Discussion.

The Author observed that the general conditions of engineering contracts in use in Great Britain at present were the result of the efforts of innumerable draughtsmen, legal and otherwise, of the past, and he thought that it would be clear that the main purpose of the draughtsmen who first settled an engineering contract was to make provision for those contingencies which might arise in the carrying out of such precarious work in such a way that, however far-reaching the modifications of the work and the conditions of the work as a result of those contingencies, the basis of the contract should remain ; that was to say, that no event, however unexpected, should vitiate the contract, and that the contract time should be kept alive by the very simple expedient of an extension of the contract period to meet the contingency and the delays thereby caused.

Gradually, however, the general conditions of contract, being drafted by the legal adviser of the employing authority, in collaboration, it might be, with their consulting engineer, and under the hands of successive advisers, reached a stage when not only had the contract been preserved in any event that might happen in its execution, but the contractor had imposed upon him almost all the risks of loss occasioned by such events. When it was appreciated that the event which caused such loss might be an event for which the Employing Authority themselves were responsible, or an event brought about by a variation in the character of the work ordered by the Engineer, or even by the failure of the structure as designed under load, it followed that the criticisms of general conditions were necessarily almost all in one direction, resulting in a consideration of the question whether or not some amelioration of those risks, and some removal or limitation upon the liabilities to be undertaken by the Contractor, would not be a more satisfactory solution of the problem.

Whilst in the Paper he had generally refrained from expressing any opinion regarding which of two views should prevail on certain aspects of the subject—he had set out those views frankly, so that those who studied the Paper might in turn adopt, or advise the Employing Authority to adopt, that course which in their opinion was best suited for the work which it was proposed to carry out—in his reference to some commonly-accepted conditions he had found it very difficult to disguise the fact that in practice he had found them to be one-sided, harsh or even unreasonable ; he had shown himself generally in favour of a contract consisting of a standardized General Conditions of Contract together with a Specification which would take precedence of the General Conditions in regard to special matters applicable to the particular contract work.

He ventured to think that a standardized form of General Conditions would have advantages to employing authorities as well as to contractors, and would be of great value to the engineering profession as a whole. Under such standard General Conditions of Contract the respective rights of the parties should be of such a nature that they might be fairly enforced whatever contingencies might arise, and in that event, if they were adopted, it should be understood by all parties that in the event of a dispute arising every clause would be enforced without question. It was common knowledge that employing authorities, and some Engineers, when challenged regarding the application of their General Conditions, had often been heard to say that they imposed certain liabilities or limitations upon the Contractor as a matter of protection only, and not with any intention, except in a bad case, of enforcing them. It had even been suggested that no fair-minded Engineer would ever think of enforcing some of the conditions still to be found in some contracts, but that they were inserted solely for the purpose of dealing with a Contractor who in the opinion of the Engineer acted dishonestly; and Contractors were known to accept conditions which on the face of them would, in the events contemplated, prove very harsh, because they were confident that such conditions would never be enforced by the Engineer concerned.

The Author and his colleagues at the Bar found considerable support for the view that the conditions of engineering contracts were not always enforced. They advised clients that some clause in the General Conditions was a complete bar to a Contractor's claim, but they found that a representation to the Engineer or to the Employing Authority that the clause which stood in the way of the claim was unreasonable often opened the way to the claim being met. In fact, one of his colleagues suggested that he was wasting his time in studying conditions of engineering contracts, because a legal basis was hardly ever necessary upon which to found a Contractor's claim if the Contractor could persuade the Engineer that it would be a hardship to him if the claim were not admitted.

While cases of that kind did great credit to the Engineer's sense of natural justice, the Author would regard the state of things to which he referred as being most unsatisfactory from the point of view of the Engineer. Sometimes the Engineer had to act for a client who expected the contract conditions to be rigidly enforced; if so, what risk might he have run if he had failed to enforce them, or at least what disappointment would he be bound to feel when he had to say to the Contractor that his recommendation to admit a claim had been refused by his client on the ground of a condition of the contract which he (the Engineer) never intended to enforce, and which he had inserted merely as a protection? He could give from his own professional experience many cases which illustrated that state of things, and he therefore suggested that the choice which had to be made was between a standardized set of fair conditions which would be strictly enforced, and the continuance of the existing practice; as a lawyer, he

would be false to his legal training if he did not favour the first of those alternatives.

If standard conditions were to be used and enforced, then the Paper indicated many matters which would have to have the consideration of those who decided the principles upon which they were to be settled. It was far from exhaustive, as he had been compelled by limitations of time and space to confine it to a few of the many matters which had come to his knowledge during his practice. He trusted also that the Paper would be of value to the younger men of the profession who might, in the light of the observations which it contained, be encouraged to give closer attention to the conditions used in connexion with works upon which they were engaged.

Mr. W. T. Halcrow said that, after showing clearly the essential differences obtaining between a contract for constructional works and one for the supply of goods or machinery, the Author proceeded to a general survey of the conditions governing and affecting a contract of the former kind. Mr. Halcrow found himself so much in agreement with the Paper that he could do little but emphasize some of the points which appeared to him to be of especial importance.

It was his experience that some engineers were apt to regard the General Conditions of Contract as a purely legal document and to think that their preparation was a matter rather for the lawyer than for themselves. His own view was that the Engineer, as the person responsible for the conduct of the work, should decide the basis for the contract between the Employer and the Contractor, and should, therefore, to a large extent prepare the conditions of contract himself. He should, however, obtain legal advice so as to avoid the possibility of imposing any condition which would conflict with the law.

The tendency to regard the conditions of contract as a legal document was illustrated by the fact that he had found resident engineers who had not even troubled to read the conditions of the contract of which they had been in charge. In his view, engineers engaged upon the construction of works should endeavour to understand the importance of the General Conditions.

Matters affecting the specification of temporary works and methods of construction were dealt with on p. 6. If the Engineer specified in detail how the work was to be carried out, the Contractor was left with little scope for the exercise of his skill and experience, and tended to become merely a purveyor of labour and materials. Whilst Mr. Halcrow fully realized that there were works which required special treatment, in his judgement it was better to give the Contractor as much freedom as possible, provided that the stability of the permanent work was not adversely affected. More favourable tenders might result thereby, to the benefit of the Employer.

In measured contracts it sometimes happened that the actual quantities

of work carried out under any item varied considerably from those in the bill, and questions arose at times regarding the fairness of applying the schedule rates to the measured quantities. It seemed to him that the conditions covering that matter should be drawn up to give the Engineer powers which would be as wide as possible, in order to deal with variation in prices in an equitable manner.

Reference was made on p. 13 to the Contractor's liability for damage to adjoining property, resulting from the carrying out of the work. That was often a difficult point, and he believed that the most satisfactory way of dealing with it was to prescribe in the contract a limit to the Contractor's risk in each particular case.

The conditions covering the maintenance of works were also discussed in the Paper. Whilst it would be agreed that the Contractor would have to make good any defects of materials or workmanship, the question of his assuming responsibility for matters over which he had no control was one which required review. Mr. Halcrow did not think that there should be much difficulty in arriving at a clause which would be fair both to the Employer and to the Contractor. The form which was usually found in contracts to-day seemed to leave something to be desired from the point of view of equity. The remarks in the Paper with regard to the date of completion being based upon the substantial completion, instead of on the final conclusion of the work, were also very much to the point. Some engineers had adopted the expression " practical completion " or " substantial completion," which appeared to him to be fair.

On p. 19 the Author dealt with variation orders for protective or strengthening works. In Mr. Halcrow's view, the Engineer should, where the safety of the work was concerned, have the power under the contract to order what was necessary without previous reference to the Employer.

Under the heading " Determination of Disputes," reference was made to the Engineer acting as sole arbitrator as an alternative to the appointment of an independent arbitrator. There had been cases where that had occurred, although he had never been in such a position, nor would he accept it. Whilst the Engineer during the course of the work had necessarily to arbitrate on matters which might from time to time arise, Mr. Halcrow's view was that, the Engineer having been in close contact with the work, it was not easy for him to detach himself from the personal knowledge which he had acquired and to place himself in the position of an independent arbitrator. He was therefore of opinion that provision should always be made for an independent arbitrator.

