, "The dead man's gate." Due south of this is an interesting cromlech, referred to by me in the 'British Archæological Journal' for September, 1871, p. 357. And the locality has retained to this day the features of some remarkable tradition, for to enter it has been said from time immemorial to be going out of the world, although the populous town of Largs is in the centre of the district. "Out of the world and into the Largs," the common expression, has no meaning in it, if "largs," as described by a single writer, though often quoted by others, means "slopes." There is no such word as "largs" in Gaelic, but there is Las'-ag, which, by the transposition of the *g* becomes La(r)gs, the meaning of which is "flame" or "blaze," and agrees with the remarkable evidence of cremation this monument discloses. I dug down the sides of the hillock at the cardinal points to examine if the strata had been disturbed, and if any archæological features presented themselves. This labour was without result. I then continued the trenches on the summit, so as to meet in the centre; and at a depth of about two feet came upon a paved platform eighty feet long and five feet wide, curved as a true segment, extending from the north-east to the north-west points of the compass, which, curiously enough, at that latitude form the points of the sun's setting and rising on the longest day. The platform had been intensely burned, and the earth beneath it, to a considerable depth, was changed by the action of fire. The interstices of the stones, which were smooth sea boulders from the shore, were found to be filled with charcoal and black earth; on washing the latter, abundance of small particles of bone were revealed. The victims must have been many to have covered an area of 400 square feet with the almost consumed remnants of their bones.

It must be admitted that, to those coming from a southern clime, the lengthening of the day in summer must have been the one object of note; and, on reaching such a barrier as the Clyde, I can well understand that progress might be arrested, while, if at Midsummer, the retrogression of the sun would be a hint to the wanderer to retrace his course, and the interval of the sun's disappearance on the longest day would be a matter of special record, and no doubt an occasion for sacrifice. I may state that the part of the hillock on which the platform lies was quite unsuited for a beacon, being screened both to seaward and landward; in the latter case, by much higher hills. Time will not permit me to refer to some curious and useful purposes for which, I am sure, some of the monoliths I have examined in the north-west were erected; but that the effects which I observed could have been misunderstood by the erectors of them I feel is impossible: indeed, they must have been erected for the special purposes I found they fulfilled. Nor can I refer to the remarkable orientation of the dolmens and cromlechs in the north of Ireland, and at Ach-na-cree-beg in Argyllshire, some of the features of which have been published in my papers, in the 'British Archæological Journal,' and in my lectures at Belfast and Paisley; but I cannot conclude the notice of sacrificial monuments without referring to a representation of one of the circles at Stanton Drew, which is shown in Mr. Fergusson's "Rude Stone

Monuments." It will be seen at once that it illustrates an adaptation of the circle, with head and nimbus both formed by the position of the stones, and placed superior to a serpentine body formed by the either natural or artificial sloping of the adjoining ground. Here, again, the position is one of almost east and west, as also are those of Loch Nell, Skelmorlie, Monteviot, and, as far as I have looked at the bearings, of all those which I have noticed. Does it not appear that, while former antiquaries have endeavoured to place the stones of this monument in a position corresponding with their ideas of traditionary serpent worship, the real design was overlooked, which was that shown in my drawing ?

I must express my deep obligation to the various proprietors, who have aided me by information; to my old friend "Cuthbert Bede," for hints he was enabled to give me from his previous inspection of the north-west; and for practical aid, instruments and measurements to Mr. Mortimer Evans, C.E., F.G.S. of Glasgow, and Mr. Peter Hislop of Dumfries, and to Messrs. Young & Co., Civil Engineers, Mr. William Gray of Belfast, and that well-known architect of Renfrewshire, the late Bailie J. J. Lamb, for advice on localities in the north-west; and on Egyptian relics, to the late Sir William Tite, C.B. Nor less to Miss C. F. Gordon Cumming; to E. S. H. B., authoress on Education for the Civil Service; and other friends; also including Mr. C. J. Lewis, for their valuable drawings; my photographic artists being Mr. Lenthall of Regent Street, and Mr. Fergus of Largs, Scotland: the photographs exhibiting the various stages of excavation, &c.

I cannot close the last portion of my subject without a glance at the historical evidence in favour of sacrificial monuments in Britain. Cæsar says the Gauls (*ergo* the Britons) "have figures of vast size, the limbs of which, formed of osiers, they fill with living men; which, being set on fire, the men perish enveloped in the flames."* Cæsar, it is to be observed, gives no account of the form of the figures; but, as he informs us respecting a deity which he identifies with Mercury, on the ground apparently that he is a god of journeys, and of whom he says "they have many images of him," persons have apparently jumped to the conclusion that the figures were representations of the human form,—I say "*jumped* to the conclusion," because the only attempts at illustration of these figures so far have been the monstrous things represented as great wicker men, which could not have stood by themselves, and, if they did, would have tumbled down directly the torches were applied to the lower parts, and which certainly are not authorised by the text. But, as it is simply beyond belief that Cæsar could have stated this without foundation, it would be interesting if we could discover what he did mean. It appears to me the conclusions formed were near, and yet very wide of the mark. Strabo's statement that in these figures were "wood for fuel, cattle and several kinds of wild beasts," clearly shows that the figure could not have been the basket idol in our popular representations, but rather an arena. Now, if we can unite these two features—the huge human form and the arena—we shall probably approximate towards the mark, still more so if we can show that the two united come under the special description Cæsar gives of the British deity already mentioned. Strabo aids us, for he uses the very word "χόρτου," meaning an inclosed place, which seems to put that part of the matter beyond question.†

In the immediate neighbourhood of Cæsar's landing is such an image, 240 feet high, and on so steep a slope of a hill (about 50 deg.) as to look almost upright; this figure, fenced round in the manner customary with the Britons in their defences in the woods, and which is still retained in a more

* "Alii immani magnitudine simulacra habent, quorum *contexta* viminibus membra vivis hominibus complent, quibus succensis, circumventi flammâ exanimantur homines."—B. VI., ch. xvi.

† "Καὶ κατασκευάσαντες κολοσσὸν χόρτου, καὶ ξύλον ἐμβαλόντες εἰς τοῦτον, βοσκήματα, καὶ παντοῖα θηρία καὶ ἀνθρώπους, ὁλοκαύτουν."

simple form by the hurdle pen, in Sussex, would have represented an almost upright human figure, and at the same time an arena. Moreover it would have agreed exactly with the word "*contexta*" as the "interwoven" work would have surrounded the limbs. I think it will be found that in the gladiatorial shows of Rome beasts and men were not mixed till after pretty general knowledge of Britain and British customs had been acquired; and, as already pointed out, this custom is reported to have been found in Britain. But the deity that Cæsar mentions as the one of whom the Britons had images is thus described by him: "They consider him their guide in travelling and on their journeys, and believe him to have very great influence over the acquisition of gain and mercantile transactions."* If, then, we find a figure having the former features, and also possessing the symbols of journeying, and placed, moreover, in the centre of that locality which had the greatest mercantile dealings with the continent, we have, I think, a strong case.

There is at Wilmington in Sussex an enormous figure having all these characteristics, which has been erroneously attributed to the idleness of the monks of an adjoining priory, who, it is asserted, thus portrayed a *pilgrim*. It was not the result of idleness, for it is a device of great care and arrangement. It is not the work of the monks, still less a monkish representation of a *pilgrim*, for the monks would have considered the nude form indecent, more especially in a religious devotee, yet the staves indicate that it was a traveller, and to that extent it agrees exactly with Cæsar's description. To this I may add that there is no known figure in pagan mythology which agrees with that description; but its precise representation is found, and I believe found only on the gnostic gems, of one of which, for comparison, I give an illustration. The Wilmington figure towers to an immense height, and when the spectator is only as high as the breast, on looking north the whole of the country between him and the Mid Surrey hills is fully commanded. The hill side had been most carefully brought to a surface, and the material so cut away thrown into the chine on the west, as shown by the section. It was so formed that it would discharge the rain from its surface in every direction, probably the cause of its long duration. The head is above 21 feet in diameter, and if the figure were kept clean, as in the case of the white horse in Berkshire, it could easily have been used for a day signal station, two of which, with the aid of the chalk, would be found enough to communicate even with London. The whole district over which this figure towered was occupied by an enormous wood, sacred to two deities known as Andred and Andras,—in other words, to the powers of nature. These deities have been sometimes described as one.

