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SIR WILLIAM ROBERTS, C.I. .,
President 1942-43.

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Address of Sir William Roberts, Kt., C.I.E., M.L.A., President, Punjab Engineering Congress, at the Annual General Meeting, on the 18th February, 1943.

Dr. Sir Manohar Lal, Distinguished Visitors and Members of the Congress :

On behalf of the Punjab Engineering Congress, it is my proud privilege this morning to extend to you, Sir Manohar Lal, and other distinguished visitors, a most hearty welcome at the opening session of our Annual Meeting. We are sensible of the enormous burden resting on your shoulders as Finance Minister in the fourth year of the world war. We know also some of the extra work war conditions have imposed on you and, therefore, value greatly the fact that you have found time (and petrol) to be able to attend this meeting.

One definition of an Engineer is "one whose function is to imbue the dry knowledge of a scientist and mathematician with imagination and apply it to practical and economic planning for the benefit of humanity. He is in fact the link between abstract knowledge and the hard facts of life, between man and his needs". A successful Engineer must be a close student of costs and it is here, Sir, that as a distinguished Economist and Finance Minister, I find no difficulty in finding in you, Sir, a most appropriate person to perform the Opening Ceremony of this Engineering Congress. Your presence is an encouragement to all Engineers who, in these days of war, are giving of their best for the furtherance of the war effort at the minimum cost.

This Congress is comprised not only of Engineers in the Services, but it has on its rolls many practising and consulting engineers, in addition to a few others, such as myself, who are really either business men or engaged in agriculture and in one way or other are intimately connected with the engineering profession. It is, therefore, a matter of great pleasure to me particularly when I welcome other distinguished visitors, who have very kindly graced this occasion with their presence.

I think the best service that the President can do on an occasion like this is to recount the activities of the members of this Congress during the past year. Our main objective has been to assist in the prosecution and in the winning of the war. All branches of Engineering, be it Railways, Irrigation, Buildings and Roads, Electricity or Public Health, have been working full blast towards that one aim. We have had Chief

Engineers of the Irrigation Department constructing aerodromes and bases and every Department of Engineering has been closely associated with the work. There are in fact no water-tight compartments, where war work is concerned. I cannot, of course, give you the numbers or details of the aerodromes and bases which have been built, but the work has been remarkable for the quickness and speed with which it has been carried out. The railway have been forthcoming with Railway sidings and in the carrying of material to sites. The Buildings and Roads Branch have given constantly of their experience in constructing roads, both *pacca* and *kachha*, and in assisting in preparing the ground for aeroplanes. Many miles of sidings have been completed. Over 600 miles of new military roads have been constructed and many important bridges over rivers and streams have been built, which will facilitate the movement of troops and stores in case of emergency. The Irrigation Branch have, in addition to joining hands for the construction of aerodromes, made a great contribution in bringing more agricultural land under irrigation, to grow more food. Of the million and half acres of increased food crops grown in the Punjab this last summer and the present winter, about a million is due to increase in irrigated food crops. This increase alone would be sufficient to feed the whole Indian Army of well over a million men, for two years. All this extra work has been performed with depleted staff, as on the average over 20 per cent of officers and close at 20 per cent of overseers have been released for war work in all the Engineering Services.

I will now deal with the special points in which the various branches of the Congress have been engaged during the year.

North Western Railway— The growth of passenger traffic at Delhi main station has for many years increased the state of congestion that takes place at the entrance to the station, more particularly at the grouping times of trains. The circulating area was inadequate for a station of such importance and the increase of traffic due to the war has made it essential to make considerable improvements. For this purpose Queens Road has been diverted and the area in front of the station, formerly occupied by the road, has been added to the circulating area. At the same time, considerably improved facilities for the public have been provided by the extension of waiting halls and booking officers for third class passengers and a large covered porch has been built for protection to the public when arriving or departing in vehicles. The concourse for first and second class passengers has also been enlarged. A notable feature of the work is the extensive use of reinforced concrete.