The arbitration clause, as usually inserted in contracts, provided that the arbitrator's award should be final and binding on all parties, and should not be liable to any exception or objection whatever. When he first interested himself in such matters he thought that the words meant what they read, but apparently they did not ; it was possible for certain matters

to go beyond the arbitrator to the courts. He had sometimes thought that, because of the nature of the works being carried out—and that point was very clearly put in the Paper—there should be some attempt to make the decision of the arbitrator final and binding.

The Author's quotation from Lord Justice Bowen's judgement was of interest. Mr. Halcrow had only to turn up old contracts prepared by predecessors in his firm to find cases where the Engineer's powers put him very much in the position of a dictator. The Contractor was apparently not allowed to have any rights, but only liabilities. At the present time, however, the Contractor was, as he ought to be, in a better position, as efforts had been made to limit his liabilities to those matters over which he had personal control. When drawing up conditions of contract it should be the Engineer's duty to ensure as far as possible that both Employer and Contractor would have a square deal.

There was a good deal to be said for the standardization as far as possible of the conditions of contract. The standard conditions drawn up jointly by the Association of Consulting Engineers and the Federation of Civil Engineering Contractors had proved of material value, and there was a steadily increasing demand for copies of them; he favoured any move towards carrying that work a step further.

He was in entire agreement with the Author's remark that the conditions should be drafted so as to be clear and unambiguous. Legal phraseology should be avoided as much as possible, as it was not easily understood by the non-legal mind. The conditions were, or should be, a working tool for those who had to carry them out, and should therefore be readily understood by them. As an engineer, he felt that the simplest language best suited the purpose.

Mr. A. M. McTaggart would like to mention a few points which occurred to him as being important from the point of view of the Contractor. In the majority of cases, for works of a substantial nature, the Contractor had to supply a detailed description with his tender showing how he proposed to carry out the work. That, in Mr. McTaggart's view, was really a contractor's asset, and, by giving such detailed information on a contract in which he might not be successful, he was giving away a great deal of his stock-in-trade. He suggested that a general description showing the intended method of carrying out the works would be sufficient in the first case, a more detailed description, in the event of the tender being considered, being at the disposal of the Engineers at that time.

He would also suggest that more positive information should be given with inquiries, and that details of bore-holes should be more specific so as to eliminate gambling as far as possible. There was sufficient margin in the general layout of a contractor's scheme and in his organization and ingenuity to make tenders competitive without the gambling influence being introduced.

With regard to bills of quantities, it was the habit of some engineers

to over-estimate those quantities so as to leave a margin for contingencies. He suggested that the margin ought to be stated, so that a contractor might measure the fair value of the work; otherwise, if quantities had been over-estimated by, say, 10 per cent., and they came out net, the Contractor was losing on the percentage which he had added to his basic figures to cover plant, stores, contingencies and general overheads, and profit.

Conditions of contract varied to a large extent, depending, apparently, more or less on the clients for whom the work was being carried out. Some clients, through their legal advisers, would appear to draw up what they considered should be the obligations of the Contractor, which in the majority of cases meant that whatever happened the Contractor had to pay. That method of drawing up General Conditions was, he felt sure, not generally acceptable to Engineers, but was rather forced upon them by their clients. He was glad to hear that Mr. Halcrow did not agree with conditions of that type.

Arbitration was a subject which led to all kinds of controversy, especially where the Engineer specified that he was to be the sole arbitrator. As a contractor, he appreciated that the Engineer in some cases felt that he knew the interpretation of what he had written and what he intended better than anyone else, but that point of view was open to criticism, as another person reading the same words and the same clauses might quite well put a different interpretation upon them and give them a different meaning. The Engineer might insist on having the final say on certain subjects in connexion with the work where an arbitrator would find difficulty in getting a true picture, but at the same time, as a general question, independent arbitration was probably preferable to all parties. He was glad to hear that Mr. Halcrow took that view.

There was a time when the Consulting Engineer, if asked why he had put certain things in the specification, would say, " I must protect myself against being landed with the worst type of Contractor and one who may take advantage of any loophole." Times had changed, however, and to-day contracting firms had on their staffs engineers who were as proud of turning out a good job as the Engineer who designed the scheme.

It was not an uncommon practice for Consulting Engineers to insert in the specification a clause making the Contractor responsible for whatever might happen to the works during the construction and maintenance period, including responsibility for failure of design. That, in Mr. McTaggart's opinion, was completely wrong, as surely the Engineers, being the party who had all the data available for the design, should be responsible for it; it appeared to Mr. McTaggart to be very unfair to ask the Contractor to accept responsibility for something which he had had neither the opportunity of studying, nor data on which to base calculations in order to check the Engineers' design. The Contractor's responsibility, should, in Mr. McTaggart's opinion, be confined to workmanship and material.

Mr. Kenneth Thomas observed that the engineering contract was a peculiar document, or compound of documents, inasmuch as there was nothing quite like it in any other sphere of industry or commerce, with the exception of the building industry, and even there an examination would reveal that there was only a very superficial resemblance between the building contract and the engineering contract. The form of the latter, as the Author indicated, was to some degree attributable to the special nature of the work which it covered, but that alone was not enough to explain its apparent one-sidedness and the peculiarly heavy risks and obligations which it placed on one party to the contract, namely the Contractor. He thought that there had for a good many years past been a tendency on the part of certain Employers, and certainly on the part of many Engineers, to recognize that there was a case for the modification of that type of contract in order to adjust the balance a little more evenly between Employer and Contractor; that had resulted in a very slow and gradual improvement in the conditions in individual cases, but taking engineering contracts in the mass throughout the country, and covering works both great and small, they were still subject to the criticism—and that applied particularly to forms of contract in use by local authorities —that they were unduly onerous and harsh to the Contractor, and he ventured to think uneconomically so.

It might be of interest to consider the reasons generally advanced for the continued retention of contracts in such a form, which frequently ran counter even to the natural principles of justice. In his experience, they fell generally into three classes. It was sometimes said, " We must protect ourselves at all costs against the dishonest contractor." On other occasions the plea was, " We must safeguard ourselves against the litigious contractor." Those two reasons, it would be freely acknowledged, were far more frequently advanced by lawyers than by engineers. Thirdly, it was frequently said " We have used these conditions for many years. They have always worked very well; why should we revise or alter them ? "

He would like for a few moments to examine those reasons. The first was the danger of the dishonest contractor. There were no doubt black sheep in every walk of life, and in the contracting industry no less than elsewhere, but certainly no more than in any other sphere. There were probably black sheep even in the building industry, but that had not prevented the adoption in that industry of a standard form of contract, the well-known R.I.B.A. form, which did hold an even scale between the Employer and the Contractor, and which was almost universally used throughout the country for works of building construction. The truth was that the employer could be protected against the dishonest contractor just as well by fair and equitable conditions as he could by unfair and harsh conditions, provided that those conditions were properly and wisely drawn ; and contractors as little as anybody would deny the advisability of all

reasonable and proper provisions to safeguard the employer against dishonesty.

In regard to the litigious contractor, if ever Mr. Thomas were unfortunate enough to get a contractor into the arbitration-room or into the Court he found that he got a black mark against his name for having failed in what the contractor regarded—and Mr. Thomas agreed—was his duty, which was to keep him out! The truth was that the litigious contractor did not exist, and even if there were a contractor who was litigiously-minded he speedily recognized the damage to his reputation and to his business which would ensue if he indulged himself in so misguided a taste.

The third argument, that the conditions had served very well for many years and that there was no need to change them, did not connote that the clauses in the form in question had been carefully and individually tested in the Courts and found to stand the test; there were very few forms of conditions of contract of which that could be said. It merely meant that the user of such conditions had been fortunate enough to experience little or no trouble in practice, for which there might be many reasons, and he therefore assumed that there was no likelihood of trouble.

The question of standardization had been referred to. His personal belief was that it would confer an immense boon on all those classes of the community who were interested, whether as employers, engineers or contractors, in engineering works. He did not minimize the difficulties attendant on the undertaking of such a task, but he had yet to learn that the difficulties attendant on any problem ever deterred either an engineer or a contractor from tackling it.

There appeared to be four essentials in the devising of a satisfactory standard form. In the first place, it was necessary to segregate those conditions which were really common to all forms of contract, no matter what work they might cover, from those conditions which were bound to vary to some extent according to the nature of the work. The latter had either to be carried to the Specification or else—more helpfully, in his view—incorporated in a supplemental document called Special Conditions; and, since there would still be a good deal of common ground about those last-named conditions, it might be very helpful if model clauses were drafted which would be suitable for use in different circumstances.