A wonderful stone in the park of Mr. Charles Hill, at West Hoathly, known as "great upon little," from the smallness of its base, and which has a natural Sphinx-like countenance, has been traditionally connected with the worship of the latter deity, and I have little doubt it was an object of worship. The stone had till lately the autographs of Fox and Pitt upon it, and is in a beautiful but weird and druid looking glen. This stone is shown on one of the diagrams in comparison with one in Northern India. But the work of art at Wilmington tells more of the perfect idol, and its colossus-like form speaks also of the great veneration of its designers for the object represented, and reminds us, by its size and attitude, of the form of that at Rhodes, itself a great seat of mercantile transactions in its day; and, further, Strabo actually uses the word "κολοσσὸν," giving us therefore the vast human semblance as well as the arena. Even now, whatever were its former uses, it acts as an enormous gnomon, and at noon the sun is exactly over its head, and the whole figure disappears,

* "Deum maxime Mercurium colunt: hujus sunt plurima simulacra, hunc omnium inventorem artium ferunt hunc viarum, atque itinerum ducem, hunc ad quæstus pecuniæ mercaturasque habere vim maximam arbitrantur."—Bk. VI., ch. xvii.

while the most casual observer could easily trace by the shadows, as they lessen and deepen in tone, the hours before and after noon. The gnostic gem shows the sun and moon in connection with the figure, and it is strange that while the surrounding heights, which comprise the Beachy Head range, are covered with British tumuli, the part of the coast near to the figure has an immense crescent or lunar-shaped embankment generally called Roman, but which is certainly a British construction. Numerous derivations have been suggested for the name or names of these deities, none of which appear to me satisfactory. The title seems, I think, compounded of the Celtic possessive pronoun *an*, and *dreos;* this expression would probably include both divinities, and signifies "*their blaze.*" A British urn was lately found, almost at the moment of my last visit, on the farm of Mr. Thomas Lambe, with bones and charcoal; and large numbers of bronze celts, and other British relics, have been discovered from time to time at some distance from, but in full front of the figure, many of which are now in the Museum at Lewes.

The CHAIRMAN: I am sure, gentlemen, you have all been highly instructed by the clever and ingenious essay of our excellent and learned friend. I know there are many now in this room who perhaps will be pleased to make some remarks on the paper, and perhaps contribute in some degree to the illustration of Mr. Phené's various researches. One example presents itself to my mind, and that is, the giant at Cerne Abbas, about eight miles from Dorchester, a very fine specimen of early British art, 180 feet high, with a club rather than a staff in his hand. Mr. Wadmore or Mr. Roberts could, no doubt, contribute to our instruction on this subject.

Mr. WADMORE, Associate,—I have been exceedingly interested in our friend Mr. Phené's paper, because I have spent some little time in looking after the same object myself, quite unaware that I was treading in the same path as Mr. Phené. But the portion of the subject I have looked at has chiefly been that of the British *oppida*, not as mounds or tumuli, but as military stations. There appears to be a great difference of opinion regarding this subject, and many mounds and camps are called after the names of different emperors, as Vespasian, Cæsar, Chlorus and others, which have no connection whatever with the Roman camps. Sir Richard Colt Hoare gives an example of the tumulus with the long barrow in Wilts, similar to one shown on the wall. I see also our friend has at the other end of the room a small diagram of one of the so-called Cæsar's camps, to which he has made no reference in his paper.

Mr. PHENÉ,—I may explain that many of the diagrams were put here in case there should be any reference in the discussion to the subjects which they represent, because questions on subjects of this kind are much more easily answered by the aid of diagrams.

Mr. WADMORE,—There are remains scattered over the country, and known as "Cæsar's camps," in reality *oppida*, some of them even extending over the space of 120 or 160 acres, and more than large enough to contain double the number of troops that Cæsar ever had in Britain. I think there is no doubt that, as Mr. Phené said, the avenues now seen were really for processions and sacrifices. A good example exists at Avebury. You see there a row of stones leading in a straight line, as Mr. Ferguson asserts, or rather on a curved line from Avebury, and at the end of that curved line was originally a temple. Near this is Silbury mound, occupying five and a half acres. There are very large mounds in other places. We find some of them on the sides of rivers. Many of them have been dug into, but no rooms or chambers whatever have been discovered; therefore I conclude that they were for purposes of military defence, and not for interment. The subject is very interesting, and a very desirable one to investigate, because we have so many remains. They are scattered like stars on the face of the country. In Wales they are very numerous; also in Dorsetshire, Somersetshire and Wiltshire. At Maiden Castle is a very remarkable example. The Ordnance survey, on an en-

larged scale (now in course of publication) may be made very useful in elucidating archæological facts, if the sites and peculiarities of all these mounds, camps or *oppida* are accurately denoted. It would be very unfortunate, if when we have these maps published, one should be described as "Cæsar's," another as "Vespasian's," and so on; especially if some astute German professor should come over here, and seeing this, should remark, "These gentlemen seem to know nothing of their archæology. They have Archæological Institutes, and yet do not know anything about the early history of their country." It would be desirable that the attention of the Ordnance staff should be called to these relics, so that while the survey is in progress they may be thoroughly investigated, and if possible their date or character ascertained. Such remains help to elucidate the very earliest stages of history, and they are perhaps the only alphabet from which we have to spell out a very difficult lesson.

Mr. ROBERTS, F.S.A. Fellow,—I beg to propose a vote of thanks to Mr. Phené, who has taken an immense deal of trouble and pains on this subject. No doubt he has brought it before this Institute because he believes, as I do, that architects, by virtue of their studies and pursuits, are able to appreciate his remarks, and that there is no society in the kingdom which could follow him or judge of the correctness of his conclusions so well as such a society as this. If that is his view, I thoroughly believe he is right, and, for once, I acknowledge that archæology here is in its proper place. I demur usually to archæological subjects being brought here; but I think Mr. Phené is perfectly right in introducing for discussion such a subject as this, because we are in the habit of studying works and constructions from the very beginning of existence, and of tracing the development of art in our every shape down to the present time. As I understand the subject advanced by Mr. Phené, it was mainly that of the similarity of construction between the pre-historic remains of this country, and those of other countries. I am not quite sure that I am right in taking that as the basis of his paper. But if that be so, he is perfectly correct, because no one who has taken any trouble to look into pre-historic remains, whether they be tumuli, flint implements, implements of manufacture, or any thing else which human ingenuity has devised prior to the use of metals, can fail to suppose that there must have been some almost universal principle which guided human beings in providing themselves with dwellings of some kind or other. I think it is impossible to come to any definite conclusion as to the date of any thing that was produced prior to the Roman period. We may call anything in this country previous to the time of Cæsar's invasion "pre-historic," but whatever the date there was an universality of design that is perfectly marvellous, and that this extended to all parts of the globe was made perfectly clear to those who attended the last Exhibition in Paris. It was made evident, by the arrangement in concentric circles, of the most remarkable collection of implements that has ever been collected together—collected from all parts of the world, and arranged so far as they could be in circles of similar periods. As seen together they were identical, whether produced from the north pole, or from the south pole; from Europe, or from any other portion of the globe. So far I go with Mr. Phené. Beyond that I do not think I can go, because all beyond seems merely conjectural. I think that Canon Greenwell, who has done so much, may feel a little proud of having a fellow-worker who takes the care and trouble which Mr. Phené does in securing the remarkable registers of facts which are seen in these diagrams on the walls. And these are what we require. No matter how carefully the excavations are made, if exact records are not made, showing things in their precise positions, and all the circumstances under which they are found they are of little or no value. Mr. Phené, I can testify, is as careful in recording these things as he is zealous in exploring, and such records will be invaluable to those who come after him in quest of information; and I am sure we all feel deeply indebted to him for the pains he has taken.

Mr. WYATT PAPWORTH, Fellow,—I have great pleasure in rising to second the vote of thanks

for this very interesting paper. It is almost entirely new to myself, except in some familiar instances. There is one point connected with the serpent mounds which attracted my attention If Mr. Phené would be kind enough to explain what connection there was between serpent worship and the mountains, I should be glad.

Mr. THOMAS MORRIS, Associate, produced a drawing, and said,—I thought it would be allowable, Sir, to bring down, as bearing on the subject of this paper, the sketch (enlarged) of a relic that fell in my way many years ago. I have not otherwise met with anything of the kind, but some of us may have done so in our visits to cromlechs and other monuments of similar ancient character. It is situated on a British or Roman road, one of those now curious bye-ways that traverse England in directions no longer precisely followed. The antiquity I refer to is on a road of this kind, not very far from Ashbury, near the Vale of White Horse, a situation that Mr. Phené has visited, and it is also very near a little cromlech or tumulus known as "Wayland Smith's Forge," which is a good deal spoken of in Sir Walter Scott's "Kenilworth." It is called at the place the "blowing stone." There is a step at the side of it, on which a man stands to unlock the lid on the top, and by stooping and blowing vigorously into an orifice he produces a sound as of a large horn, and I remember that the man, from the habit of blowing in this way, had acquired a sort of protuberance against his mouth, which seemed just to fit the cavity in the stone. It must interest those gentleman who follow this walk of inquiry, to know that Sir John Lubbock, Mr. Beresford Hope, Mr. Bouverie, and other gentlemen, are at this time maturing an Act (which seems to have every prospect of becoming a law) to preserve all such remains as Cæsar's Camps, cromlechs, &c. In a schedule to the Bill I notice the term "sarsen stones."*—The Act is a step that may ultimately lead to the preservation of more finished monuments and antiquities of an architectural character. I think it an important beginning, and that every gentleman here should wish it success.

Mr. PHENÉ SPIERS,—I should like to ask Mr. Phené whether he has any authority for turning the head of the serpent round as he has done in the diagram, and if so, whether there is any reason for supposing that there was a head, as well as the emblem of eternity, the globe, at the top. If that turning round is correct, you then expect to find some indications of the existence of a head. The other diagrams exhibited, however, differ from this one, and do not show any.

