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WILLIAM STEWART DORMAN,
Founder, Punjab Engineering Congress.
Honorary Secretary, 1912-19..

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passed from the gloom and anxiety of a deplorable and rancorous war, to a sense of relief in the return to more normal and rational conditions of life. I think you will all agree with me in ascribing the chief credit, in this Province, for our successful issue from the war, to the firm and vigorous policy of its ruler, our honoured guest to-day. Were I a poet I might, like Virgil, the friend of my school days, sing arms and the man, who, first and foremost in this Province, organized victory, by straining every resource of the Government, and by sending forth the youth and manhood of this warlike territory, to fight, and perchance to die, on foreign battle fields, for King and Country! "*Dulce et decorum est pro patria mori.*"

During the war the vast majority of the British members of the Congress volunteered for employment on military service; and although most of these volunteers had to be refused the permission they desired, by reason of their services being required in civil employment, from seventy to eighty members of the three branches of the Public Works Department, out of whom half were members of this Congress, were actually deputed for military service. The value of the services rendered by these latter has been duly acknowledged on various occasions; and amongst the decorations or honours conferred on account thereof I may mention the award of the C. M. G. to Mr. White, Deputy Agent, North-Western Railway; the D. S. O. to Mr. Townsend, Lt.-Colonel Anderson, R.E., Major Battye, R. E., Major Chesney, R.E.; and the Military Cross to Captain Woodhouse, R. E., Captain Carson, R E., Major Gossett, R. E., Lt.-Colonel Garforth, R. E., Major Roberts, R. E., Major Sopwith, R. E., and Messrs. Fane, Farquharson, Gregory, Bennett and Trevor Jones. The names here mentioned probably do not exhaust the list of those who gained special distinction during the war.

GENTLEMEN--The first two meetings of this Congress took place in February 1913 and 1914, at a time when none of us even imagined that a great war might be impending. Since then, each of our annual meetings has been saddened by a sense of loss of friends and relatives; by anxiety for the future; and by a general sense of perils by land and by sea, and in the blue vault of the sky above us.

For years past we have been able to talk of little else but the war, and of problems connected with the war. The war is now, happily, a thing of the past; and it is to me, personally, a matter of intense satisfaction, that this, the first occasion on

which it has fallen to my lot to preside at your annual Congress, synchronizes with the joyous advent of peace. After all, "Peace hath her victories, no less renowned than war;" and it seems to me that tasks of construction afford a nobler field for the application of the resources of engineering science, than tasks of destruction. It has been said that the outstanding feature of the recent war has been that it has been largely an engineers' war. Let us hope that our efforts during the coming period of peace will signalize it also as mainly an era of immense expansion of engineering enterprise. During the period of the war, and certainly during the latter part of that period, works of construction have been practically at a standstill throughout this Province, owing to the necessity of devoting all available resources, financial, material, and human, to military purposes; but now that the war is over we must make up for lost time, and devote our energies, with redoubled zeal, to the design and execution of works of public utility.

Amongst the more important railway projects now taken up, or about to be taken up, I may mention the shortening of the bridge over the Chenab at Wazirabad, from twenty-eight spans to seventeen, at a cost of five lakhs of rupees; the doubling of the line from Kotri to Rohri (exclusive of the Indus Bridge) at a cost of one hundred lakhs of rupees, half of which sum has been spent already; the doubling of the Rawalpindi-Golra section, at a cost of twelve lakhs; a new goods yard and lines at Rohri, costing ten lakhs; and works in connection with the storage of liquid fuel for locomotives, at Karachi.

The Buildings and Roads Branch of the Public Works Department last year threw a bridge across the Haro River within a period of three months; and it is now engaged on the construction of a new bridge across the Chenab at Wazirabad, which has been estimated to cost nineteen lakhs of rupees.

It is also engaged on an extensive programme of road construction in the valley of the River Beas in the Kangra District, estimated to cost Rs. 6,38,000; another road in the Attock District, to cost Rs. 2,39,000; and a project for bridges over the Umlah and Tangri nalas near Ambala, to cost four lakhs of rupees.

