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ERRATA.

Page 5. First equation from top should read

$$p = p_o - g \int_{h_o}^{h} \eta dh.$$

do. Third equation from top should read

$$p = p_o - g \int_{o}^{h} \frac{p}{R'T} dh.$$

Page 8. Insert λ in middle term of equation, *i. e.*,

$$\frac{dx}{dt} = \lambda \frac{d\varphi}{d\mu} \cdot \frac{d\mu}{dx}$$

Page 13. Line 11. Equation should read

$$F(\theta) = \frac{d(\rho_o \sin^2 \theta)}{d\theta}$$

do. Middle term of equation (5) should be

$$\frac{K'}{K} \int \frac{\sin \theta}{(D - \rho \sin \theta)^2} d\rho$$

Page 15. In equation preceding (3) delete K

do. Last double integral of (4) should have $d\theta^2$

Page 16. Last term of (5) insert + sign

between $\frac{8ar}{3}$ and $\frac{\pi r}{2}$

do. Equation (1) Coefficient of β in denominator of expression in brackets should be $(\pi+2)$ instead of 3.

Page 81. Paragraph 26, equation should read

$$aT_c^4 + bT_c^2 + dT_c = H_r$$

Chart No. 2 of Col. Battyes, paper. The figures 0, 20, ... 200 given at bottom of chart are "spacing in inches."

ADDRESS

OF

Mr. F. A. HADOW, C.V.O., M. Inst., C.E.,

PRESIDENT.

April 1923.

GENTLEMEN,—It will, I know, be your collective wish that I should follow time-honoured practice in opening our proceedings to-day by welcoming our guests. Although it is a matter of regret to us that His Excellency, the Governor, is away from Lahore, and is consequently unable to be present, we are very glad to see the Hon'ble Sir John Maynard, and many officials of the Punjab Government, as well as the Hon'ble Mr. Hindley and others from outside the Punjab. These guests, by accepting our invitation to be here to-day, show their recognition of the importance of the Engineering profession to the future of this Province, and their appreciation of the work of the services which are officered by the members of the Punjab Engineering Congress; this should be a great encouragement to all of us.

Next, I want to thank you, gentlemen, for the honour you did me a year ago in electing me your President; it seems rather late to be now doing this, but I have not had an opportunity till to-day. I need hardly say that I very much appreciate this honour, but I feel rather diffident in fulfilling the obligation, which it throws upon me, of addressing you to-day; mainly because many years ago my particular train of duties got switched off from the main line of Engineering on to a track which has extraordinary allurements of its own, but on which it is extraordinarily difficult to pull up in time to allow of the points being reset for a siding to take one back to the main Engineering line. It is sometimes a matter of regret to me that I have left the direct practice of the Engineering profession, and I specially feel that regret to-day when I have to address a gathering of Engineers. Nevertheless, gentlemen, there is something I want to say to you about Civil Engineering as a profession, for the majority of the members of this Congress fall into the category of Civil Engineers, though there are some who would, perhaps, fall outside the present limited application of that expression.

First, then, why are we called "Civil Engineers"? The term is of course generally accepted now to distinguish Engineers who are not in the Army from the corps of Royal Engineers, but it is interesting to find that this is supported by history. This was explained in the presidential address of Mr. W. B. Worthington to the Institution of Civil