Mr. EASTLAKE, Secretary.—I did not clearly understand Mr. Phené's remarks as to the correct sense of the word "*simulacra*" in the passage which he quoted from Cæsar. It is true that "*simulacrum*" need not necessarily mean the likeness of a human being, but it was certainly the figure or representation of something, and in the absence of any direct proof to the contrary, I should still be inclined to regard the popular interpretation as probably the right one, and believe that it was intended to convey the idea of a huge wicker-work effigy of a man, whether erected upright or laid horizontally.

Mr. PHENÉ,—I should like to give some explanation of the diagrams, to aid my reply. I have here, also, some remarkable flints, upon which Mr. Roberts can perhaps give some information. They were obtained from under the turf on the great figure at Wilmington. I will endeavour to answer what has been said *seriatim*. The observations of Mr. Wadmore are very much to the point, because I have felt that for many years prior to my search in the Hebrides I could not profess to know

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* "It will here be proper to notice those remarkable stones of a fine siliceous grit, called by the country people "sarsden" stones, or the "grey weathers," which are scattered over the Berkshire and Wiltshire downs. They appear to have been removed by some violent concussion of the earth, as they evidently lie on strata to which they do not naturally belong. The greatest number of them are to be seen in a valley near Ashdown Park, on a stratum of chalk; others on a bed of clay, in the parish of Compton Beauchamp. They are frequently blasted with gunpowder, and used for pitching, but are too hard to be worked."—*Lysons' Mag. Brit.*

anything of ancient comparative archæology. Indeed, there was a want which my foreign examinations did not satisfy. It is very satisfactory to me when I find anyone who has been a fellow labourer in the subject. Mr. Wadmore's remarks were, however, more of a general kind than directed to the particular subject of my paper, except his support to my view of stone avenues being connected with sacrifice, which I value highly. I perfectly agree with Mr. Roberts upon the universality of design which characterises these pre-historic works. I have dwelt upon this point in a paper which I have sent round to the members, and probably that is in Mr. Roberts's mind. I did not intend this present paper to be more than a repetition, or recapitulation rather, of some of the most striking facts, which have come directly under my notice. As to the "blowing stone," we read of it in 'Tom Brown's School Days,' and it is a most interesting and curious thing. In the neighbourhood of the stone it is traditionally connected with King Alfred, but in my opinion we might just as reasonably say King Arthur. It is certainly one of the most interesting relics we have. It is impossible to go into that district without feeling great interest. Mr. Papworth and Mr. Phené Spiers asked me a question or two, which I will endeavour to answer. In doing so, I may be allowed to state what led me to engage in these pursuits, which in their results have enabled me to lay such curious facts before you. I read in a very interesting work by Dr. Oliver that certain mountains were objects of worship by the ancient people of this country, and it appears that these mountains were always looked upon in worshipping towards the east. In order to test this, and to see whether it was merely an idea of the author's, I searched in the vicinity of such mountains, and in almost every case—in Wales and Scotland especially —I have found remarkable things that have been overlooked by others, or not previously discovered, or else considered unworthy of attention. It will be seen by the diagrams that in each case these very remarkable mounds are in the vicinity of triple peaked mountains; but other mountains are supposed to have had their respective properties, each of which was a special object of adoration. Mr. Phené Spiers's observation was very much to the point. I did slightly touch upon that part of the subject when I said that in the first instance I considered the form referred to that of a saurian, although it was difficult to decide whether it was a saurian or a serpent. I feel myself now only on the shore of an investigation which I think may prove one of great interest. In reply to Mr. Eastlake's remarks, it may be well to explain that it was not the rendering of the word *simulacra* I objected to, but of *contexta*, which I put in italics to draw attention to it.

The discussion having then been brought to a close, a vote of thanks was unanimously passed to Mr. Phené for his Paper, and the Meeting adjourned.

Royal Institute of British Architects.

Closing General Meeting, held on Monday, the 9th of June, 1873, Sir G. Gilbert Scott, R.A, President, in the Chair:—

PRESENTATION OF THE ROYAL GOLD MEDAL.

The preliminary business of the meeting having been transacted in due form,

The President rose and said:—Gentlemen, We have now arrived at the most interesting portion of this evening's business, viz. the presentation of the Gold Medal which is annually placed at the disposal of this Royal Institute by Her Majesty the Queen, and which the Institute has this year, I am quite sure, with immense satisfaction, awarded to our distinguished member and highly valued friend Mr. Thomas Henry Wyatt. (Loud cheering). I need hardly add, gentlemen, that this award has been graciously, and, I am quite sure, right heartily approved and confirmed by the Queen. (Hear, hear). It adds greatly to my own personal gratification, and must, I am sure, add greatly to the pleasure of the members of the Institute, that it has so happened that this period coincides with the period at which we are placed under such great obligations to Mr. Wyatt through his having for three consecutive years performed the duties of President of this Institute, with the greatest possible judgment and with most eminent success. (Hear, hear). That, however, is a mere accident, and it is no part of the merit for which this honour is awarded, though it adds greatly to our satisfaction that the coincidence is as it is. Mr. Wyatt has most fully and most amply merited this honour from his own intrinsic and abstract merit. Mr. Wyatt, as we all know, is a scion of a family who have supplied members to our own profession—eminent members—and also to the art of sculpture for at least a century. I think it may be more: I know myself of at least ten members of his family who have been devoted to the arts, while he himself, together with his eminently gifted brother, Sir Digby, still continue to carry on the honours which their family have already won. And, gentlemen, I believe I may add, indeed I know I may add, that another generation is now in the spring time of hope; and it is therefore our privilege to hope that that name will be continued to future generations, if possible with greater honour than it has hitherto received. I think it is something like forty-two years ago since I first had the honour of making Mr. Wyatt's acquaintance, and that thought must make us both feel rather old. We were not in practice then, but I well remember at that early period being struck with the gentlemanly bearing which has characterised Mr. Wyatt throughout the whole subsequent period of his life. If there is one personal characteristic which marks him more than another, it is that bearing, especially with reference to our high art and profession, and the honour and dignity of our art. These, however, are personal and secondary claims upon our admiration. His absolute claims are from his own actual works; and I do not know any living member of our profession who has carried out so many works for such varied purposes as Mr. Wyatt; and I have no doubt, if I knew them all, I should be able to say, with such eminent success. But, unfortunately, we are most of us so busy that we do not visit the works of our brethren so often as we ought; and in

fact to visit all Mr. Wyatt's works would perhaps take up a whole year. They consist of every variety of building, I believe, that can be named. In the first place there are numerous churches, some of them restorations, some new, which I cannot attempt to enumerate. Foremost amongst the new churches, I may mention that which we have known for so many years—the magnificent church at Wilton. That building has the singular merit of importing into this country a perfect specimen of a noble style—the early style of Lombardy, with all its richness and magnificence of material and workmanship. It is a truly magnificent building; probably most of you know it, and it is useless for me to expatiate upon it. Another church, which, I regret to say, I have only seen during the progress of the work, is the noble minster of Wimborne, restored by Mr. Wyatt. I have not seen the result, but all speak of it as a great success. The next class of buildings I may mention are numerous mansions which he has either built, or added to, or altered. I will not enumerate them; but I may mention one in particular. Our friend Mr. Wyatt was selected by Count Woronzow to design for him a palace in Russia; but in our own country we have continuous specimens of his skill in that department of architecture throughout the length and breadth of it, while Ireland contains others. He has also designed public institutions and public buildings without number, foremost amongst which is the magnificent Exchange recently finished at Liverpool. There are a number of others, consisting, I believe of Assize Courts in four counties, and amongst the public institutions there are numerous gaols, lunatic asylums and hospitals; in fact, works of all kinds, the attempt to enumerate which, however interesting, would weary this meeting. Addressing Mr. Wyatt, the PRESIDENT continued: I assure you, Sir, it gives me the greatest possible pleasure to have the honour of presenting to you, on behalf of the Institute, this mark of their high esteem and admiration of your personal qualifications, your talents and your works. I am quite sure that although they may not have been influenced by the fact, the members of this Institute cannot forget the immense debt of gratitude they owe you for your labours as President. Yet I feel it is impossible to sever the two; and in awarding to you this token of their admiration of your professional merits, the pleasure of that award must, I am sure, be enhanced by the consideration of the eminent services which you have rendered to this Institute. For my own part, I feel that this medal ought to have been awarded to you long ago. I believe it is by accident only that it has not been awarded; but I will take upon myself to say, that I think the delay has been amply compensated for by the happy coincidence which it has brought about; and I further venture to say, that never has this medal been awarded by the members of this Institute with greater or more enthusiastic pleasure than is the case on the present occasion. (Loud applause).

