

the writer was requested to write this paper must be the apology for its many deficiencies, but he trusts it will be discussed with the same friendly spirit in which it is written.

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## DISCUSSION.

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Mr. G. A. MANSFIELD, in opening the discussion, said he considered that unless an architect possessed sufficient engineering knowledge to enable him to correctly design the ordinary iron-work which might be termed an integral part of the various structures with which he had to deal he was not qualified for his duties. There were many matters connected with the design and construction of elevators, electric lighting and motive plant, &c., for all the numerous requirements met with in large buildings which were of a purely engineering character, and in such cases it became the architect's duty, in justice to himself and his client, to import into his work that special knowledge which alone could deal satisfactorily with these questions. He (the speaker) had had to do this on several occasions, and so far there had been no clashing of interests or conflict of opinions. It had been his good fortune to meet with gentlemen with whom he could act in accord and with very satisfactory results. With regard to the author's first question he (the speaker) could scarcely imagine a case in which an architect would draw up his specification and conditions so loosely for an important contract as to place himself at the mercy of the builder. If such a trouble ever came to his (the speaker's) lot he would be very unwilling to allow a contractor to assume such a position without contesting the

matter in a Court of Law, but, as the author had pointed out, a clear provision should be made in all cases by which the proprietor should have the power to introduce what skilled labour he thought fit. The next point was whether a condition of things should be tolerated under which building contractors tendered for engineering work. This raised the question of commission and touched the architects more nearly than it did the engineers. He (the speaker) had always held one position in this matter, although he was fully aware that it was not the position held by many architects in this city, that was, if he could prevent it, he allowed no builder to get a commission out of work unless the builder was so brought into connection with it as to give positive assistance to the client. These remarks would apply with greater force to machinery, for what service a builder could render the proprietor of a building by carrying out machinery work he could not see; where the builder had nothing to do, and no money passed, no commission should be claimed.

Mr. Oakshott congratulated the author on his paper, which had interested them all very much. He quite agreed with the author as to the ordinary engineering matters with which architects had to deal in their ordinary practice, but whenever any exceptional work had to be done, the architect should not hesitate to consult a professional engineer.

Mr. A. D. Nelson said he wished to compliment the author not only on the subject which he had brought before this Association, but also on the manner in which the subject was dealt with for their consideration. Those of them who had been in the engineering business for any length of time knew full well that there were many grievances in the engineering circles and the only true way to settle them was by discussion in that friendly spirit which was so clearly shown in the paper read by Mr. Selfe. He (the speaker) felt sure that they would all agree with him, that after the various points which had been raised by the author had been levelled down there would be

food for thought, and that it would have a beneficial effect upon all concerned in architectural, engineering and building pursuits. The author stated that Fergusson's definition of architecture was the art of ornamental and ornamented construction, and that civil engineering was the art of disposing the most suitable materials in the most economical and scientific manner. Well, suppose they looked a little further on. They knew that architecture was divided into three branches, civil, naval, and military, but as they had nothing to do with military and naval architecture that evening, they would confine themselves to civil architecture alone.

When architecture was taken in its broadest sense it might be regarded either from an artistic, scientific, or utilitarian point of view. In the first case, as a means of giving external and sensible expression to mental conceptions or ideas, it was a branch of æsthetics or of the fine arts, properly so called, and took rank with sculpture and painting. No one would deny the truth of the foregoing remarks. Even in our young city we saw the handywork of architecture daily, and men who came from older countries expressed their appreciation of the architect's handywork in this colony. It mattered not what class of building or structure was being designed by the architect, if carried out for its respective purpose, it would be found to have obeyed some æsthetical principles. Nature, they were told, was not self-contradictory, neither should true architecture be self-contradictory, and to art and science, beauty and utility when rightly understood were never in conflict. This, then, was a concise idea of architecture.

Regarding the author's remarks concerning the difficulties which arose when engineers' and architects' work overlapped, he believed that the view which Mr. Selfe held was one that most architects in the city would agree with. He (the speaker) was prepared to admit that oftentimes circumstances might prevent engineers or architects from carrying out work in a manner which they themselves must know was to the best

interests of their clients. Suppose they took as an illustration that an architect designed a building; he might have all the necessary skill to design his girders as well as the building; he might be bound down by his client to the amount of money he had to spend, and having a desire to give the building a good appearance, might be forced to study economy, and under the circumstances would probably endeavour to get his ironwork and fittings as cheap as possible; but would he be justified in so doing? They knew it was sometimes done, it might be, caused by the keen competition that existed. The architect might argue that if he did not do it some one else would. Although an action such as this was not justified, yet it was given to show how such an event might occur.