Engineers in London about 18 months ago, and, though some of you here may have read that speech, I hope I may be excused for making use of it. Mr. Worthington said that the earliest recorded use of the term which he had been able to trace was over 150 years ago, in March 1771, when the Society or Club was formed which, at a later date, gave rise to the Society of Civil Engineers known as " the Smeatonian." The minute then recorded was to the effect that " the Civil Engineers of this Kingdom do form themselves into a Society." It seems clear that the term was then used by the founders of that Society to distinguish themselves from Military Engineers, for a little earlier than this, namely in 1757, the Engineers, who had since 1716 formed the regular corps of Engineers under the Board of Ordnance, first received commissions and thus obtained Military rank ; it was not until 1787 that this corps became the " Royal Engineers." It is some satisfaction perhaps to Civil Engineers to know that the origin of the term " Civil Engineer" dates from about the same time as that of the " Royal Engineer ;" the term became more firmly established when the Institution of Civil Engineers obtained their Royal Charter in 1828. It is worth mentioning however that the term " Civil Engineer " in those days had a wider meaning than is usually accepted in common usage at the present day, for it then embraced every branch of professional Engineering with the exception of the Military ; in fact, the founders of the Institution of Civil Engineers were for the most part men engaged in the construction of machinery, and the wide range of the profession is illustrated by the constitution of the Council of the Institution of Civil Engineers, which includes members practising in several branches of Engineering, each of which has now an important institution devoted to its special interests. The narrower application of the term Civil Engineer has gradually developed—universities and colleges have established parallel courses for the Civil Engineer and Mechanical Engineer, Railways have adopted the title of Civil Engineers for those Engineers concerned with the construction and maintenance of the formation and track, and style those Engineers who are concerned with the design, manufacture, and repair of locomotives and rolling stock, Mechanical Engineers ; the present accepted limitation of the term Civil Engineer is exemplified by the fact that the Indian Institution, which has been recently founded, calls itself the Institution of Engineers in order to embrace all branches of the profession.

So much then for the term " Civil Engineer ;" it can be accepted that it was introduced to distinguish Engineers engaged in works of a nature not immediately connected with Military affairs and operations from Military Engineers or Royal Engineers.

We then may ask " what is a Civil Engineer"? The Institution of Civil Engineers defined its objects (*vide* their Royal Charter) as the general advancement of Mechanical Science, and more particularly the promotion of that species of knowledge which constitutes the profession of a Civil Engineer, being the art of directing the great sources of

Power in Nature for the use and convenience of man. But, in the more restricted sense which may be said to be established now by general usage, a Civil Engineer is a person engaged in the design, construction, and maintenance of works of public utility, such as docks and harbours, railways, canals, roads, drainage, etc. He is in fact a very important link in the chain of development of trade, industry, and commerce, in all of which such great strides have been made during the last century.

But a young man must go through a definite training before he can become entitled to call himself a "Civil Engineer." In old days, the only way he could get such a training was by serving an apprenticeship or pupilage in an office and on works that were under the supervision of a recognised Civil Engineer; in an intermediate period it would probably have been considered best for him to go to one of the big foreign Polytechnic Schools on the Continent of Europe before entering on a practical training, but at the present day there is no lack of facilities for Engineering Education in England, and it is considered essential in that country that a young man who wishes to become a Civil Engineer should go through a college Engineering course before, during, or after a practical training. India has naturally gone forward on the same lines; Engineering colleges, such as Roorkee and Sibpur, have been established, and it is recognised by administrators of experience that a college course of Engineering is essential for the training of a Civil Engineer. And, gentlemen, it is all important that the status of the Civil Engineer should be kept up; it is just as important for the Engineering profession to have its proper standards, as it is for the Medical profession, and we all know how particular they are in that matter. Now the standard of the Civil Engineering profession has been laid down by whom? Not in its inception by Educational authorities, or even by colleges and universities, but by Engineers themselves. The profession would not be in the position it occupies to-day if it had not been for the big Engineering Societies, especially the Institution of Civil Engineers; societies formed and run by Engineers in the best interests of the profession. It has throughout been one of the foremost aims of the Institution of Civil Engineers to keep up the standard of the profession, and the training and qualifications required to entitle a man to call himself a Civil Engineer have been prescribed from time to time by that Institution. The right of the British Institution of Civil Engineers to define the qualifications required of a Civil Engineer is now generally recognised, and consequently, the influence that Institution is in a position to exercise is very great. Is it not the duty of every qualified Civil Engineer to do all he can to uphold this status? It is all important to every Engineer that the standing of the profession shall be maintained, and essential that any looseness in the use of the term Civil Engineer should be resisted. If, for instance, there arose any inclination to go back on the advance that has been made and to admit that men who, measured by the present standard, are insufficiently qualified by education and training, are competent to exercise the functions of an Engineer, irremediable harm would be done to the profession and

to the progress of the world generally, which depends so largely on the work of the Engineer.