Mr. THOMAS HENRY WYATT.—Sir Gilbert Scott and Gentlemen, Though I certainly have enjoyed many opportunities during the last three years of expressing my gratitude to the members of this Institute for acts and expressions of good will and approval, yet I do not feel that on this occasion I can adequately express my deep sense of this your last and most generous act—the bestowal of the highest professional honour it is in your power to give. But, gentlemen, if words fail me, I am not the less grateful. To you, Mr. President, I am specially indebted for the kind and flattering way in which you have spoken of my works, and for the partial and generous interpretation you have put upon my actions. I know well how little these works in themselves deserve this honour, and no one can know so well as I do how much I am indebted to others for what there is of interest in those works—I mean to faithful and attached assistants who have been long with me. In judging of these works, however, critics should bear in mind the relative advantages that the younger architect of the present day has had over us of a passing generation. But, Sir, if I cannot conscientiously claim merit on the score of realized works, I can and do claim it on the ground of an earnest

attachment to my profession, and a constant desire to raise in public estimation the character of that profession. Like one of my predecessors in this honour (Mr. Fergusson), I was intended to be a merchant, and spent two or three of my early years in the Mediterranean, trying to learn the beauties of cottons, coffees and calicoes! I utterly failed in the attempt, and then my father sanctioned my trying my hand at that profession which had always been my ambition. I need hardly say that a lengthened journey home through Italy and France confirmed my wishes and aspirations. From the first, I felt that if it was not in my power to realize great and meritorious works, it might be in my power to win the confidence and personal regard of my clients; of those who entrusted their interests to my care; I further believed that I might by consistent and honourable conduct also win the approval and good will of my professional brethren. I am thankful to say that in the first of these objects I have fully succeeded, and am proud to feel that in your award of this medal, I have not failed in the last. You have been good enough, Sir Gilbert Scott, to speak of the numerous members of my family who have been Architects and Sculptors. I cannot but feel a pride in being a member of a family whose tastes and pursuits have associated them with art in any form. The works of some of these (one in particular) have been criticised with much virulence and little consideration; the fact is, that the taste and fashion of his day may have dictated much that he did. I can only hope that in some future generation, when our works are measured by some other standard than our own approval and our own prejudices, they may be more mercifully dealt with. One word more, Sir, and I have finished. It has been suggested elsewhere that as President, I should not have accepted this award, so kindly proposed by the Council for your approval. Independently of there being abundant precedent for such a recommendation, I felt that this question had to pass the ordeal of the approval of the Institute generally; and that I had no right to suppose I could be a safer guardian of my own honour than you would be. I was the President of this Institute, and not of the Council merely, and if the Institute confirmed that proposal, I considered that I should be relieved from all responsibility. Gentlemen, it did meet with your cordial and generous approval, and I have now only to say how gratefully I accept this honour, which has been so graciously sanctioned by Her Majesty.

[Mr. Wyatt having received the Gold Medal from the hands of the President, resumed his seat amid loud cheers.]

Mr. HORACE JONES, Fellow.—Permit me to add that the vote respecting the recommendation of the award of the Royal Gold Medal to Mr. Thomas Henry Wyatt was unanimous in the Council, as it was unanimous in this room.

The PRESIDENT then proceeded to award the Soane Medallion and other Institute Prizes (see Notice Paper No. 16), after which Dr. Hayward, of Liverpool, was requested to read his Paper "On Health and Comfort in House Building."

ON HEALTH AND COMFORT IN HOUSE BUILDING; OR VENTILATION WITH WARM AIR BY SELF-ACTING SUCTION POWER.

By John W. Hayward, M.D., M.R.C.S., L.S.A.,
Vice-President of the Liverpool Architectural and Archæological Society.

Mr. President and Gentlemen,

As implied in the title, my subject is not house building itself, as such, but only certain arrangements for health and comfort therein.

House building has at least two aspects—architectural and sanitary. The former belongs exclusively to your own profession, but the latter comes within the sphere of the medical profession also. It is the architect's province to provide dwellings for the people and to see that they are made protective and safe; and it is part of the medical man's province to help to make them healthy and comfortable. In this respect the medical profession has lately been very forcibly reminded of its duty by one of your own Fellows (Mr. George Aitchison), who, in the 'Builder' of December 2, 1872, made the following observations:—"No greater benefit could be conferred on mankind than the teaching them the necessity of ventilation, but that lesson is more likely to be learnt if it come from the doctor than from the architect. . . . . Until the faculty can convince the people that their life is shortened and serious diseases are brought on by want of ventilation, architects have no chance."

House building being the point in which the duties of the architect and the physician meet, it becomes necessary that architects and medical men should occasionally discuss together the requirements involved in this art. Much public and much mutual benefit would, I am sure, result from such a practice. Under this impression I willingly accepted your invitation, and I am pleased that I have been able to be present myself, because I look forward to much interesting and profitable discussion this evening. The object I have in view is to invite your consideration of a few conditions of house building that I deem of particular importance in a sanitary and medical point of view.

In building a dwelling house, the conditions I deem of essential importance are the following:—

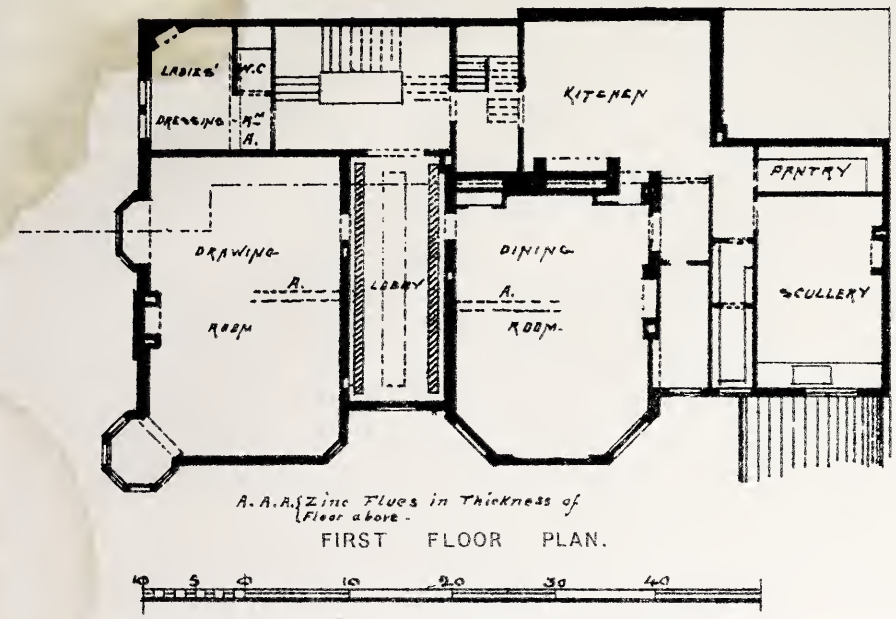
First. That the house shall be so placed as to be as much as possible exposed to the fresh air and sunlight; *because* fresh air and sunlight are essential to the health and growth and life of the occupants. The SITE, therefore, should be rather elevated, if not absolutely, at all events in comparison with the surrounding objects.

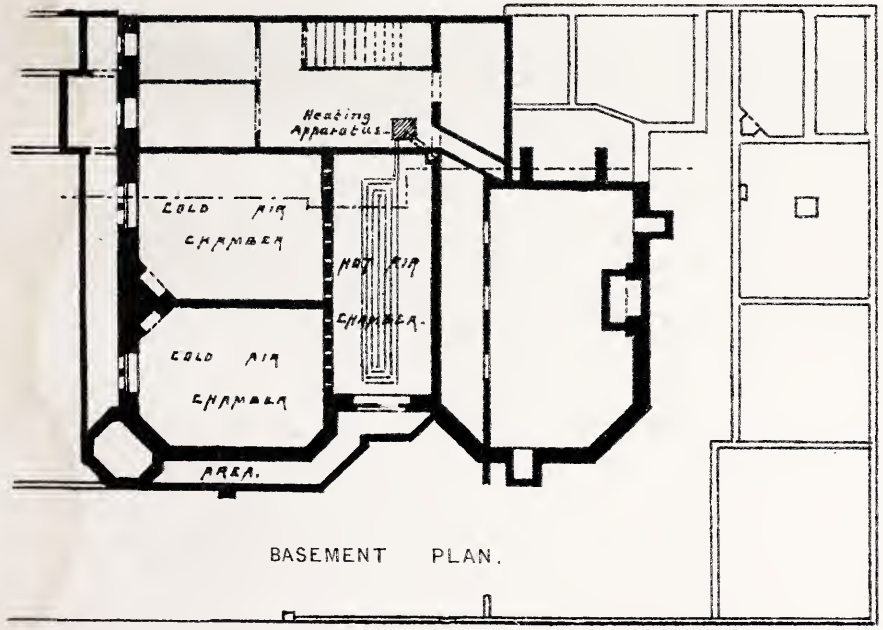
Second. That it shall be absolutely free from damp; *because* a damp house is a most potent and active and ever present cause of disease, especially of rheumatism, neuralgia, colds, coughs, consumption and such like. The site, therefore, if not naturally dry, must be rendered so by means of asphalt or cement, throughout the foundation, and the roof and gutters and drainage must be perfect. All the house drains should terminate outside the house on an open grid or trap, that is, they should be cut off from the street drain, and they should be ventilated by having a pipe run up from every soil pipe and every bend in the house.