Secondly, the General Conditions proper had to be drafted in such a way as to endow the Engineer with the fullest powers to have the work executed as he wanted it. That was of supreme importance, because it was humanly impossible to foresee every contingency in connexion with an engineering contract at the time that the drawings and specifications were prepared. What was of no less importance from another point of view was that the Contractor should be entitled to be paid for his work if the requirements of the Engineer involved him in additional expense. In that connexion, it might be fruitful to examine the question whether or not the Engineer ought not to have power to vary the contract price where the

requirements that he thought it desirable to impose in the interests of the work either greatly increased the Contractor's risks relative to that work, or materially altered the quantities of the work so as to make, in effect, the Contractor's itemized price for that work uneconomical relative to the altered quantity which he had to do.

Thirdly, an effort had to be made to make a fair apportionment of responsibility for risks as between Employer and Contractor. That was a matter on which there was room for wide differences of opinion, and it necessitated a careful and sympathetic examination of the different views. It seemed to him that in that respect the economic aspect would have to carry very great weight, and that the real desideratum was to achieve a basis of tendering which would secure the minimum price being offered to the Employer for the work which was to be carried out.

Finally, there was the all-important matter of draughtsmanship. When the points of principle had been settled as best they might be, the draughtsman had to exercise his skill in the use of language so as to ensure, so far as was humanly possible, that each word and sentence had its proper value and correctly expressed the intention of the authors. The draughtsman's task was, or should be, to eliminate ambiguities, so very frequent a source of dispute, and to achieve a document which was not only standard in form but was as perfect in clarity of language as a standard document ought to be. The authors had, however, necessarily to be at pains to see that the draughtsman, in his enthusiasm for clear and correct expression, had not altered the sense of what the authors of the document meant to say. The task called for exemplary patience and care, for extreme frankness in the expression of intentions, and for the complete abandonment of those methods of subtlety and finesse which were designed to gain for one side or the other some advantage based on someone's failure to see what was being implied. The result would, however, in his opinion be ample reward for all the patience and labour expended upon the preparation.

Mr. Raymond Carpmael remarked that any views which he expressed were not to be taken in any way as committing his company, the Great Western Railway. As he sometimes did when he realized that his personal opinions should have a secure foundation, he had referred to those of his illustrious predecessor in office, Isambard Kingdom Brunel. In the archives of the Great Western Railway he found the following words of Brunel, uttered nearly 90 years ago :—

" You may have seen that a great appeal case before the Lords, affecting claims of some hundreds of thousands, has just been finally decided in favour of the Great Western Railway Company after fourteen years of litigation ; and this favourable decision was entirely obtained by carefully prepared specifications, and by my not having departed in any single case, in years of correspondence, from the letter and spirit of the contract, and particularly from the fact—strongly commented upon by Lords Cranworth and Brougham—that I had maintained my position of umpire between the Company and the Contractor. It is, then, as essential to the Company as to the Contractor and to me that I should maintain that position."

The case referred to was that of RANGER *v.* THE GREAT WESTERN RAILWAY COMPANY. Although the Author rightly emphasized the importance of the clarity with which engineers should express their views, Mr. Carpmael ventured to suggest that the spirit was of even greater importance than the letter. It would appear that Brunel himself actually took that view, because it was recorded that in his opinion :—

> " In a railway the only works to be constructed are engineering works, and there can really be only one engineer ; and in your case especially, where, as I apprehend, the contractor is part of the company, and has to be treated with consideration, and perhaps less vigorously, at all events differently from an ordinary contractor, considerable management and discretion will be required of your engineer, and a degree of responsibility which I would only undertake if sole engineer."

The only comment which Mr. Carpmael wished to make on that took the form of a question : Why should ordinary contractors (if there were such people) be treated differently from railway contractors ?

It was a Great Western Railway tradition, which his predecessors and himself had followed, that the Contractor should be treated with consideration, as part of the Company. Harsh and unreasonable treatment of contractors was certain to result sooner or later in an advancement of tender prices as compensation.

On p. 6 the Author emphasized that " the nearer the contract drawings can be prepared to represent the work as eventually carried out, the less likelihood there is of disputes arising under the contract " ; and on p. 7 he said : " Upon the clarity with which Engineers are able to express their requirements may depend much of the successful outcome of an engineering contract, and time spent on making a specification as precise and unambiguous as possible is time very well spent in the interests of the client." Mr. Carpmael would go further and say " in the interests of everybody." He fully agreed with the Author's statement ; his own Company followed the Brunel tradition in taking particular care to make their drawings and specifications as representative and precise as possible, and he had reason to know that that was realized by their contractors.

With reference to the Author's remarks regarding the bill of quantities and schedule of prices, almost all Great Western Railway contracts were " lump sum " and contained a " provisional clause." The amount of the tender therefore equalled the total of the bill of quantities ; the schedule of prices set out the unit prices on which adjustments in the contract quantities were based. With regard to preliminary items, which were referred to on p. 9, Great Western Railway practice provided for separate sums to be stated for " preliminaries," and although no provision was actually made for adjustment thereof, the equity of adjusting some at least of them was apparent in the event of extensive variation of a contract. Such cases were dealt with " in the spirit of the contract." The Author also said : " If the real intention of this schedule is to provide for pricing work which proves to be of different depth from that described in the bill, then

the Author ventures to suggest that a schedule of percentages representing the increase or decrease required for deeper or shallower sewers than those at anticipated depths is a more suitable provision." Mr. Carpmael found it somewhat difficult to appreciate the difference between a variable schedule of prices to meet variable conditions, and a percentage variation in prices to meet such conditions.

On p. 10 the Author said, " There is a strong body of opinion that a standardized form of contract may not prove satisfactory in every case, and, if the specification is to be regarded as subordinate to the General Conditions on all matters where there is divergence, the Author respectfully agrees." Mr. Carpmael, however, felt very strongly that there should be no divergence whatever between the General and the Special Conditions of Contract. The former should be drawn in such a way as to be comprehensive and applicable to all contracts with which any particular organization was concerned, whilst the latter should be applicable, without divergence from or overlapping of the General Conditions, to particular contracts.

Under the heading " Maintenance and Defects " the Author referred to the condition sometimes placed on a Contractor of making good defects in works for which defects he could have no responsibility whatever. It could hardly be accepted as being equitable to call upon a Contractor to maintain or even to construct a building or to carry out works either inherently defective in design or subject to physical subsidences, both of which were entirely outside his control or responsibility. Under the General Conditions of the Great Western Railway, the Contractor was given the benefit when he could show that the Company or their servants or agents or a third party were in default. The Author said that the Association contract in clause 39 attempted some solution of the problem. It would be interesting to know whether he could suggest a better solution or a more appropriate wording.

With regard to the Author's comments (p. 17) on the provisions relating to " Alterations, Additions, and Omissions," the Great Western Railway General Conditions specified that " Any additional or extra works which the Contractor may be required to carry out shall also be governed so far as applicable by the same terms and conditions and by the same specification," and, in the event of divergence of opinion arising between the Contractor and the Company as to the applicability of that clause and the financial effect of its application, recourse to arbitration was open. With regard to prime cost and provisional sums, the Great Western Railway specified that " It is the duty of the Contractor to see that the supply of all such goods or materials or the carrying out of work as above mentioned shall be governed by the terms and conditions of his contract with the Company." In certain instances the Company themselves obtained quotations for and included as prime-cost items work to be carried out by specialized firms. In such cases it was made clear to those firms that the Company's contract conditions applied.

On the question of arbitration, although for many years he had as Engineer for his Company occupied the invidious position of sole arbitrator, he welcomed the recent introduction into his Company's contract conditions of an arbitration clause. He would point out, however, that such a clause cut both ways. Without it the Engineer would take meticulous care to acquaint himself with all the details, with a resultant settlement favourable and satisfactory to both parties; with it, no matter in whose favour the decision was given, future rancour and unease might originate. In any case, in all railway contracts some matters—for example, the work procedure as affecting traffic working, which involved the safety of the travelling public—had to be left to the unfettered discretion of the Engineer. In general, for the same reason, decisions affecting progress of work (although, as regards Contractors' costs, appropriately referable at a later date to arbitration in the absence of agreement), should be made by the Engineer, by whose decision the Contractor should be bound.