This then brings me to an important matter which is of great interest to the Congress. You all know the difficulties involved in the question of affiliation of the Congress with the Institution of Engineers (India), which has been receiving a good deal of the attention of the Council during the last year. Now I am much in sympathy with the hesitation and doubt which is felt by a large number of members of the Congress, as to whether it is in the general interests of the Congress to affiliate with the Institution. The Indian Institution of Engineers has recently come into existence, the Congress is an older body ; and the Congress (or a large number of its members) fears that affiliation may detrimentally affect the Congress both financially and otherwise. No one can deny that these fears are natural, and the report of the Council to the Congress on the subject, which will be considered at the business session on Friday, will show the stage at which we have arrived in our negotiations with the Institution. I must say, however, that, from the broader point of view, that is in the interests of the Engineering profession in India, I very much hope that we shall be able to come to terms with the Institution, for the history of the Civil Engineering profession indicates, to my mind very clearly, the importance of strengthening the big responsible body, and shows how this must be for the general good. It is noteworthy that in the last two years, the newly elected Presidents of two big and important Institutions have criticised the attitude of the Engineer who says " What is the Institution going to do for me?" Instead of answering this question in my own words I would like to again make use of the address of Mr. W. B. Worthington on his election as President of the Institution of Civil Engineers in London, and in this case I will quote his own words :—

" There is undoubtedly a school of thought which measures the " value of our Institution by some tangible gain or personal benefit. The " man who thinks he owes least to the Institution should remember that, " though he may practise successfully the profession and art of a Civil " Engineer, yet it was the Institution which established it, and that it is " very largely the prestige of the Institution which lends to-day an autho- " rity to those who claim the title of Civil Engineer, whether they are " members (of the Institution) or not."

I say then, gentlemen, that it seems to me almost a duty on our part to run even some little risk in facing this question of affiliation with the Institution of Engineers (India), and provided the Punjab Engineering Congress can maintain its individuality and name, which I believe it will be possible to do (and so much is due, if it can be arranged, to those enthusiasts who took the main part in the inauguration of this Congress) we should go at any rate part of the way ourselves to get over the difficulties involved. In this I am, of course, stating my own views, but, having given some thought to the matter, I felt I should not

be true to my own ideas and instincts if I did not take this opportunity of expressing my own conviction, that in the end, it will be in the interest of the Punjab Engineering Congress to be affiliated to the Institution of Engineers (India). The progress of that Institution is of great importance to all Engineers in this country, individually, and collectively; the economic advancement of India must depend largely on the Engineering profession, and the position of the Institution as representative of the whole Engineering profession in India has already been recognised by the Government of India—therefore, I say, let us take courage and make fresh efforts to overcome the qualms that we have in going in for this affiliation.

Gentlemen, I hope I may be excused for departing from what I believe to have been the practice in past presidential speeches to this Congress of expatiating on the year's progress of this Province; even if some of you do not quite agree with some things that I have said, I hope I may, at any rate, be given the credit of expressing my honest opinion; I *am* a Member of the Institution of Engineers, but in my present position, I have put that aside entirely and tried to look at the question simply from the point of view of this Congress.

There was a play on in London last year entitled "Loyalties"; the underlying note in it was the different kinds of loyalty that there are or ought to be in the world; may I suggest that a man's loyalty to his profession is not the least important of the various loyalties he can foster, and it should be every Engineer's ideal to uphold the standard and honour of the Engineering profession. Does not this loyalty to our profession also lead us in the direction of affiliation with the Institution of Engineers, and, in fact, lay some sort of obligation on us to work to that end?

I am afraid I have been led on to dilate more than I originally intended on this subject, and I fear I have trespassed unduly on time which ought to be given to the discussion of the papers set out on the agenda; Ishould like however to thank you for the patient hearing you have given me.