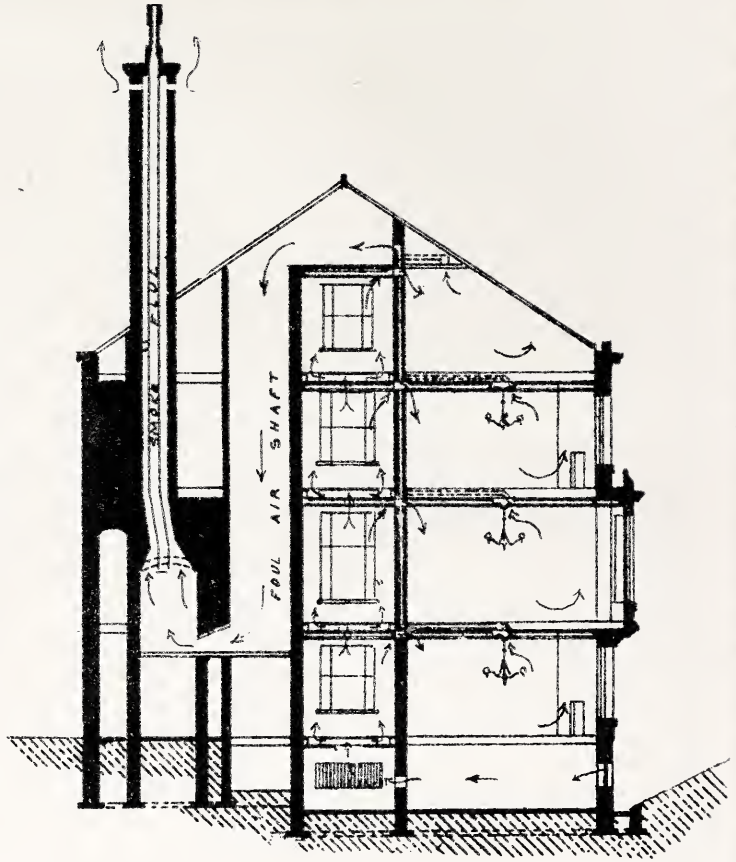
Third. That it shall be so placed that the direct rays of the sun shall have free admission into the living apartments; *because* the sun's rays impart a healthy and invigorating quality to the air and stimulate the vitality of human beings as they do those of plants, and without sunlight human beings as well as plants would sicken and die. The ASPECT, therefore, should be south-east.

PLANS & SECTION OF Dr HAYWARDS HOUSE

SHOWING THE SYSTEM OF VENTILATION ADOPTED.







Fourth. That the look-out from the living apartments shall be cheerful, lively and interesting; *because* much of the time of the family must be spent in-doors, and a cheerful look-out is as necessary to render in-doors attractive and even endurable in the daytime as society is in the evening. The PROSPECT, therefore, should be as extensive and varied as possible.

Fifth. The apartments should admit into themselves a great quantity of light; *because* light is essential to the health and vigour of the inmates. The *window openings* should, therefore, be large; but as the greater the surface of glass, the colder the rooms in winter and the hotter in summer.

Sixth. The window openings should be well splayed, as well outside as inside, so as to do with as little glass as possible.

Seventh. The *windows* should be so arranged as to admit the direct rays of the sun at the times when the apartments are in use; *because* it is when the apartments are occupied that they require the cheering and invigorating influence of the sun's rays. For instance, the breakfast-room window should admit the early morning rays; the dining-room windows, one should admit the morning rays for breakfast time and the other the noon rays for dinner time; and the drawing-room windows, one should admit the morning rays for callers and another the evening rays for company; and the bed-room windows should, if possible, admit the early morning rays.

Eighth. The *interior* of the apartments should provide wall space for the arrangement of furniture; *because* without wall space no manner of furnishing a room can make it either handsome, elegant or comfortable. The WINDOWS, therefore, should be few, and they and the door and fireplace should be so arranged as to provide as much wall space as possible.

Ninth. In the bed-rooms the window, door and fireplace should be so arranged that the bed can be fixed entirely out of the draught, and not have to be placed between the window and door, the window and fireplace, or the door and fireplace; *because* a cold draught playing on persons whilst sleeping is often dangerous to life, and always destructive of comfort.

Tenth. The DOORS of the apartments, besides not admitting cold air when shut, ought not to admit cold air when open; *because* the draught thus produced not only destroys the comfort of the apartment, but produces lumbago, rheumatism, neuralgia, etc., in the occupants. The DOORS should, therefore, open out of a warmed lobby or corridor.

Eleventh. The APARTMENTS should provide a large cubic space for air; *because* plenty of air is essential to the health and comfort of the inmates. The apartments should therefore be as large and lofty as possible.

Twelfth. The apartments, besides providing a large cubic space for air, should also provide for the escape of the foul and admission of fresh air; *because*, however large an apartment is, the air is sure to become deteriorated and contaminated when the apartment is occupied by living beings. There should, therefore, be TWO SPECIAL OPENINGS to each apartment, one for the escape of the foul air and another for the admission of fresh air. There must be *two openings*, an outlet and an inlet. It is useless to make one without the other; it is useless to make an outlet unless there is also an inlet, for no air can go out if none comes in. This is a self-evident fact; still it is very frequently disregarded in attempting to ventilate apartments. There will, for instance, be a perforated or louvered pane in the window, a perforated brick or grating in the wall, an Arnott's ventilator in the chimney breast, an opening above the gas with a tube leading to a grating in the wall or into the chimney smoke flue, or some other contrivance for the escape of the foul air, whilst there is no opening at all for the admission of fresh air; and the doors and windows are made to fit as tightly as possible, and even list put round them to prevent any possibility of air getting in by them, as though that could go out which never got in! In these cases, if the outlet act at all as an outlet, it must obtain its supply down the chimney—

hence a smoking chimney; but generally, instead of acting as an outlet, it becomes an inlet to supply the current up the chimney, and always so when the fire is burning—hence the cold draught so generally complained of from the ordinary ventilators, and hence the reason that ordinary ventilators are so generally closed up in disappointment and disgust, and ventilation decried as a nuisance, failure and farce.

Thirteenth. These OPENINGS providing for the escape of foul air and the admission of fresh air should, both of them, be *special and permanent*, and altogether independent of every other arrangement of the house, such as opening the windows, doors, chimneys, &c.; *because* the escape of foul air and the admission of fresh air are most needed when, in consequence of the coldness of the external air, we close the doors and shut the windows. Special VENTILATION is most needed in winter, in cold frosty weather, with an east wind blowing, and when we are very careful to shut the doors and windows, and adopt every other means we can to exclude the out-of-doors air, particularly if sitting at table for meals, or round the fire for evening entertainment.

Fourteenth. The OUTLET should take the foul air from the upper part of the room; *because* the foul air being more heated is specifically lighter than the fresh air, and so rises to the upper part of the room. The outlet should, therefore, be in or near the ceiling.

Fifteenth. The outlet should be effectually protected against any possibility of back draught—indeed it should have a considerable amount of suction; *because* any liability to back draught is quite incompatible with an efficient outlet. The OUTLET, therefore should not communicate directly with the out-of-doors air, but, by means of a tube or flue, should pass through some permanently heated contrivance. If the outlet go directly to the out-of-doors air, as, for instance, a tube from over the gas to a grating in the outer wall, there will certainly be back draught; and so also will there be if the tube lead to an opening into the chimney flue—at any rate when the fire is not burning, and particularly if the room door be also open, and most certainly if there be also a strong draught up the chimney of another room opening out of the same lobby, as, for instance, a dining-room or a kitchen. To prevent any possibility of back draught the outlet should be provided with some means of constant suction, and the more thoroughly to remove the foul air the more suction the better, provided there is also an ample inlet for fresh air; if not ample, the suction would produce a smoking chimney and draughts from around the windows and doors, and perhaps draw in air from foundation and drains. The necessity for this suction is generally acknowledged, and it is sometimes attempted to be gained by carrying the tube before mentioned up a little way in the smoke flue, and even by bending it down and round the fireplace. But a fatal objection to this plan is, that it is quite inoperative for the greater part of the year, and is of no use whatever unless the fire is burning; when the fire is not burning it may indeed become an inlet, and then an additional objection is that a back draught down the smoke flue carries the soot into the room to the spoiling of the ceiling, paper and furniture. And to be really effectual the suction referred to must be *constant* and *permanent*, and operative both winter and summer, and day and night; and whether the apartment is occupied or not, and whether the fire is burning or not. The OUTLET must, therefore, pass through some contrivance for keeping it constantly and permanently heated.

Sixteenth. The *inlet* should admit only warmed air; *because* the admission of cold air would produce dangerous draughts, and these specially directed towards the part of the room occupied by the inmates in cold weather, viz. the neighbourhood of the fireplace. The INLET should, therefore, open out of a warm lobby or corridor.

Seventeenth. The *outlet* should be sufficiently large to carry off all the foul air at the time when the apartment is being put to its maximum of use; *because* it is just at that time the outlet is most

needed, its capacity for other times could be regulated by a valve. The outlet for a dining-room, for instance, should be calculated for a dinner or supper party, and that of a drawing-room for a ball, conversazione or soirée, and should be sufficiently capacious to carry off at the very least fifteen cubic feet per minute for each occupant. The outlet should, however, be considerably less than the inlet, or it will produce draughts.