While he most heartily endorsed the Author's opinion as to the necessity for the taking of the greatest possible care to ensure that so far as possible Contractors were made fully aware of the circumstances of any work for which they were asked to tender, he felt that the greatest regard should be paid to "the spirit of the contract"; he ventured to differ in that one respect from Brunel's view and to suggest that if Brunel had not insisted upon the observance of the "letter" as well as the "spirit" of the specification, the settlement of the final account would not have taken 14 years, and heavy legal expenses would thereby have been saved.

In several other ways, which time did not permit him to specify, the Great Western Railway conditions were in accord with the views expressed by the Author.

Mr. M. B. Buxton emphasized that fair conditions of contract were most satisfactory both to the Employer and to the Contractor. They tended to make the job go better, and in almost every case, he believed, they enabled a lower price to be quoted. For many years he had been a member of the Contracts Committee of the Federation of British Industries, some of the members of which were engineers representing various interests. In a semi-judicial manner they had to try to assess whether the terms in various contracts brought up by members were unfair or unreasonable, and it was surprising to find how many terms in the contract conditions of certain municipalities, railway companies, and Government departments, perhaps through an oversight, were in need of revision.

With reference to the Author's remarks under the heading "Alterations, Additions, and Omissions," engineers were aware that variations occurred on every job, and he would like to know whether the Author considered that the power given to the Engineer in most contracts was sufficient, or whether, as fair-minded men, Engineers ought not to ask for rather greater powers than they at present possessed when there was a substantial variation in a contract.

He agreed with the suggestion that the engineering profession demanded standard terms of contract. The Royal Institute of British Architects had had them for 21 years, and their standard terms had recently been revised in a very fair way. Would the Council of The Institution consider setting up a Committee to go into the question and to obtain the benefit of the advice of those with experience in the matter ?

Mr. Hugh Beaver observed that, whilst it was in the interests of all parties to have a fair contract, the interests of the several parties could not be identical. A contractor was employed principally for two reasons: namely, to secure the most experienced person in carrying out the class of work involved, and to relieve the Employer of responsibility. The point to be emphasized in a civil engineering contract was that the Engineer had the dual position of specifying and indicating for the Contractor's assistance how works were to be carried out, and yet had his duty to the Employer in seeing that the responsibility for fulfilling the contract remained always on the Contractor.

If a standard form of contract and General Conditions were to be drawn up, the first stage, so far as engineers were concerned, was to decide what was wanted and what were the ideal conditions. When those matters were decided, it was time to discuss the matter with the opposite side, for, whatever was said, there were bound to be two sides to a contract. A further difficulty was the different degree of responsibility and authority that the Engineer might hold, and the growing interference of the Employer in the administration of a contract.

The Institution should consider the question of standardized conditions of contracts, particularly for structural engineering and building. Most building contractors were accustomed to the R.I.B.A. form of contract, but that was not a good contract; in fact, he had seen a recent legal opinion to the effect that it was not a contract at all.

Standard General Conditions of Contract should make allowance for the different conditions that applied to different classes of contract, such as " cost-plus " or " building-fee " contracts, or the " value-cost " contracts of the London County Council, or the common Continental system where the Engineer priced the bill and the Contractor tendered by percentage, additions, or deductions. There was, for instance, nothing more debatable in a contract than the definition of " cost," and there were numerous problems peculiar to the " cost-plus " contract, such as the question of maintenance and renovation of bad workmanship or poor materials.

Another matter of importance was that of insurance. He was satisfied that the ordinary insurance clauses in the ordinary contract did not give to the owner the protection that was thought. In some cases and circumstances it was fairly certain that there was, in fact, no protection for the Employer at all—especially where there was a large number of contractors on the same job—in regard to third-party risks. He thought that the only

safe way was for the Employer to take out the policy himself, or to lay down his exact terms.

So far there was no insurance for the Engineer. There were policies in existence for architects, but he knew of none for engineers. The Engineer was, however, incurring a definite risk, in spite of all the efforts of the usual contract to place on the Contractor responsibility for the suitability of the ground, for the stability of work during construction, and so forth. In Canada, incidentally, the law put those responsibilities on the Engineer as well as on the Contractor. If, as the Author suggested, the Contractor's degree of responsibility might actually be altered by variations and modifications of the original contracts, plans, and specifications, then the risk might be really serious to both Employer and Engineer.

Another important point was the power of modification, and with it the power of extension or reduction of a contract, or its termination. It had always been Mr. Beaver's firm's view that Engineers—acting either on their own or on behalf of the Employer—should, so far as the Contractor was concerned, have almost unlimited power in that respect. The Contractor was, however, always entitled to claim extra payment, and in the last recourse to have the contract declared void and to be dealt with on a *quantum meruit* basis, should it be so altered as no longer to be that which was reasonably contemplated by both parties at the outset. That view was by no means universal, and at least one important Government department retained, or used to retain, the right to terminate any contract on a month's notice, paying only for the work done. There had also been cases where part of an accepted contract had been cancelled and then placed at a lower price with another contractor.

He would like to ask the Author if an extension of time should be given at the time when the alleged cause or reason for it occurred, or at the end of the contract.

There was an interesting point in regard to constructional plant that was overlooked in the Paper. Almost universally the contract vested the ownership of all temporary plant in the Employer during the period of the contract. What, therefore, was the position when the Contractor did not own the plant—when, as was often the case, he hired it, or was purchasing it by instalments? In Canada and the United States the Contractor generally formed a separate company to own the plant. The security, which it was thought the Employer possessed, was thus often illusory.

There were many other points that would have to be settled when conditions of contract came to be standardized, such as the position and responsibility of sub-contractors and nominated sub-contractors; at the present time they were often sub-contractors only in name, and it was in practice impossible for the Engineer not to deal direct with them. Further, the American practice of sub-letting whole contracts, or the major part of them, was growing in Great Britain. Again, had the Contractor any right

to object to the resident engineer, or to a change of resident engineer? The Author recommended that the term Resident Engineer should be defined; from some points of view it had often seemed wiser to leave that term undefined. Arbitrators were, in fact, already rather inclined to allow the fact that the resident engineer had "acquiesced" in a certain course of action by the Contractor, to influence them in considering whether the Contractor should be made to implement his contract literally. Wisely, they gave no reasons for their decision, but it might be apparent from the award that that had been their view. For that reason it might be best to leave all power only to the Engineers.

There were two questions that he would like to ask the Author. Was it advisable to have an item in the schedule for every clause or sub-clause in the General Conditions that involved, or might involve, expenditure by the Contractor? Why did he not recommend bonuses for early completion?

Finally, Mr. Beaver would suggest that in addition to the General Conditions, there was scope for much standardization in the specifications.

Mr. N. G. Gedye had been much impressed by the fact that the Author, in his introductory remarks, had emphasized the desirability of any condition put into a general set being capable of being fairly enforced and intended to be enforced. He thought that that was the crux of the whole question. It was desirable to eliminate from existing sets of conditions, standardized or otherwise, clauses which could not be fairly enforced, and which the Engineer, and perhaps the Employer also, did not want to enforce, and that the courts could sometimes avoid enforcing because they considered them inequitable.

It was important not to overload the conditions of contract with matter which could be more appropriately included in the specification. If, for instance, in any particular case it was desirable to prescribe or limit the methods to be adopted by the Contractor in the carrying out of the work, it was preferable to deal with such matters by specification, and he believed that that was the sense of the Author's views as set out under the heading "The Specification." A point not commonly covered by the conditions of contract was that mentioned on p. 9. A clause setting out clearly the basis for adjustment of value of preliminary items was certainly required, and such adjustment was not infrequently desirable when the quantities involved in certain sections of the work were either largely increased or largely decreased.

It was very difficult indeed to find a satisfactory solution of the problem of the Contractor's liability for all damage, whether to the works or to adjoining property. Should that include or exclude damage to or failure of work carried out in accordance with the design and specification and resulting from inherent weakness in, or insufficiency of, the designed work? The Association's clause 39 dealt satisfactorily with the case of damage during the period of maintenance, but it did not satisfactorily cover the special case just referred to.

There would seem to be little doubt that variation orders for protective or strengthening works, when the magnitude of the additional work involved was relatively small, should be given by the Engineer without the necessity of first seeking the authority of the Employer, and where a question of safety was involved the Engineer should be empowered in any case to make a variation order. It was perhaps desirable that there should be some clear indication in the conditions of that power and intention, but where was the line to be drawn ? The power could hardly be an unlimited one.