Coming to the question of designing and building girders, he (the speaker) claimed it was the duty of an engineer and not an architect, the architect to state the load, but the engineer should be the best judge of the design and how it should be constructed, and from his experience and practical knowledge he was better qualified to know the class of work that was being put into it. It was patent to many that it was essential after a girder had been designed, that it should be carried out in a workmanlike manner, and if the man supervising the work had not that practical experience and knowledge to know that the work was done faithfully or otherwise, he failed to see how it was within the power of the architect to do justice to his client. If, on the other hand, the girder work had been designed by an engineer and placed in his hands, responsibility was at once removed from the shoulders of the architect, and rested upon the engineer to whom the work was entrusted. They knew that at the present time girder work was done at a price which would be simply ruinous if carried out under the supervision of a first-class engineer; but where girders were constructed without supervision, and where there was no law to regulate what factor of safety should be used, or no inspection of the girder prior to its being placed in position,

shoddy girders would continue to be made, and buildings, which should stand almost to the end of time, ran the risk of coming to grief through inferior ironwork. He maintained that if this class of ironwork was to be in use in the future, the sooner some steps were taken to place a thoroughly reliable man in a position so that he should have the power to reject and condemn all such work as he, from his experience, would deem unfit for its purpose, the better it would be for everyone. He knew perfectly well that an architect sometimes instructed manufacturing engineers to design his girders ; this was not for the best interests of his client, as the more metal that was used in the construction of girders the better for the manufacturer, as, he presumed, when the manufacturer designed the girder it was left entirely to his honesty to give quality of iron and workmanship satisfactory. He maintained that many of our engineers had had extensive experience in building material, yet he thought there was no one present who would be prepared to say that a civil engineer would be justified in designing a large building and supervising the construction of the same.

The author had asked some very pertinent questions with reference to the manner in which tenders were oftentimes called, and the unfair conditions under which engineers had to tender. As an illustration, the Government might construct a building which, when it is completed, they then call for tenders for a plant of machinery to fit the building, and ask the contractors to supply their own plans and specifications for approval. Every man who wished to tender had to get out plans and specifications to submit to a department. What was the consequence ? Every man tendered on different ideas and possibly different classes of work. One might offer a first-class modern job ; another might be prepared and throw in anything he could get passed, and, as it had been in the past, trust to political influence to get it through. Where was the justice ? This class of tendering had been done frequently. It might be caused by overwork in the department ; but if such was the

case, why should the contractor be compelled to formulate ideas and go to the expense for which he got nothing unless his tender was accepted? To say the least it was a bad practice, and one that engineers would, he trusted, put their foot down on. If the department were undermanned, there were plenty of men who would be glad of the chance of employment. Practical men in business would be only too glad of the opportunity of getting out plans and specifications, thus each contractor would be on the same footing and there would be no injustice.

Mr. J. J. Stone considered that the examples given by the author were very exceptional. With regard to the first question he (the speaker) could scarcely conceive it possible for any professional man to be so far forgetful of his responsibilities as to omit such a very important matter as making provision for placing upon the work certain things with which the builder or contractor had nothing to do. His answer to the second question would be in the negative. With regard to the third question asked by the author, he (the speaker) believed that Government contracts were referred to, perhaps in connection with waterworks or similar work, where a large portion of the machinery had to be imported, the embargo placed upon the contractors in consequence of the large sums of money which had to be deposited with the Government was an important matter. In reference to the fourth question he wished to enter his emphatic protest against the present system of tendering. He considered that when the Government called for tenders, full designs of what was required should be submitted for contractors to tender on.

Mr. Jones (a visitor) considered some of the author's remarks somewhat far-fetched, as he (the speaker) had never heard of a single instance where a builder had refused permission to the architect to bring engineers or other professional gentlemen on to the work to complete the structure. Generally speaking, architects and engineers, worked together very amicably in this respect.