Eighteenth. The *inlet*, on the contrary, should be as capacious as possible; *because* it has to provide not only for the outlet in the ceiling but also for the chimney, and that when the fire is burning and requiring for its supply alone from six hundred to a thousand cubic feet per minute. Indeed the INLET should be able to admit more air than can possibly find its way out by both these outlets, otherwise it will produce draughts. When the air can get out of an apartment more rapidly than it can come in there are sure to be currents; but when more air can come in than can get out—when the air has to go out under pressure, so to speak—there will be little or no current. And the INLET should be through the wall of the opposite side of the room to the fireplace; *because* the fire will then draw the air into and across the room, and thus cause it to circulate throughout the whole of the apartment. If the fireplace be on the same side as the inlet, it will not only not assist to circulate the air throughout the apartment, but it will prevent it from so circulating by drawing it directly up the smoke flue. And it should, moreover, be split up into as many divisions as possible so as to distribute the supply along the whole side of the room, and thus assist to prevent any perceptible current; and this will be further helped by having the openings through the cornice instead of through the skirting, because then the fresh air will be the warmest that is in the corridor, and it will also have to descend through the warmer air of the room before it can come in contact with the persons therein. When through the skirting it is the coldest air of the corridor; it comes through the coldest air of the room, and it comes first to the part of the body where it can least be borne, viz. the feet.

In this country it is necessary to provide specially for ventilation. In consequence of the nature of our climate, the doors or windows can very seldom be left open, even in the day, and never in the night, without risk. Indeed, no direct admission of the external air into the apartments of the house can be endured during at least eight or nine months of the year—in fact, the great prevalence of cold, searching and shrivelling east wind renders such an admission absolutely dangerous; so that no kind of arrangement of openings directly to the out-of-doors air, such as drawing down the window sash, perforated bricks or gratings in the wall, perforated or louvered squares in the window, the wire gauze at the top of the window sash, Watson's ventilators, or any other contrivance that communicates directly with the out-of-doors air, can possibly answer for ventilation in a country like ours. In this country where eight or nine out of the twelve months in the year are cold, windy and winterly, houses should be built with reference to winter, and not with reference to summer; and they should be planned and built with the object of keeping out the cold air and not with the object of letting it in; ventilation should be provided for specially; and in making this provision it should be borne in mind that we are living at the bottom of an ocean of air, and that the same manipulation is required as though we were living at the bottom of an ocean of water, and were endeavouring to make it come in at the bottom of the house and go out at the top in a continuous stream.

From the foregoing remarks it will be seen that I maintain that VENTILATION is the great and main necessity of house building; and that whatever else may be left undone this should be attended to; and whatever else may be left imperfect this should be made perfect and complete; and that it should include the whole house; and should be self-acting and inexpensive. It should, I repeat, be perfect and complete, include the whole house, and be self-acting and inexpensive.

Ventilation is *the* point for discussion between the architectural and medical professions, for it is

here in particular that their duties meet and combine; the education, knowledge, and experience of both professions are wanted here. However much the medical man may be impressed with the absolute necessity of rooms and houses being ventilated, he cannot himself provide it; this must be done by the architect: and, on the other hand, the architect cannot be expected to provide flues and tubes, which involve extra expense, except under the certainty that they are absolutely necessary, and required arrangements involved in the plan of every house. But there is a third party interested in this subject, namely, the public. The public are, after all, the "yea" and "nay" in this matter: it is, indeed, for them that these arrangements are to be made, and they are the paymasters. Whatever extra cost is involved, it is the public that will have to pay it; and it is of little use for a doctor to prove the necessity, or for an architect to design the arrangements, unless the public be persuaded to adopt them and pay the cost involved. That the public can be thus persuaded I have no doubt, but that this will take some time I am equally ready to admit. It will take some time thoroughly to educate the public into the absolute necessity for special provisions for ventilation, because they have hitherto been left under the impression that special arrangements for ventilation are unnecessary and superfluous, or that they are impracticable, or at least incompatible with warmth and comfort; and I am sorry to have to add that they have been encouraged in this impression by many architects and engineers, and that medical men have not protested with sufficient force and intelligence. Medical men have gone on from generation to generation silently mourning the resulting evils of the want of efficient and practicable means of ventilation, and architects have continued to design houses with very little regard to these absolutely necessary provisions; whilst the public have submitted, and if they have not thought it was all right, have at least thought that the evil was quite beyond their remedying, because every amateur (if not every professional) attempt hitherto made had only ended in failure, disappointment and loss of money.

The first duty then of the architectural and medical professions now, is to make amends for this —to admit their past culpability, and, promising better for the future, proceed at once and vigorously to instruct and educate the public into the absolute necessity there is for ample ventilation in every house and every room, and to show them that such is not only possible and practicable, but is also compatible with warmth and comfort, indeed, conducive to these. Let architects make up their minds never in future to design any house, large or small, without introducing special arrangements for efficient ventilation; let them do this as a matter of course, as they would flues for smoke and passages for drainage; and if their clients object to the cost, let architects explain the absolute necessity, just as they would the necessity for stairs, doorways, or chimneys. Suppose a client were to object to the provision of a separate chimney flue for each fire-place, and argue that one flue would serve for several fire-places, would not the architect remonstrate and point out the evils of such an arrangement, and that so effectually as to overcome the client's objections? Certainly he would. And I am convinced that a similar result would attend explanation of the necessity of provision for ventilation; that is, of course, supposing that successful and uncostly provision could be guaranteed. But even should the architect not thus succeed, at least one good result must follow this practice, namely, education of the public in the necessity of such provision. Should the client still positively refuse to have these provisions introduced, he would not be able to blame the architect, as so many now do, when subsequently he found by experience the mistake he had made; and the architect would then rise in his estimation in proportion to the urgency with which he had advocated the special means for ventilation. Unless the architectural profession adopt some such plan as this, the most persevering and zealous efforts of the medical profession will be frustrated. It would, I think, be productive of much good, if the Royal Institute of British Architects were to issue a short paper, sheet, or fly-leaf, explaining these requirements, so that

each architect might present one to his objecting client. It is of little use for medical men to grumble at the want of ventilation in a patient's bed-room when it is impossible to obtain it, except with air at a temperature which would itself kill the patient. In about ninety-nine out of every hundred houses in this country, bedrooms open directly out of the stairs lobby, and this opens directly to out of doors, without even the protection of a vestibule door, so that every time the outer door is opened, there is a rush in of the outer air, and the whole air of the lobby is reduced to nearly the temperature of the outer air, which in winter will perhaps be below 28 deg., and there is no provision in the lobby for raising it any higher; stairs lobbies probably range in frosty weather about 35 deg.; and at this time there is necessarily a fire in the patient's bed-room, and in all probability the bed has to stand between the fireplace and the doorway. Now the fire requires at least 600 cubic feet of air every minute, and this it must obtain either from the stairs lobby through the doorway, or from the outer air through the window opening; and the outer air will at this time be not higher than 28 deg. Now the temperature of the patient's body will be about 98 or 99 deg.; imagine then the evil effect of exposing the patient to a current of air at 28 or 35 deg.! Of course chill must be produced, and then there will most probably follow neuralgia, rheumatism, inflammation, &c. But patients are of necessity so exposed, to a certain extent, in about ninety-nine out of every hundred houses in this country, either by the fire drawing air in, or by the rushing in that takes place when the door is opened; and imagine the danger of having the door or window permanently open at such times! The result might be fatal to the patient, and it would certainly be dangerous to the attendants. A medical man cannot, indeed he dare not, order the door or window to be kept open, under such circumstances, however much he feel the necessity of fresh air; of the two evils he must choose the lesser, for it is better that the patient's recovery should be retarded by foul air than that he should be killed outright by cold draughts; and it is better that the attendants should have to leave the room occasionally for fresh air, than that they should shortly be laid up with rheumatism, neuralgia, or inflammation. The evil is bad enough when the bed has to stand between the fireplace and the doorway, but it is worse when it has to stand between the fireplace and the window, for then the beating draught is with the outdoor air. According to the last published annual report of the Registrar-General, asthma and consumption alone, caused in England itself, 18,125 deaths, and I have not the slightest hesitation in saying that a very large proportion of the cases of these diseases owe their origin and still more certainly their obstinacy and incurability, to this vicious construction of bedrooms. Most persons occasionally take cold, and in the majority of instances the cold falls on the respiratory organs, in one case as influenza, in another as sore throat, and in another as bronchitis or pneumonia. Now, in each of these instances the temperature of the air respired affects very materially the progress of the case, and even determines whether it shall be mild or severe, or indeed, whether it shall be curable or fatal. In acute bronchitis the temperature of the air respired should never be lower than 65 deg.; but how is it possible to obtain this temperature in ordinary bed-rooms in winter, when bronchitis is most prevalent? And even when it is obtained by well fitting windows and doors and large fires, matters are not much better, for the very means taken to obtain warmth exclude fresh air, and subject the patient and his attendants to the evils of foul air. As before stated, it is to these unpropitious bed-rooms that may be traced very many of the cases of consumption, chronic bronchitis, and asthma, and indeed of heart disease also, for heart disease is one of the results of chronic bronchitis and asthma. In fever cases much fresh air is required, and sometimes every endeavour is made to obtain it, even by opening the doors and windows, hence many typhoid fever patients die of bronchitis, and many typhus fever patients die of pneumonia, and many rheumatic fever cases are prolonged and complicated; and with all their knowledge and care medical men cannot prevent these evil results, because of the defective construction of bed-rooms, and

even of hospital wards. But it is not in bed-rooms only that cold draughts are pernicious, they are almost equally so in sitting rooms, in which, as Mr. Rawlinson puts it, persons may be "roasted on one side and frozen on the other," which subjects them to neuralgia, rheumatism, colds, cough, asthma, consumption, etc. ; and the cold lobbies contribute materially to these evil results ; in fact the defective construction of ordinary houses is a crying appeal to all present and future architects and engineers to improve our dwellings.