With regard to property in materials and plant, there was one class of plant in connexion with which the usual clause was a potential danger to the Employer. In the case of work in harbours and rivers, where barges, dredgers and so on were employed by the Contractor, claims in connexion with third-party marine risks might fall hardly on the Employer in the event of the Contractor's default in meeting a claim. In such cases a clause was sometimes provided exempting such plant from the usual proviso of property in materials.

The Author's observations on arbitration were of great interest. He would apparently prefer to eliminate from clause 55 of the Association's General Conditions all, or at any rate some part, of the matters reserved to the sole and final decision of the Engineer. Mr. Gedye would not object to some further limitation of the reserved matters, and he hoped that the Author would amplify his view on that point and would say whether or not his opinion was that all matters should be referable to the arbitrator.

Mr. E. J. Buckton said that there were three points in the Paper to which he would refer.

The first point dealt with the extension of time. The Author called particular attention to the provisions in time-extension clauses that extension should be in full satisfaction of all claims, and referred to the question of allowing an arbitrator to revise awards under claims for extension of time.

Most contract forms made the Engineer sole judge of extensions. That was not as dangerous or unfair as it might at first appear, owing to the difference between the effect of delays caused by the Owner and those resulting from outside causes. In the delays caused by the Owner, by the ordering of extras or otherwise, time ceased to be binding if not extended by the extent of the delay, so that if the Engineer, whatever his powers, did not extend time or did not extend it to the extent of the delay, the Owner lost his right to damages. The contract might profess to leave the Engineer judge of the delay, but if the Owner were responsible for the delay, the Engineer would be bound to extend by the actual delay, as otherwise his Employer, being the cause of the delay, lost his rights. If the delay were due to external causes—accidents, storms, abnormal weather-conditions, etc.—those were certainly not matters to be left to arbitration, perhaps 2 or 3 years after the event, when the circumstances would be

more or less forgotten and when persons who could have given evidence might have ceased to be available. The proper time to settle them was when they had just arisen and the circumstances were fresh in mind, and it should not be allowable for any party to raise trouble afterwards by calling into question a decision of the Engineer, which should be binding upon both sides, for it had to be remembered that, if the Engineer's decision regarding extension of time for causes not due to the Owner could be appealed against, it could be appealed against by the Owner as well as by the Contractor.

The second point lay in the vesting of plant and materials in the Employer and re-vesting them in the Contractor. A purely vesting clause would seem to be unfair to the Contractor unless accompanied by a re-vesting clause. The re-vesting clause was, however, a clog on the efficacy of vesting which made it very difficult, in the case of failure of the Contractor, for the building Owner to derive any benefit. Mr. Buckton suggested that a fairer and more practical method was to create a definite charge on the plant, so as to make it answerable in the case of the Contractor failing to fulfil his contract; or, in other words, to effect a deposit of the plant as security for the fulfilment of the contract by the Contractor in the same way and with the same effect as any deposit made as security for the carrying out of a contract.

The third point was that the Author thought clauses 55 and 56 of the General Conditions of Contract of the Association of Consulting Engineers needed amendment. Clause 55 referred to disputes settled by the Engineer, and to the quality of work carried out and materials supplied by the Contractor. It said nothing regarding the quantity of work necessary to fulfil the contract requirements, and the kinds, as distinct from the quality, of the materials to be used in specified works; neither did it deal with the instructions regarding the order in which the work was to be carried out, nor questions relating to the nature, adequacy, and suitability of the Contractor's plant and materials, all of which matters should be decided by the Engineer.

Clause 56 was an " arbitration " clause. The well-known " dispute-prevention clause," although so often associated with the late Mr. A. A. Hudson, was not originated by him, as it had been in use long before his time. It arose from the practice of making the Engineer's certificate final and binding in all matters in connexion with which it was issued, in consequence of which, by the issue of the certificate, all difficulties or disputes were prevented from arising, so that the Engineer in such cases came to be called, about the middle of the last century, a " preventer of disputes," as distinguished from an arbitrator, who could only exercise his functions after disputes had arisen. Years ago, in one of Mr. Buckton's firm's contracts, they had a " dispute-prevention clause " followed by the ordinary " arbitration " clause, and one contractor, seeing that everything was covered by the " dispute-prevention clause," wrote in and asked what

was left for the " arbitration " clause. The reply he received was " everything not covered by the dispute-prevention clause " !

Under a proposed Bill which, about 2 years ago, passed the House of Lords, it was intended to make it illegal for the Engineer to arbitrate. Actually the Engineer was the one man who really knew the subject, and often both parties wished him to handle it ; if, therefore, both parties wished him to settle disputes, he should be allowed to do so. If that Bill became law, in the case of disputes the Engineer would be shut out and Counsel substituted ; the whole atmosphere would be changed and would invariably become false, as descriptions would be given by men who had never been on the works and who were merely describing what had been described to them, at second or third hand. The Engineer was perhaps the only person in a position to give a fair and just decision, but he would be forced into the witness-box as a partisan witness on behalf of the Employer, and he would be treated as adverse by the Contractor's advocate. The natural result of such a law would be to deprive Engineers of any position of independence which they might have attained, and to deprive them of the quasi-judicial functions with which they were at present often entrusted. As, however, the Engineer would always remain the only person who knew most about the work and the circumstances in which it was carried out, it was questionable whether contractors would benefit from the law, for the Engineer's knowledge, instead of being used independently and in fairness to both sides, as he was bound to use it at present, would be driven to be employed on one side only, and for one purpose only, namely to invalidate the Contractor's claims. He would be driven to it as the natural consequence of the impossible position in which he would be put by the procedure, which would result from his being deprived of capacity to give any quasi-judicial binding decision and from his becoming merely a witness on behalf of the owner ; in contracts of real importance the Contractor knew by experience that he had nothing to gain in not having the Engineer as a fair and independent man, holding the balance even between the parties, and very much to lose by having him as an inevitable opponent.

The Author also referred in other places to the Standard Conditions of the Association of Consulting Engineers. They had been published about 8 years ago, but so far Mr. Buckton's firm had been unable to use them. Only last week they reviewed them once more for a particular job, and found them unacceptable. Others might be more happily placed, but usually large civil engineering works were carried out by a schedule contract (namely, measure-and-value principle) and that was not suitably catered for in the Association's standard form.

The great objection to the form in connexion with large civil engineering works was that it was based upon the lump-sum principle, with quantities part of the contract, and was therefore essentially subject to the legal effects and limitations of such forms. It was difficult to see why the Association had not provided two forms, the present one for use in suitable

cases and a " measure-and-value " form for cases where the quantities could only be estimated and where the intention was to pay for the work actually executed as measured.

In the form, contract time was stated to be of the essence of the contract. He believed that it had been held that time could not be essential if, as in the present case, it could be extended or compensated for by liquidated damages. The words, in addition to having no effect, were misleading to laymen.

Under the Standard Conditions the plant was vested with a re-vesting condition which, as he had already said, led to many difficulties. In the only case of that nature with which his firm had to deal, when the Owner, having had to complete the work on the Contractor's failure, attempted to sell the plant on the termination of the work, he was stopped by the Trustee-in-Bankruptcy and the plant was ordered to go to the Trustee and to be sold for the benefit of the general body of creditors. When put to the test, the clause had been found, in the case mentioned, to be valueless.

There was also a number of lesser points, and generally the Association's Standard Conditions, he suggested, were due for an extensive revision.

Standard Conditions, drawn up by collaborating engineers, contractors, quantity surveyors, contract lawyers, and other interested and experienced persons or bodies, could be most useful, but too much faith should not be placed in their ultimate adoption for general use. In any case there should be no attempt to make the form compulsory, and it should be kept flexible enough to have some appeal to the large and important Corporations which had their own views and experience, and rightly did not want to be dictated to in the matter of the conditions under which they were prepared to place contracts for the cost of which they were responsible.

Mr. Buckton's view was that reasonable discretionary powers should, where possible, be allowed to Engineers under a contract. Admittedly that was very difficult and could only be done by express provisions in the conditions, as the Engineer was not a party to the contract and had only such power as he was given. He believed that, under common law, a contractor undertaking to do work at a price fixed or accepted by him, took all the risks of the execution of the work, and whether or not the clause placing all risks upon the Contractor was inserted in the contract, the effect was the same. It did not necessarily follow, however, that the parties could not agree to make some provision for extra payment if unexpected and unforeseen difficulties arose in such matters as, for instance, deep foundations. Whatever was done, however, it should be remembered that an Engineer had no more power than an arbitrator or a Judge to make after the event a contract for the parties other than that which they had made for themselves.