Breaches due to Floods in Sind.—The enormous floods in the Indus during the summer of 1942 caused many breaches in Railway lines in Sind particularly. Efforts to divert the waters to the three canals taking off from the Sukkur Barrage proved inadequate and the line was breached in many places. The biggest openings occurred where a heavy deep flood moving at a high velocity made the normal methods of repair by filling with quarry spoil or cinders quite out of the question. It was therefore, decided to tackle the work by means of pile bridges, utilising mainly 20 and 40 feet girders. One large span of 150 feet was put in and altogether 60 spans had to be placed in the line to deal with the emergency. The average velocity of the flow of water in the major breaches must have been about 6 ft. per second at the maximum flood and the greatest depth to be piled about 36 ft. Penetration of piles in the bed of the breaches varied from 14 to 20 feet, and the maximum length of pile available was 40 feet. This meant scarfing and an added difficulty in the construction of the bridges. Fortunately, the Railway carries large stocks of plate girders, rolled steel, joists etc., and possesses steam cranes with long jibs, otherwise the work could not have been carried out. No. 7 McKiernan Terry pile hammers were used to drive the piles and locomotives with special connections to supply the steam. Work was continued throughout the twenty four hours, Sundays and holidays included. In all 2,144 lineal feet of pile bridging was constructed in five breaches, utilising 36-40 feet plate girder spans and 23-20 feet plate girder spans, representing a total tonnage of 536 tons, several thousand feet of rolled steel joists and 439 timber piles. Over 300 men were employed and the work was completed for rail traffic in about three months.

Where the water flowed swiftly, the simple method of guying the piles with rope during driving had to give way to the use of specially constructed frame guides. Progress was increased by the use of an improvised piling pontoon which could only be used in comparatively still water.

P. W. D., Building and Roads Branch—In spite of Staff difficulties, many important road projects costing about 1·3 crores have been undertaken to assist in the war effort. Many of these are completed and others nearing completion, and they are vital factors in the defence of this important Province guarding the N. W. Frontier of India. Total new mileage constructed is 572 miles, which has meant construction of roads at the rate of almost two miles a day. By the end of the financial year, 1942-43, there will be in the Province 4,500 miles of first class metalled, and tarred roads and 1,620 miles of unmetalled feeder roads opening up the country and bringing the villages nearer to the main arteries of commerce. This shows a tremendous advance when compared with the

mileage, say, in 1935 when there was only 2,757 miles of metalled roads in the Province.

With an increase in the total mileage of roads in the Province and the consequent increase in traffic, the problem of maintenance has loomed large. Also it has been necessary to make improvements for the evolution of road specifications capable of carrying the very heavy intensities of loads drawn upon them. To meet this demand, concrete roads have been introduced at various congested points, such as round about Lahore in miles one and two of Lahore-Multan road and miles three and four of the Grand Trunk Road, where a concrete track of 10 feet wide has been laid, giving a total carriage-way of 40 feet width. A further length of 2½ miles of concrete roads has also been laid right in the heart of the city of Amritsar in connection with the reconditioning of Amritsar roads on behalf of the Municipality. It has not only improved the traffic conditions but has considerably improved the sanitary conditions also.

Widening of Roads :—With the increase in traffic along the main arterial routes it has been felt that the existing width of the roads is not sufficient to carry the traffic as it exists to-day. A start, therefore, has been made on widening the main arteries which have heavy motor traffic upon them. Practically the entire length of the Grand Trunk Road between Gujrat and Attock bridge, a distance of about 175 miles odd, has now been widened to accommodate two lanes of traffic at a cost of 6½ lakhs. In addition considerable length of Lahore—Ferozepore—Ludhiana Road has been widened.

Village Roads—Village and *kachha* roads have also not been neglected. Experiments have been carried out to employ the recently developed subject of soil stabilisation for solving the problem of *kachha* roads. The aim has been to evolve a low cost all weather road for light traffic where insufficiency of traffic would not justify the spending of huge sums of money on the metalling of roads. Recently a length of about 4½ miles of this type of road has been laid near Lahore Cantonment to test the efficiency of the road. If this experiment proves successful, it should be of immense value to the profession and relief to the average man in the village.

This department has also given its contribution to the construction of projects in connection with aerodromes, many of them costing 36½ lakhs each. Considerable progsess has been made in reducing costs by experimenting with cheaper specifications for the runways, such as stabilisation with cement and the use of stabilised soil, etc., in their construction. Very interesting information has been obtained from these experiments.