The Irrigation Branch is preparing three projects of the greatest magnitude; each of which is likely to cost about a thousand lakhs of rupees, and to yield a nett financial return of from six to eight per cent. per annum on the capital expenditure. These projects are the Thal Canal, offtaking from the Indus at

Kalabagh, to irrigate five million acres, or eight thousand square miles of wilderness lying between the Indus, Jhelum and Chenab rivers ; the Bhakra Reservoir dam, 355 feet high, to be built across the Sutlej, at its debouchure from the Himalayas, in order to store up 110,000 million cubic feet of water for purposes of irrigation during the winter ; and the Sutlej Valley project of canals offtaking from the Sutlej, near Ferozepur, for the irrigation chiefly of the territories of Bikanir and Bahawalpur. Other important projects in hand are the remodelling of the canal head works at Rasul and Khanki ; which members of this Congress may possibly find it profitable and convenient to inspect, at our next general meeting, a year hence.

I may appropriately say a few special words here about the Irrigation Branch of the Public Works Department. Properly speaking, the history of perennial canal irrigation in the Punjab goes back only fifty years or so, to the year 1869. It is true that a trickle of water was passed down to Delhi a hundred years ago, through the Western Jumna Canal ; but this was, prior to the year 1869, little more than a conduit of natural drainage through river creeks, which did almost as much harm as good. Even by the year 1869 it was irrigating annually only about 400,000 acres, or only half of what it irrigates at present.

The permanent head works of the Bari Doab Canal were built in 1869 ; and although the canal had been opened ten years earlier, it had, down to that time, irrigated only 200,000 acres per annum, or about one-fifth of what it does at present. But even these two canals reckon their real prosperity no further back than twenty-five years ago, when perennial canal irrigation in the Punjab really began the boom which has been maintained ever since.

Our Punjab canals irrigate now in good years 9,600,000 acres, or 15,000 square miles, annually, and furnish nearly forty per cent. of the entire revenue receipts of the Province. The budget estimate for the ensuing year shows that, apart from assignments made from Imperial sources, the revenue receipts of the Punjab are estimated to amount to 560 lakhs of rupees, out of which over 215 lakhs of rupees are the yield of canal irrigation.

During the past year an experiment has been initiated whereby irrigation water is supplied to a landowner on terms of volumetric contract, instead of, as hitherto, on terms of payment per unit of area of crops matured on the irrigated land. This experiment has proved successful, and has been extended to the lands of other landowers, and there is a prospect

that we shall be irrigating shortly about forty thousand acres on these terms. Syndicates of peasant irrigators are also coming forward, with the approval of the Director of Co-operative Societies in the Punjab, and offering to take water on the same terms, so that one may almost look forward to the time when all irrigation water in this Province may be sold across the counter, in bulk, like sugar or flour. This may yet prove to be the most remarkable advance in irrigation business since the beginning of Punjab irrigation history.

GENTLEMEN—We greet with both hands the return of peace; but in doing so we find our joy somewhat damped by knowledge of the recent enormous increase in the cost of living, an increase which presses with unfair intensity upon salaried officials.

We have heard of the "piping times of peace," but a contemplation of the progressive submergence of fixed salaries in the rising tide of the market prices of the necessaries of life, is so depressing, that if we were to tune our pipes now they would bring forth only a plaintive melody. Fortunately, His Honour Sir Michael O'Dwyer fully recognizes the necessity of readjusting the scale of salaries of all classes of officials *pari passu* with the inflation of market prices; and we may rest satisfied that the expression of his views in the proper quarter will bear refreshing fruit in due course.

It will be comforting to a large portion of this audience to learn that he has not overlooked, in this connection, the hard case of the Provincial Engineering Service, or of those engineers who are employed by the Government on short term contracts.

Whatever the result of the recommendations of the Local Government in this matter may be, I beg leave to tender to His Honor, who will shortly relinquish the reins of the government of this Province, the hearty thanks of his engineer officers for his kind interest in their welfare.