Mr. Bryant Irvine said that the Author had given a very interesting history of the evolution of the present arbitration clause, but that he did not answer a question which had been in Mr. Irvine's mind for some time;

namely, why the clause as at present drafted had such great and universal popularity. Mr. Halcrow mentioned one of the limitations to be found in that clause. Section 56 of the Association contract said that the award of the arbitrator " shall be final and binding on the parties," and Mr. Halcrow remarked that it would be of great advantage to members of the profession if those words could be taken to mean what they said. There were, unfortunately, two very important difficulties in the way which could not be overcome.

The first difficulty was contained in the Arbitration Acts. Section 7 of the Act of 1889 provided that arbitrators should have among their powers the right to send any award which they made in the form of a special case to have the opinion of the Court; and it was further provided in section 19 of that Act that the arbitrator might, at any stage of the proceedings, state his award in the form of a special case for the opinion of the Court on any question of law arising in the course of the reference. In the last few years similar provisions had been made by Section 9 (1) of the Arbitration Act of 1934. During the evolution of the present arbitration clause, therefore, that possibility had always had to be considered.

The second difficulty was the general legal position which had arisen from the decisions in cases where people had endeavoured to get over the provisions of the Arbitration Acts. There was an example of that in the case of CZARNIKOW *v.* ROTH, SCHMIDT AND COMPANY [1]. A clause had been inserted in the contract in that case which provided that no person " shall require, nor shall they apply to the Court to require, any arbitrators to state in the form of a special case for the opinion of the Court any question of law arising in the reference, but such question of law shall be determined in the arbitration in manner herein directed." That was exactly what Mr. Halcrow said would be a great advantage, if it were a clause which was binding on the parties. Scrutton, L.J., said in that case [2]:

" Arbitrators must understand that parties before them have a right to take the opinion of the Court as to whether the arbitrators should be given the guidance of the Court in matters of law, and that they must not attempt to stop the action of the Courts by interfering with or hindering such a right of parties."

He also said [3]:

" The Courts . . . do not allow the agreement of private parties to oust the jurisdiction of the King's Courts. Arbitrators, unless expressly otherwise authorized, have to apply the laws of England. When they are persons untrained in law, and especially when as in this case they allow persons trained in law to address them on legal points, there is every probability of their going wrong, and for that reason Parliament has provided in the Arbitration Act that, not only may they ask the Courts for guidance and the solution of their legal problems in special cases stated at their own instance,

[1] 1922, 2 K.B., 478.
[2] *Loc. cit.*, *p.* 490.
[3] *Loc. cit.*, *p.* 488.

but that the Courts may require them, even if unwilling, to state cases for the opinion of the Court on the application of a party to the arbitration if the Courts think it proper."

For those two reasons, it was impossible for the words stating that the award of the arbitrator " shall be final and binding " to mean what they said.

Over a period of years Mr. Irvine had asked his friends in the engineering profession whether they could explain to him the real reason for the great popularity of the arbitration clause, and it was in the hope that the Author would be able to provide him with a solution to that problem that he had referred to the matter. Realizing those two difficulties, it was easier to examine the four matters which were usually raised by members of the engineering profession in defence of the arbitration clause.

The first point was that arbitration had the advantage of speed. When an action was brought in the High Court there was the possibility of an appeal to the Court of Appeal and then to the House of Lords. When difficulties were submitted to arbitration and the award was not accepted, the case stated by the Arbitrator came before that Court in which an action started in the High Court received its first hearing. There was then still the same possibility of appeal to two further Courts. That being the case, it was clear that the arbitration clause introduced the possibility of four hearings, whereas if the difficulties were submitted to the High Court in the first instance, there would only be the possibility of three. For that reason the arbitration clause was bound to mean that the final determination of the difficulties might only be achieved by a longer route.

Further, if it were suggested that it took some time to get heard in the High Court, it would certainly not be quicker to obtain the award of an arbitrator and then have to take a place, if there were an appeal, in the list in the High Court in which the action could have been set down many weeks earlier had there been no arbitration.

Further, with regard to the actual time taken up by the hearing, it could hardly be claimed that that was inevitably shortened where the proceedings were conducted by an arbitrator. Unless the arbitrator was one who spent most of his time on the work, it was unlikely that he would have the grip of the principles of evidence and the appreciation of the quickest method of reaching the point which those who appeared before the High Court expected as a matter of course from a Judge.

The second suggestion that Mr. Irvine had heard made was that it was cheaper to go to arbitration. That did not appear to bear careful scrutiny. In the first place solicitors and Counsel were employed in any important arbitration in exactly the same way as if the matter were coming before the High Court. There was also the possible expense of an additional hearing, as the proceedings were starting by arbitration and not in the High Court. Finally, the fees which were paid to the arbitrator and for

the hire of a hall were bound to compare very unfavourably with the actual fees paid for a hearing in the High Court.

The third suggestion was that by arbitration the parties avoided the mysteries and expense which were involved in obtaining the services of lawyers. From what was set out above it would be clear that that suggestion had no substance whatever, desirable as it might be if it could be achieved.

Lastly, it was suggested that the advantage of arbitration was that engineers were able to submit their disputes to an engineer for determination. If that were the real reason, Mr. Irvine was in favour of its being made clear, and of abandoning the other explanations which were so frequently made. If a speedy determination of a dispute were required, and it was felt that an engineer was better fitted to achieve that result than a Judge, even though the latter was generally fully experienced in obtaining the assistance of expert technical evidence and quickly assessing its value, possibly the time had come when The Institution might consider the appointment of a small panel of arbitrators who were qualified both in engineering and in the law. The Tribunal of Appeal appointed under the London Building Act of 1930, and the London Court of Arbitration, provided examples of arbitration under the best conditions. In those cases the arbitrator was usually a man with special knowledge of the problem before him, who at the same time was fully conversant with the legal difficulties which might arise. If only the first of those qualifications were demanded, as appeared to be the case in some arbitrations, the final award had to run the risk of being obtained only by a longer and more costly route than would otherwise have been the case. Unless both those qualifications were found in the Arbitrator, the final determination of the dispute would in many cases be obtained more quickly and cheaply if there were no arbitration clause in the contract, and the dispute were submitted at once in the ordinary way to the High Court of Justice.

Mr. W. S. Kennedy thought that there were two basic principles that ought to exist in contract conditions. One was that the Engineer should have entire power over the work: the Engineer should be allowed to say that the work had to be done in a particular manner, if he considered it better and safer, and he should be allowed to reject materials which he considered unsuitable. The second was that the Contractor should be allowed to put in a claim to an impartial arbitrator at the end of the contract if he thought that any of the Engineer's orders had occasioned additional expense.

If those principles were applied to the power to order variations, it was necessary to make a certain exception. The Author stated on p. 6 that "... no Court interpreting the contract will readily disregard the fact that the contract was entered into on the basis that the works as shown on the contract drawings were substantially those which the parties expected to

be carried out and (unless expressly stated to the contrary) were the works for which the Contractor made his tender, calculated his on-costs and generally arrived at his contract prices." The Author mentioned drawings, and possibly he would extend that to include quantities. It would appear, however, that there was bound to be some limit on the power of the Engineer to order variations of quantities, and Mr. Kennedy therefore considered that a percentage variation (perhaps 10 per cent.) would be satisfactory. The Author, however, objected to percentage limitations altogether. It was well known that hard cases made bad law, but one of the first big arbitrations in which he had been engaged [1] dealt with the construction of the railway from Wootton Bassett to Patchway. It was the case of a measure-and-value contract. The Engineer had specified certain quantities which were to be put into an embankment, but the material would not stand at the angle which both parties had assumed, with the result that the amount of material which had to be put into the embankment was more than doubled. The Contractor's view—with which Mr. Kennedy agreed, although he did not say so at the time !—was that if the quantity of material were doubled, the work would be altogether outside the contract, as a contract for 2 million cubic yards was not the same as one for 1 million cubic yards; the extra material could not be obtained from the cuttings and he would therefore have to fetch it from elsewhere, entailing a great deal of extra expense. The Contractor accordingly asked for a larger cost per cubic yard than the original measured-value price. The Great Western Railway naturally held the view that the contractor tendered at 1*s.* 6*d.* per cubic yard, and that as the contract stated the quantity to be " more or less " 1 million cubic yards, the fact that there was more should make no difference to the price. The litigation lasted 4 years and Mr. Kennedy thought that it would have been very much more economical if the parties had understood that that kind of variation was not within the terms of the contract.