Now, bad as are the evils that result from cold draughts through doorways and window-openings in both health and disease, the evil results of preventing these by having tightly-fitting doors and windows are infinitely worse. Of course you are all familiar with the results of a fish being out of water or being in impure water; well, exactly the same results follow to human beings when out of air or in impure air. Death by drowning is nothing more than an effect of man being out of air, and death by charcoal fumes is only an instance of the results of excessively impure air. Now, human beings themselves burn charcoal, or what is the same thing, carbonaceous compounds, in their food; and they pollute the air with the very same poisons that burning charcoal does; and they also produce other impurities besides, such as sulphuretted hydrogen and other poisonous gases; also particles of animal matter, warm, moist, and in a state of decomposition, being given off from the lungs, stomach, bowels and skin. The quantity of deleterious gas and watery vapour thrown into the air of a room by one adult person, amounts to something like four gallons and a half per hour, and contains suspended in it something like three-quarters of an ounce of solid matter; and this from all persons into all rooms, but from patients in bedrooms there are also other impurities, such as evaporated urine and stool, etc., which are exceedingly injurious in some cases, for instance, in typhoid fever and cholera; and the secretions and excretions of patients in infectious diseases are all extremely injurious; one whiff of the breath of a diptheria patient has been known to be fatal to persons up to that time in health, and merely passing by a small-pox patient has been known to communicate that disease so virulently as to produce death. What then are likely to be the qualities of a warm bed-room where these poisons are kept pent up and in concentration for want of ventilation? It is indeed frightful to contemplate the evil results to the attendants and to the patients themselves, shut up for hours together and sleeping in warm bed-rooms, the air of which is loaded with these poisons! Medical men know by daily and reluctant experience that the foulness of the air of many of the bedrooms into which they have to go is enough to produce nausea and vomiting immediately on their entrance, and sometimes does so; and they silently curse such architectural monstrosities.

Now, bad as are the evils of the want of ventilation in bed-rooms in winter, they are infinitely worse in summer, when the temperature outside is equal to that inside, and the whole air of the town is still, and there is not even the help of a fire to make a change of air in the room; for when the temperature is the same in-doors and out, and their is no wind, there is no spontaneous change, even when the doors and windows are open: this is remedied in hot climates by the use of the punkah and other immense fans; but in this country all the change that can be obtained is from a miserable little hand-fan which just vibrates the air in front of the face but scarcely moves it away at all. Under these circumstances is it at all surprising that putrefaction and germination should go on at a rapid rate and produce fever, diarrhœa, cholera and gangrene, sometimes to a frightful extent? Truly there ought to be provided in every house a power of absolute *suction* of the vitiated air from every room, independent of the chimneys and windows, with provision for the inlet of fresh air, and this at an agreeable temperature.

Thus far my remarks have applied to the ventilation of *rooms*—to "single-room-ventilation," but rooms are not the only parts of a house that require ventilation. No plan of single-room-ventilation

can possibly supersede the necessity of a general plan for the whole house. The lobbies require special means of ventilation and warming quite as much as do the rooms, indeed the latter cannot possibly be obtained without the former. When referring to bedrooms of patients in winter, with the fire drawing in 600 cubic feet of air each minute, I laid stress on the fact of this air being cold; but coldness is perhaps the lesser of its two evil qualities; it is also *foul*, indeed, perhaps loaded with dangerous effluvia. This is one of the evils that our improved architecture and building have increased, if not absolutely provided for us. The water closet opens into the lobby; the front door is made to fit as tightly as possible, to prevent cold draughts; and this prevents fresh air from coming in from the front; whilst with well-fitting intermediate doors to shut off kitchen smells, the admission of fresh air from the back of the house is prevented: these arrangements make the lobby into a chamber with the termination of the main drain opening into it through the water-closet. The rooms of the house—at least one or two living rooms and the patient's bed-room—have fires in them, and these fires must and will have from 600 to 900 cubic feet of air per minute each, and this they obtain most easily from the lobbies, round the door when this is shut and through the doorway when it is open, which of necessity it frequently is * The supply of air for the rooms is thus obtained principally through the water-closet especially if, as is usually the case, this is against an outer wall with a ventilating window through this wall, for the cold air then absolutely *blows* into the house through the water-closet window. The water-closet is placed against an outer wall, and a window placed there under the mistaken notion that the foul air will force its way out through it in spite of the force of the wind, and in opposition to the power of gravitation and that of fire-suction. It is, however, perhaps worse if there is no water-closet window when all other inlet is shut off, for then the fires of the house will suck in air through the water-closet pan out of the drains, as they did in Londesborough Lodge during the stay of H.R.H. the Prince of Wales. So also will opening and shutting the lobby doors: this may be demonstrated by the simple experiment of holding a lighted taper or bit of smoking tape within the closet pan; by this it will be seen that every time the doors are opened or shut, air is drawn up through the water in the pan. We all are familiar with the circular stain on the under surface of the lid by the foul gases. The foul air of the house drains and of the main drain of the street is then being continually drawn into the lobbies of the house; so that the freshest air to be had in such houses is that loaded with water-closet effluvia! One partial remedy for this state of matters is to keep the water-closet lid and door shut; and another is to cut off the house drains from the main drain of the street by an open trap or grating just outside the house. These are, however, only very partial and imperfect protections; the only complete and effectual remedy is a direct opening from the outer air into the lobby, only protected by shutters to regulate the supply according to the requirements of the house, and by hot-water pipes to regulate the temperature according to the season of the year; and this should be sufficiently large to supply the whole house during its maximum of use, and so as to make it more easy for the rooms to draw air through this opening than any other way; indeed, instead of the lobby drawing air from the water-closet the water-closet should draw air from the lobby,—there should always be an *in*ward current from the lobby to the water-closet produced by absolute suction through its ceiling, and this should be strong and continual: a window in the water-closet opening to the outer air is quite a mistake, as it is sure to drive the water-closet odours into the house; the water-closet window should always be shut.

From what I have advanced, it will be rightly concluded that what I hold to be a prime and

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* Also directly from the drain, when there is a fixed wash basin communicating with the drain.

absolutely fundamental condition of a healthy and comfortable house is an ample supply of fresh and agreeably warm air in the lobbies, corridors, or other central spaces out of which the rooms of the house open, or draw their supply. This is, in truth, absolutely necessary, and no house can be ventilated without it; no effectual removal of the vitiated air from the rooms, or admission of fresh air into them, can be accomplished without this; in fact, no house can be made comfortable and healthy without it. The supply of air must not only be ample for the maximum requirements of the whole house, but it must be fresh,—that is, as fresh as can be procured, and if possible passed through canvas or other filter: and it must not only be ample and fresh, but it must also be warm; if it is to be admitted freely and copiously into sitting-rooms and bed-rooms, air must not be below 60 deg. temperature, indeed it should be about 65 deg.; without ventilation, that is, still air, is comfortable at 60 deg., but air in motion—that is, when there is ventilation—is not comfortable to sit or remain still in lower than 65 deg. There must, therefore, be a coil of hot-water pipe at the entrance opening, or somewhere in the lobby. Even Mr. Rawlinson admits this, and provides it in his own house, and recommends it for all other houses.

The next thing is the admission of this air into the rooms: of course some will gain admission when the doors are open, and even round the doors when they are shut. But this is not enough; for, when a room is fully occupied, a quantity of fresh air, equal to the cubic contents of the whole room, should gain admission every twenty minutes: that is, three times every hour. Special inlets must therefore be provided directly from the lobby into the room; and these should, if possible, be controllable by valves to accommodate the supply to one or two persons,—that is, to a partial occupation of the room.