It is, I think, appropriate to take this opportunity of saying a few words in his presence by way of anticipatory farewell. I am sure that I only voice your general sentiments when I express the thorough appreciation which those here present feel of his personality, and of the vigour of his administration. We who have witnessed the manifestation

of his physical and mental vigour, feel sure that popular rumour cannot be altogether mistaken in the belief that the Home Government will wish to re-employ that vigour in another field at least as important though not, perhaps, so congenial to him, as the Punjab. But wherever he may go he takes our hearty good wishes with him.

The professional papers which have been laid before this Congress, and which will shortly be discussed by us, are ten in number. As usual, most of these have been written by irrigation engineers ; and whilst I appreciate this evidence of the professional zeal and keenness of the officers of my own particular branch of the Public Works Department, I should have been better pleased if the important Railway Branch had contributed more largely on this occasion to our professional enlightenment. Only one railway engineer has contributed a paper to this meeting, but I am glad to be able to note that there is a prospect of our railway colleagues taking a large share in the professional contributions to our next annual meeting The Buildings and Roads Branch of the Department has done well in presenting two papers to us, and a paper by an electrical engineer affords a welcome variety to our discussions, and an extension of the range of interest thereof. The active membership of this Congress now numbers 230 ; which is satisfactory, considering that the entire numerical strength of the Public Works Department of this Province, including the railway and canal branches, is not more than about 340 ; out of whom about 70 or 80 are still absent on military duty, and others on leave. I have little doubt that our numbers will exceed 300 in the near future.

I have only one matter left to mention to you. Most of the members of this Congress are probably aware that a movement has been set afoot recently with the object of establishing an Indian society of engineers, somewhat on the lines of the Institution of Civil Engineers in England, and corresponding associations in America and elsewhere.

The organisers of this movement have addressed the members of this Congress and myself, inviting us to join the proposed society. The invitation will be discussed at our business session to-morrow afternoon, so I need not say much on the subject now. The advisability of the formation, in due course, of an all-India association of engineers has long been present to the minds of members of the Punjab Engineering Congress, for one of my predecessors, Colonel Cra'ster, in his address

to the Session of February 1916, spoke on the subject as follows :—

"We look forward to the formation of a single body on the lines of the Canadian or American Institution of Civil Engineers,—possibly with head-quarters in new Delhi—which will embrace the whole of the profession throughout India, with vigorous branches in each Province, acting as feeders to the central body." And more recently, on the advice of my Committee, I addressed a letter to the Secretary to the Government of India, Public Works Department, in which I mentioned that this Congress, as well as the corresponding Congresses of Bombay and Burma, looked forward to the formation of a central society, with a branch in each province of India, representing all branches of the engineering profession; and expressed the hope that His Excellency the Vicero might interest himself in our aims, and reserve for this central society, which we hoped to see founded shortly, a suitable building site in the imperial city of Delhi.

In these circumstances we are naturally pre-disposed to welcome the general principle of the establishment of a comprehensive all-India Society of Engineers,—the germination of an idea, the seed of which has been sown by ourselves; but when it comes to considering the proposition in detail, we must, of course, be careful to make sure that any arrangements which we may make will not conflict with the best interests of our existing Congress in the Punjab. His Honour Sir Michael O'Dwyer remarked, in a speech delivered at our meeting of February 1916, that he was proud of the fact that the Punjab, in the establishment of this Congress, as in so many other matters, had set the lead to the rest of India. We must not lose that lead, gentlemen. We must continue to point the way from the Gate of India to those who reside within the gate; and we must be careful that in holding out the hand of welcome to the proposed all-India Society of Engineers we do not cease to nourish the plant which has already sprouted, and is flourishing under our care.

May this sapling, invigorated by the streams of scientific criticism, flowing through its members, grow into a veritable and enduring Tree of Knowledge in the Land of the Five Rivers; and, like this Province itself :

"*Crescat e fluviis*"

SPEECH

BY

SIR MICHAEL O'DWYER, K.C.S.I.,

LIEUTENANT-GOVERNOR OF THE PUNJAB.