Mr. J. Nangle said that in regard to the question of factors of safety to be used in buildings, what was wanted was a comprehensive Building Act which would remedy to a very great extent the existing evils. He begged to differ with Mr. Mansfield to a certain extent, as he (the speaker) failed to see how an architect could give such attention to the designing of ironwork as was desirable. It was preferable to have the assistance and attention of an engineer in all works above a certain standard.

Mr. W. D. Cruickshank complimented the author on the manner in which he had dealt with this somewhat delicate subject, and agreed with him that the *overlapping* of the duties of the architect and engineer was at times likely to lead to slight misconceptions between the parties. To prevent misunderstanding, it was far more sensible to meet and discuss the matter in a friendly spirit than to indulge in a newspaper controversy which must prove unsatisfactory to all parties. With reference to the question of percentage or commission, they, as professional men, were greatly to blame for the present condition of affairs. Why should a man not be paid in proportion to the work he did? Why should a commission agent be allowed to step in and obtain twice as much as the professional man? The sooner steps were taken to ensure the due payment of the professional man without the intervention of the middleman the better. The tendency of the modern educational system, under which our young men gained a smattering of many subjects but a real knowledge of none, was much to be regretted. Mr. Mansfield had stated that an architect, if he understood his business, was competent to carry out engineering work in connection with buildings; that might be so, but he (the speaker) had seen girder work put into Sydney buildings that was simply disgraceful. He did not wish to impute that the architect in these cases did not understand the principles of construction just as well as an engineer, but he submitted with great respect that there was a class of knowledge which

could not be obtained from books, and no man could be a judge of work without long years of experience and observation.

Mr. Horbury Hunt (a visitor) said that in the main he agreed with Mr. Stone's remarks. His (the speaker's) experience with Sydney contractors had been one of good fortune and good fellowship. He had always found them ready to assist him in carrying on the work they were jointly associated in. He contended that an architect, if he were an architect in the full meaning of the term, must be a civil engineer, but no architect of the present day would set aside the services of a professional engineer in connection with the great and complicated structures of the present day. With regard to the question which affected them all—their remuneration—he was pleased to say, that the Institute of Architects had framed a code of fees and charges which rendered dispute between clients and architect almost impossible. He would have pleasure in forwarding a copy of that document to the Engineering Association in the hope that the members would attempt something of the same kind for themselves.

Mr. N. Selfe, in reply, said it was a matter of some regret that during a discussion in which so many highly qualified architects, engineers and builders had taken part, definite attention was not given to more of the important points raised in the paper, especially to those which were of every-day occurrence.

Considerable indignation was vented on the first proposition, which was of minor importance because there was but one opinion on the matter. Such a case had, however, actually come under the author's notice, and the unanimous opinion expressed was anticipated; but by putting it before other, every-day, and more important questions, the latter did not receive due attention in the discussion.

That there were substantial grounds for the other questions was thoroughly well known. Scores of cases if necessary could be cited, and in fact their existence was clearly proved by some



and tacitly admitted by other speakers. Mr. Stone was alone—and under a misconception—in thinking they were taken from the bye-paths of professional practice. The paper put the cases as hypothetical ones, because the discussion was invited on broad principles, and not on detailed transactions, the introduction of which would have involved personal matters fatal to free and beneficial interchange of opinions.

A great deal of trouble was taken by some of the speakers to show—what was clearly set forth in the paper—that an architect was to a large extent a civil engineer, but no one attempted to claim that he was also a mechanical engineer; and as it was not a function of a civil engineer, but of a mechanical engineer, to design moving machinery, the very clear inference to be drawn was that such work was beyond the scope of the architect.

At the same time the fact was emphasized that no men at the present day could be both a qualified architect and engineer too. Mr. Mansfield certainly expressed an opinion that no one was justified in calling himself a fully qualified architect unless he was engineer enough to design, calculate, and supervise the manufacture of all the ironwork that entered into the construction of a building, but it might be taken for granted that he meant by deputy.

The foundation of a true architect's qualifications—as an architect—was a knowledge and perception of art, and a training in its application, whereas an engineer's qualifications started from a purely scientific basis; the probability was, therefore, that, with ordinary persons, the greater the engineering capacities the less the architectural, and *vice versa*. The fact was that "Engineers' Gothic" had become a bye-word and reproach, as it no doubt deserved in most cases. And the great architects of the modern world seemed to leave actual engineering work severely alone, especially when machinery was involved.