The Author mentioned the relationship of the Contractor with the Engineer and the Employer. Mr. Kennedy considered that the Contractor's position was a relation with the Engineer as the Employer's agent, and with the Engineer alone; he did not think that the possibility should be considered of the Contractor making an appeal to the Employer because he thought that the Engineer had done something which was not right. The Employer and the Engineer should consult together, and the Engineer should tell the Contractor the decision of the Employer and the Engineer.

The President said that several speakers had referred to the desirability of revising the General Conditions of Contract in order to come into line with modern practice. The Institution had decided to meet the Federation of Civil Engineering Contractors, so that the existing terms of General

[1] PEARSON *v.* THE GREAT WESTERN RAILWAY.

Conditions of Contract could be considered with a view to standardizing them as far as possible.

*** **Mr. F. M. G. Du-Plat-Taylor** pointed out that there was a tendency to reduce General Conditions of Contract to a common formula, but that the form of those conditions had to vary with the class of work and risk.

In sea-defence work the risks were greater than in any other class of work, as the risk of damage by wind and waves, either during the execution of the work or during the period of maintenance, was almost impossible to assess. He had, for instance, known a foreshore, which had remained in a more or less stable condition for many years, to be washed out by a series of onshore gales so that its level was reduced by over 10 feet. Such an occurrence would undoubtedly have proved fatal to any structure designed on the basis of the condition of the foreshore as previously known.

Further, the stability of a sea-wall might be contingent on the proper upkeep of other structures, such as groynes. That was the case in JACKSON *v.* THE EASTBOURNE LOCAL BOARD (1884), a suit which was carried to the House of Lords. The Contractor was held to be responsible for the failure of a sea-wall, although that was admittedly mainly caused by the failure of the Local Board to maintain or to repair existing groynes, or to provide additional ones. Such a risk was one which, if thrown upon the Contractor, would be bound to result in very high prices, and in those circumstances it was one which Mr. Du-Plat-Taylor generally advised his clients to take upon themselves.

Schedules of prices were mentioned on p. 7. Such schedules should in his view form part of every contract. They were required, in any case, for assessing the value of work carried out as day-work, and should therefore include for such things as the use of plant, and the use and waste of timber and other materials required for temporary works.

On the question of extent of work, mentioned on p. 11, he suggested that it was, in many cases, advantageous to include in the Conditions a provision that the prices stated in the bill of quantities should hold good for quantities up to 25 per cent. in excess of, or 25 per cent. less than, the quantities shown. That might give the Contractor some benefit in case of an excess quantity being ordered, but it cut both ways.

He suggested that the words "substantial completion" were the appropriate ones to use in a certificate of completion, as better expressing the state in which a certificate could be issued, where various minor matters still remained to be finished.

With regard to the question of the seizure of plant on discharging a contractor, the plant was really held as a security for the original contractor meeting his obligations under the contract: that was to say, for the excess

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*** This and the succeeding contributions were submitted in writing.—SEC. INST. C.E.

cost which might be incurred by completing the work by other contractors and for liquidated damages, if any. In one well-known case a contractor was turned off a very large job and his plant was seized. A law-suit followed and the plant remained on the site until the suit had been finally decided by the Court of Appeal. By that time the works had been completed by another contractor, and the original contractor's plant had become both rusty and obsolete, and was practically worthless. The second contractor made no use of it. It seemed to Mr. Du-Plat-Taylor that if the impounded plant were efficient and in good condition, the proper course was for the substituted contractor to use it, and to allow the building owner reasonable hire rates for it. In the final settlement with the original contractor, the sum so obtained should be put into hotchpot, and any balance remaining after the extra cost of the works and all claims against the original contractor had been met, should be paid over to the latter. It would be necessary for the protection of all parties that the impounded plant should be surveyed by a competent mechanical engineer both before and after its use by the second contractor, so that any damage that the plant might have sustained whilst in use by the latter should be paid for by him.

Sir Lynden Macassey observed that the complexity of a public-works contract could readily be appreciated by comparing the form of contract of to-day with the simple form in use 75–80 or more years ago. In those days, railways, harbours, docks, bridges, waterworks, etc., were being constructed in profusion, and design and construction were certainly, with the methods and materials then available, as difficult as they were to-day. It might, then, be fairly asked, how had the present complexity been developed? The answer, he thought, was that in the main it was due to the attempts of engineers, under pressure from, or with the too-willing assistance of, lawyers, to try to foresee, and to insert provisions to cover, every kind of circumstance and condition which might possibly arise, or contingency which might be encountered, in carrying out the works, followed by subsequent modifications of those provisions to try to come within, or to keep without, decisions in the Courts.

Whether that had been in the true interests either of the engineering profession or of their clients was very doubtful. In the old days a company or authority carrying out public works was prepared without hesitation to leave decisions on all matters of subsidiary detail to the Engineer, in whom it invariably placed full professional confidence. That was obvious from the striking simplicity of the old-time public-works contract. Might not the professional status of an engineer and his authority over his client be higher to-day if so many refinements in its provisions had not been introduced into the form of contract, and the subject of such refinements had been left as was originally done, to be treated as ordinary matters incidental to the carrying out of public works which the Engineer himself would decide and determine if and when they arose? It might reasonably be conjectured whether that would not also have inured to the material

benefit of the engineer's client in the shape of lower-priced tenders. To-day, however, the public-works contract in all its complexity had become so largely a matter of common form in Great Britain that no doubt to simplify it would be difficult. The only reform probably now practicable in Great Britain was the standardization in a reasonable form of the provisions of all such contracts. Such standardization would be the next best thing to simplicity if the latter were unattainable.

Since the complexity of a modern English public-works contract would probably continue in Great Britain, if indeed it did not further develop, it was worth while, in Sir Lynden's view, to consider it from a wider standpoint. The form of contract in use in foreign countries, and indeed in most of the Dominions, was in many respects different and altogether simpler. Those who had had to negotiate concessions with foreign governments, or contracts with authorities or companies in foreign countries, for the carrying out of public works by English construction syndicates or contractors, knew the ineradicable suspicion which the complexity of the present-day form of English public-works contract always aroused. Indeed, sometimes that suspicion was so strong that it was frequently quite impossible to secure the adoption of the English form, and another and simpler form of contract had in the end to be accepted. Having regard to the comparative simplicity of the form of contract which foreign interests were accustomed to, and preferred, that had for some time raised in Sir Lynden's mind the question whether or not there was any sound reason for English engineers and contractors, who were nowadays handicapped by so many competitive and other disadvantages in securing contracts for, and in the carrying out of, public works in foreign countries, having their difficulties increased by the use of a nationalistic form of contract to which there was such general international objection.

There had been no more remarkable development in the commercial world than the way in which great English international trading and commercial organizations, which at one time were able to insist upon a characteristically English form of contract, had now abandoned it, and had adopted a form which had been agreed with foreign organizations allied in business with them. Many English engineering firms, when they were supplying machinery in Great Britain, would offer or accept a form of contract in common use amongst English mechanical engineers which did not differ substantially in its main provisions from the common form of English public-works contract, yet if they were offering to contract for the supply of the same machinery in a foreign country, they would never think of doing so on that form of contract, but would proffer a form which was in common international use for the supply of machinery. They knew that to quote on the basis of the complex standard English form would probably involve the rejection of their quotation.

There was scarcely any great international trade centred in Great Britain in which an international form of contract had not now been introduced.

The usual way in which it had been done was by the institution by the English trade organization of consultations with foreign organizations representing interested parties. In that way a form had been ultimately evolved which commanded general approval, and which before very long by common consent and practice became the accepted international form.

To give an illustration, at one time the provisions inserted in the Bills of Lading and Charter Parties in use in different countries of the world regarding general average were of an extremely diverse and conflicting character. The International Law Association, at the instance of certain great commercial interests, instituted an inquiry through its various foreign branches, and eventually, after several international conferences, succeeded in formulating "Rules of General Average." After subsequent amendments which experience had showed were desirable, the rules so framed came to be adopted by general agreement all over the world, with the greatest advantage to international trade, as the York-Antwerp Rules of General Average, the names being derived from the places where the conferences were held.