The next consideration is the abstraction of the vitiated air from the rooms. An opening or openings must be provided in or near the ceiling: to this must be adapted a pipe or flue, and this must run up an inner wall to the top of the house; each room, each water-closet, and each gaselier in the house should have a separate flue: all these flues should terminate in one common chamber in the top of the house: this chamber should terminate in one common flue or shaft; and this should be kept permanently heated. It is absolutely necessary that this latter flue should be kept permanently heated, for in no other way can a constant suction from the rooms, &c., of the house be procured and maintained, and in no other way can the rooms be emptied every twenty minutes, which they ought to be; and in no other way can back draught be prevented. This common abstraction flue may be kept permanently heated with very little trouble and for very little permanent cost, by a jet of gas constantly burning in it, or by a few coils of the hot-water pipe; or for no permanent cost, by bringing it down to below the kitchen floor, and carrying it up behind the fire and round the smoke flue, and terminating it outside near the top of the chimney; in this latter case, the kitchen chimney smoke flue should be made of iron. This permanently heated abstraction flue being properly proportioned to the size of the house, will empty the whole house three times every hour, and of course three times every hour will the whole house be replenished with fresh warm air. An intermediate drum or chamber, into which all the flues of the house may terminate separately, and which is emptied by one common abstraction flue, is absolutely necessary, for in no other way can the suction act equally on every room.

The plan I have thus sketched meets, I think, all the requirements of house ventilation with which I set out, namely, that it must be perfect and complete, must include the whole house, and be self-acting and uncostly. For the benefits of an efficient and complete system of ventilation and warming, I maintain that the outlay is very small indeed; the exact amount will of course depend on the size of the house. For the *ventilation* the PRIMARY cost is very little; of course the shutters of the primary inlet will cost something, so will the zinc tubes and the special kitchen chimney flue; the PERMANENT

cost is almost nothing: and for the *warming*, the PRIMARY cost is only that of the apparatus itself; and the PERMANENT cost is only a few tons of coke per annum; so the plan is "inexpensive." It is also, as far as such an arrangement can be, self-acting; because, the *ventilation* once set according to the number of occupants, wants nothing more; and because it acts day and night, and winter and summer, alike; and the *warming* wants only the stove fire attending to night and morning, and perhaps once in the day. It "includes the whole house," because the abstraction flue sucks equally from every room and the fresh warm air, entering at the basement, passes upwards through all the lobbies and rooms of the house in one continuous stream, never to return.

To those who are familiar with the subject of house ventilation and warming—and none can be expected to be more so than yourselves—such assertions as these may appear unwarrantable; but I make them advisedly, and as confirmed by practical experience and scientific experiment. I have now lived four years and a half in a house provided with these arrangements, and have thereby satisfied myself and all my friends who have observed along with me, that the system is complete and perfect, and answers every expectation originally formed; there are perfect ventilation and complete warmth throughout the house, so that persons may sit in any part of the room, and do not require to crouch over the fire, or be "roasted on one side and frozen on the other;" the odour of dinner is gone directly, and so is that of smoking, in any room; the bed-rooms in the morning do not smell like bed-rooms; there is no offensive odour from the water-closets, and both the ventilation and warmth are easily regulatable according to the requirements of the occupants and the season of the year; each room receives an ample supply of fresh air, so distributed that there is no perceptible current, and which in summer is cooled from 5 to 10 deg., and in winter is warmed from 10 to 30 deg.; so that all the year round the atmosphere of the whole house can be kept from varying more than 8 to 10 deg. In the coldest winter it can be kept up to or above 65 deg., and in the hottest summer it is prevented from rising above 72 deg., and it could be kept down to almost any temperature by spray or ice in the primary inlet. Of the comfort and advantage of these conditions I have had practical experience, not only in health but also in disease. For some weeks in the winter of '69 and '70, I had staying with me a young lady in the early stage of consumption, and my wife was laid up with bronchitis; both patients felt the advantage of being able to range through the lobbies and the whole house at any time with a full supply of fresh air, and without the fear of the irritating effect of cold air. Also in the spring of 1871 I had two of my children down with severe putrid scarlet fever; and I then felt the immense advantage of plenty of fresh warmed air going from the lobbies into the bed-rooms, and thence out of doors without returning into the lobbies, and with the ability to load the incoming air with disinfectants. By using disinfectants in the first floor lobby the air entering the house became impregnated, and then passing through the lobbies into the rooms to out of doors without returning into the house, left my professional part on the ground floor free from any risk of infection, much to my own and my patients' satisfaction. But this is not the only practical testimony: During the four years and a half, thermometers, placed in the different lobbies, rooms and passages, have recorded the temperatures throughout the house; and during 1871-72 very careful observations of the currents of the air through the house were made with Casella's anemometers: one fixed in the primary inlet, in the secondary inlet, in the outlets from the different rooms, in the downcast shaft, in the transverse, and in the upcast in two places; and readings were taken in the morning before the fires were lighted or the sun had risen, in the day at different times and under varying circumstances of the house, also in the night after all the fires had gone out: with many persons in the house and with few. Canvas has been stretched across the primary inlet, and readings taken with the canvas and without, and with the doors open and with them shut; during strong wind, and in calm weather. The results arrived at are: That with a good kitchen

fire burning and the water in the boiler boiling, we gain an average increase of temperature in the upcast shaft in winter of about 20 deg. between the outside air and the air in the upcast, for the suction of the vitiated air out of the house; and that this produces a velocity of about 220 feet per minute. The temperature of the smoke at the beginning of the kitchen smoke flue is about 230 deg., and of that escaping at the chimney top 195 deg. Even with an earthenware smoke flue, open kitchen range, and wide chimney top, therefore, we utilise about 35 deg. of the waste heat of the kitchen fire. With an iron smoke flue, close kitchen range and contracted chimney top, we should in all probability utilise from 50 to 70 deg., which would probably increase the velocity to about 300 or 350 feet per minute. The area of the upcast is four square feet; 480 cubic feet of air, therefore, passed through the house every minute, besides what went up the chimneys,—enough to supply the standard quantity of fifteen cubic feet per minute to thirty-eight persons in the house at one time; and, supposing the ordinarily used fires to be lighted, about 4,500 cubic feet of fresh air would pass through the house every minute,—enough to supply 300 persons; for of course the occupants would have the use of that which passed to the fires as well as that which passed to the ventilators. The quantity passing up the upcast is not diminished when the fires are burning.

Finally, Gentlemen, I am sure it is the warmest house in winter and the coolest in summer; the most airy and fresh, and at the same time the house that is the freest from cold draughts in this country, if not in the world; and from personal experience of the comfort and advantage of living in a house built to live in, and of the discomfort of living in houses built for gain, I do not hesitate, in reference to ordinary houses, to vary the well-known epigram, and say that "knaves build houses and fools live in them."

Mr. T. H. WYATT, Fellow:—In moving a vote of thanks to Dr. Hayward for his interesting paper, I would express a hope, in reference to one of his remarks, that architects will never "inwardly curse" the *medical* profession for *their* shortcomings; but I will venture to say I have spent half my life in endeavouring to circulate many of the sanitary theories which have been laid down by the author of this paper. And if I had shown such a section of a house as that now before us to my clients, and adopted the arrangement which it involves, I should have expected my *congé* very soon. I have been all along endeavouring to urge the introduction of fresh air, but I found the ventilation doctors had so frightened my clients by large flues under main walls and under party walls, and the arrangements in other places, that they prefer to run the risk of fatal consequences which our author considers imminent, rather than construct their houses upon the improved system recommended. I think some of the inconveniences spoken of may perhaps have been slightly exaggerated. I am sorry to confess that I sleep every night in a bed placed between the door and the window. No doubt there may be objections to it. We are, however, not the less indebted to Dr. Hayward for his kind intentions in bringing the subject before us, and I for one shall seek to introduce many of the benefits he has suggested.

Mr. ROBERTS, Fellow.—Twenty years ago this subject was under discussion here, introduced by a paper which I was requested to prepare, showing the importance of attention being paid to sanitary matters. And in order to show that architects have not been unmindful of the subject, I may state that a work I wrote upon it, went through two editions in France, and the same in Italy.

The PRESIDENT.—A large proportion of houses are built without any architect at all; and I apprehend it would be upon such houses that Dr. Hayward's censure would mostly fall. I quite feel with Mr. Wyatt we ought to thank Dr. Hayward for the practical suggestions he has brought forward,

many of which, no doubt, are the result of a large amount of thought given to the subject. One great value of the paper will be that it tabulates a great number of ideas that may have been floating in our minds, and it will become a record of many points which we might otherwise overlook. We have general ideas in our minds, but when we come to practical work we forget half of them. A paper like this reminds us of them one after the other, which will be of great use to us.

Mr. ROBERTS.—It is only justice to Miss Florence Nightingale to state that at meetings of the Social Science Association, that lady has read several papers on the subject.

Mr. A. PAYNE, Associate.—May I be allowed to ask whether the plan described in this section has been adopted in any other private houses, or in any public buildings? It may be useful if we can practically observe how it is carried out.

Dr. HAYWARD, Visitor.—With one or two exceptions, this section contains no very special or extraordinary arrangements. The only part which seems not to have been hitherto in use is that of utilising the upper landing, which costs nothing, and requires no alteration. In the houses of Parliament this system is adopted to a certain extent. The only other private residence that I am aware of, besides my own, which has been constructed on the principles I have described, is that of Dr. Drysdale's at Liverpool, which was built before mine. The great point is to have a central space in the house through which the air can be drawn and abstracted by the kitchen flue. In some houses the system has been partially carried out.

A vote of thanks having been passed to Dr. Hayward for his paper, the meeting (being the last for the Session 1872-3) was brought to a close.