MR. WOODS AND GENTLEMEN.—I feel that I must say a few words to express my acknowledgment of the very kind words which your President has said on your behalf with reference to myself. As Mr. Woods has told us, you have met in recent years in the deep shadow of war. This year you are meeting in the sunshine of victory and of peace. The Punjab Engineering Service can look back to these years with pride. They have borne a very large share in helping to bring about the results which we are all so proud of, and the list of distinctions earned in the Field, to which Mr. Woods has referred, shows that the Punjab Engineering Service, like the Punjab martial races, can always be relied upon in time of crisis and in time of emergency.

The war may or may not have been an engineers' war; that aspect I leave to you. Anyhow, the war has brought out the vital importance of public works. It has also, here in India away from the theatre of active warfare, made us realize what we owe to the Public Works Services. We realize more clearly the value of the facilities which they have provided, as they have been to some extent contracted in time of war. Our canals, it is true, worked uncurtailed during the war, and they were invaluable sources of food supply, not only in this country but to the allied armies as well. On the other hand, railway facilities were very much cut down owing to war conditions, and, in some cases, railway lines have been dismantled to provide rails for the theatres of war, a measure which threw increased burden on our roads. The people have, therefore, realized more fully what they owe to the facilities which have been provided in a province like this by the Public Works Service. The Punjab perhaps more than any other province has been built by these Services; the system of canals provides half of the food supply of the province, while the steadily growing net

work of railways and the increasing number of metalled roads, are bringing the producers into close touch with the markets.

We have an example of what has occurred in the Punjab during the last fifty years now taking place under our very eyes. In Mesopotamia, after the enemy had been driven out from the land he had tyrannized over and mismanaged, the first thing was to set to work to organize a peaceful administration, and the most potent services in the organizing of administration were the provision of roads ; the construction of railways ; and the re-opening of the canals. In all these works officers of the Punjab Services have played a great part. In fact their part has been so great and useful that we are in vain endeavouring to get them back. The military authorities in Mesopotamia have such a high appreciation of their services that they are very unwilling to part with them. However, we in the Punjab, now that peace has been restored, have to resume the great programme of work on railways and irrigation which was interrupted or held in suspense during the war, and to carry out the programme we need the services of all our officers.

During the war our programme of roads was continued, and we are glad to hear that the last link in our road system to the north is now being provided by the construction of a road bridge over the Chenab. Mr. Woods has referred to some of the great schemes of railway extension and irrigation which will now be pushed through. We desire, for the future prosperity of this province, to bring these schemes to fruition as early as possible. Their magnitude staggers the imagination. There are three great irrigation schemes, each of which will cost one thousand lakhs, and one wonders where the men and money are to come from. But the Punjab engineers have never flinched before any task, however great ; and the Punjab Government and the Imperial Government have generally been successful in raising funds for great schemes, when they promised to be materially beneficial both to the Government and to the people. We can, therefore, face those projects of railway extension and canal development with full confidence, and the papers which appear on the agenda of this Congress furnish proof that the engineers of this province are already seriously grappling with the problems before them.

There is one condition which is absolutely necessary. In order to get the best out of the Services through whom the Government acts, those Services should feel they are adequately remunerated and that their work is duly appreciated.

It is hard to expect a man to give the best that is in him unless he has reason to feel satisfied as to the conditions of his Service. Some people may perhaps be unreasonable in their claims for the improvement of their pay and prospects ; but, speaking quite candidly, I entirely agree with Mr. Woods when he says that the present pay and prospects, which were fixed in different conditions, are now generally inadequate. I sincerely hope that the proposals which are now under consideration will give substantial amelioration of conditions in all branches of the Engineering Service, *viz.*, Imperial, Provincial and Temporary ; and without violating official confidence I may tell you that I have strongly supported substantial improvements in the conditions of these Services.

It only remains for me to thank you for the very kindly and friendly welcome you have given me to-day, which I appreciate as a compliment not only to the head of the administration ; a post which I am going to relinquish in a few weeks, but as a personal compliment to myself. Owing to other and even more pressing duties I have perhaps been unable to take so much interest in the engineering work of this province as I should have liked to. I am most grateful to all branches of the Service employed in the Punjab for all they have done, and whether Imperial, Provincial or Temporary, and whether British or Indian, they have both shown examples of solid co-operation for the progress and well-being of the province. I thank you for all you have done for the province and the Empire during these recent years of crisis.