Another illustration of the prevailing tendency was afforded by the present proceedings of an international committee, of which Lord Macmillan, P.C., G.C.V.O., K.C., Hon. M. Inst. C.E., was the Chairman and Sir Lynden was the Convener, that was engaged, with the co-operation of important international commercial interests, in trying to formulate a commercial arbitration clause and rules to govern arbitrations taking place under the clause which would be internationally acceptable and could be adopted in any international commercial contract. The representative international trading and commercial organizations all had their own distinctive standard forms of contract available for their members, containing their own special arbitration clause and rules for arbitration. The well-known international courts of arbitration also each had their own arbitration clause available for insertion in contracts to provide for arbitration by the court selected, of disputes under the court's rules. There was, however, a great and growing number of commercial firms and business men, who were neither members of trading organizations nor were desirous of referring their disputes to any of the international courts of arbitration. They were in the habit of inserting all kinds of arbitration clauses in their commercial contracts, and there was frequently the greatest confusion as to what national law or what procedure to apply to the arbitration. That had led the International Law Association to constitute the Committee mentioned above, which was representative of the principal commercial countries, in order to formulate a standard arbitration clause and code of arbitration rules for voluntary adoption in international commercial contracts. There was little doubt that when the clause and rules were authoritatively formulated and promulgated they would soon come to be adopted internationally, just as the York-Antwerp Rules of General Average had been adopted. Many other similar illustrations could be given.

Sir Lynden therefore ventured to submit that The Institution should consider whether it would not assist English engineers and contractors if it followed the same line of progress as the commercial world, and endeavoured to evolve a form of public-works contract for use outside Great Britain, proceeding on lines familiar to, and acceptable to, foreign interests, and at the same time providing effectively for all the main matters for which, according to English practice, it was felt provision should be made. It could hardly be contended, he thought, that the value of the present English form of public-works contract, with all its complexity as compared with the customary simpler foreign form, was worth the detriment to English engineers and contractors which experience showed resulted from attempts to use it for the construction of public works in foreign countries.

Mr. H. F. Payne suggested that either a standard set of General Conditions subordinate in particular scope to the Specification, as suggested by the Author, or a set of recommended clauses with alternatives for use according to the magnitude, complexity or period of the contract, would be very useful.

If a standard set of conditions were adopted, at least two forms, one for small lump-sum contracts accompanied or otherwise by priced bills of quantities or other details of tender sum, and one for measure-and-value contracts, would be required. A separate form of conditions for measure-and-value contracts might also with advantage be provided where the provisional sum sub-contracts were of considerable extent.

The clauses dealing with labour, referred to on p. 14, could better be included in the Specification, save for the general statement that the Contractor was to provide all labour required.

In addition to the methods of valuation of variations given on p. 18, valuation by day-work should be included at the discretion of the Engineer, and the percentage addition to be allowed for the Contractor's overhead charges and profit should be stated.

Where the provisional sum sub-contracts were of such size or nature that they would have to be paid in instalments in interim certificates, the general conditions of the sub-contract should either be to some known standard or should be prepared and inserted *in extenso* in the General Conditions. They should make provision for the direct payment to sub-contractors and for the allowance of a cash discount to the General Contractor.

Mr. C. P. Taylor observed that on p. 17, the Author referred to certificates on " practical completion." Mr. Taylor had for many years introduced in contracts the following phrase :—

" Provided that the Engineer shall not be entitled to reject any part of the contract work which fails to pass any test if he is satisfied that such failure is due only to some minor omission or defect which the Contractor undertakes to make good at the earliest moment convenient to the Purchasers."

Whilst that had been more generally employed in relation to machinery, the spirit of it could clearly be expressed in a clause suitable for contracts for constructional work.

On p. 19, under the heading " Property in Materials and Plant," the Author referred to the practice of marking such equipment with the Employers' name, and he used the phrase " in the case of the Contractor not being a Company." Why was that necessary ? As a very large proportion of contract work in Great Britain was carried out by Companies, the practice could have very little value unless it could be applied under those conditions.

The Author, in reply, pointed out that the crucial test of the conditions of engineering conditions only arose when there was a difference of opinion between any of the three parties concerned—the Employer, the Engineer, and the Contractor. If the Engineer possessed the complete confidence of the Employer, and the Employer was prepared to leave all matters of difference to be settled by the Engineer, then the Engineer might, as suggested by Mr. Carpmael, interpret the conditions in " the spirit " rather than by " the letter " of the agreement. It had, however, to be borne in mind that Employers were entitled to require the contract to be administered and interpreted strictly, and that therefore the test as to whether or not conditions of contract were reasonable had to be made on the basis of their ultimate legal interpretation. For that reason, if Engineers thought that they should have a discretion to vary rates, to order protective work at the cost of the Employer, to limit liability of the Contractor in certain exceptional contingencies, etc., they had to see that their power to do so was contained in the contract.

The advantages of the Engineer disposing of matters in dispute during the progress of the work were obvious, and the fact that conditions of contract entitled either party to require that the matter should come before an independent arbitrator did not, as suggested by one of the speakers, prevent the parties agreeing at the time of the dispute to waive that right, and to ask the Engineer there and then to give his decision and to be bound by it.

The Author thought that the discussion had emphasized the vagueness of existing forms of contract in regard to the effect either of incorrect bills of quantities or of variations on the Contractor's preliminary items, contingency items, overheads, etc. Moreover, the fact that variations might entirely change the conditions of the work and the Contractor's liabilities, was not, in his opinion, sufficiently provided for in the usual forms of contract.

Clause 39 of the Association contract had limited the Contractor's liability for damage during the maintenance period, but that did not, in the Author's opinion, really touch the question whether or not the Contractor should take the responsibility for failure under load of work which he had carried out strictly to the Engineer's design.

The Author appreciated that the Association clause in its form was one which was based upon a lump-sum called the " contract price," but having regard to the fact that by clause 52 it provided for the modifications of that sum in accordance with the actual measurements of the work, he would have expected that those desiring to contract on the measure-and-value principle would have found it acceptable.

The provisions for vesting of plant were designed for the purpose of additional security to the Employer and—what was often equally important —to ensure that upon the dismissal of a Contractor the Employer might use the plant and materials for completing the work. If there were a vesting clause the Trustee-in-Bankruptcy could only claim the plant if the Contractor were an individual and not a Limited Company, and if there were no indication by the marking of the plant or otherwise that the plant did not belong to the bankrupt.

A Contractor could not, of course, by his contract with the Employer give ownership to the Employer of plant which did not belong to him, and the true owner might take away such plant at any time. For that reason it might be desirable to require that all plant brought upon the job should be the property of the Contractor.

The extension of time for completion should never be deferred until the date of completion had passed or until the end of the contract. It was only right that the Contractor should know when the event which justified an extension took place what additional time he had to complete the work. An agreement to pay a bonus for early completion, in the Author's opinion, was not as a rule desirable, because it cast upon Employer and Engineer the obligations of giving the facilities for completion at an earlier time than the contract time, upon which no doubt they had made their original programme for delivery of sites, plans, etc. The clause was one which naturally often caused differences and disputes. Criticism of the R.I.B.A. form of building contract had been made. It was because that form of contract was dealt with not as a compromise of principle but as a compromise of words that that contract, as had been said, failed to express clearly what the parties intended. A committee representing different interests and compromising on words could make nonsense of a clause ; a committee compromising on principles and then handing their decisions to be embodied in one document could fairly expect to have their compromise expressed in clear words. In the contract which he trusted engineers would ultimately have there would, he hoped, be no compromise on the words which were necessary to express the decisions which the parties had previously made.

In that connexion it should be mentioned that the R.I.B.A. form of contract was not the only one in which the contractor's view had been considered and in many respects embodied. That had been done also in the Institution of Electrical Engineers Model Form of Contract for the supply of plant and materials and the execution of work connected there-

with, and there was no doubt that the civil engineering conditions of contract, in the varied forms used to-day, lagged far behind any of the conditions of contract used by the kindred industries which had to make provision for contingencies which might arise in the carrying out of work. It was interesting to note, in relation to Sir Lynden Macassey's comments, that the I.E.E. Model Form of Contract was on sale in New York as well as in London.

*** The Correspondence on the foregoing Paper will be published in the Institution Journal for October 1939.—SEC. INST. C.E.