An other scheme of interest to the Engineers is the motoring road around Simla. The scheme is estimated to cost Rs. 8,75,000. It is anticipated that the road would be completed by next year.

The Department is also engaged in the following major works:--

Name of the Project		*Estimated cost*
(*a*) Camp for Evacuees at Gurdaspur	...	Rs. 2,51,942
(*b*) Camp Jail at Hissar	...	Rs. 4,60,000
(*c*) Housing accommodation for coolies at Simla	..	Rs. 3,50,000
(*d*) Lahore Sewerage and Drainage scheme		Rs. 2,44,44,160

Besides these activities, the Department is also assisting the war effort by organising the Punjab Civil Pioneer Force. This Force at present consists of two units, of 1,229 officers and men, each under the command of one Commandant and 13 officers, with 11 Technicians. One unit under the command of an Engineer from this Department has already been raised and the other one is in the process of being formed now.

P. W. D. Irrigation Branch.

Food Crops.

Half of the total work on the aerodromes was entrusted to the Irrigation Department. Their next great effort was directed to increasing the area under crops, and particularly food crops. They were fortunately able to connect this effort with Land Reclamation, since in the normal process about two acres of rice and two of gram or berseem are produced for every acre reclaimed. The area reclaimed was four times the area reclaimed in the previous year. The area of food crops produced in the process was about 80,000 acres, giving eight lakhs maunds of rice and four lakhs maunds of gram. The Thur area reclaimed during the year is estimated at about 18,000 acres. Water was supplied for 50,000 acres of *Baqaya* land in the colonies and was sufficient to produce 40,000 acres of crops. Total increase under irrigated food crops of one million or ten lakhs of acres is expected this year.

Timber and Fuel—The Department has given very substantial assistance in connection with the exploitation of canal plantation both for timber required for the military and the Supply Department and for charcoal for Producer Gas. Over a lakh cubic feet of shisham and kikar timber was supplied from canal plantations to meet military requirements. The manufacture of charcoal is expected to reach 8,000 maunds a month very shortly.

Although, owing to war conditions, the Thal Project work has been almost completely stopped, the new barrage at

Daudkhel, the largest yet constructed in the Punjab, is, however, now practically complete. It only remains to divert the river across it. The work is also continuing on the lining of a small length of the Lower Chenab Canal, and two distributary reaches. These works will set free additional water for irrigation and will provide experience which will be valuable if lining is taken up on a large scale, as is probable, after the war.

W. J. Extension --The work on the Western Jumna Canal Extension Scheme to provide kharif irrigation to famine stricken areas in Hissar and Rohtak, which was started in 1940, was pushed on vigorously in spite of numerous difficulties in procuring labour, transport and material on account of the war.

Some supplies were actually given to Tosham tract in kharif 1941, as a result of which nearly 34,000 acres of new area was irrigated during the year.

Pai Rohana and Beri Bhalaut areas were given supplies during kharif 1942.

With the increased cost of labour and material, the scheme is now estimated to cost 1,57,00,000. Essential works directly connected with the extensions are expected to be completed during 1943.

Proposals for extending perennial irrigation from Dabwali Distributary to a portion of Dabwali tract, which is one of the driest areas in Hissar District, have been in hand and it is hoped that regular supplies will be available in kharif 1943.

Headwork Repairs—On the Sutlej Valley Project, the river Sutlej, owing to the prolonged and high flood last year, caused great strains on the various Headworks. There was, however, little damage done at Ferozepore and Islam, but more damage was done at Sulemanke. The up-stream left pocket developed a scour hole and the down-stream was found to be inadequate. Repairs and remedial measures are in hand. Important repairs and additions to the training works at all the three Headworks have also been found to be necessary and are in progress.

The Haveli Project, opened on the 2nd of April, 1939, is functioning satisfactorily and an area of nearly nine lakhs acres was irrigated from this project during 1941-42. The Pakpattan link canal, which was constructed as a part of this Project, greatly helped to augment supplies of the Pakpattan canal.

No serious damage resulted from floods to irrigation works other than these enumerated above.

Before I close, I feel I owe an explanation to the members of the Congress in regard to the meagre get up of the papers

which are to be discussed in this meeting. Our main difficulties have been due to shortage of paper and other requisite materials for the printing of papers and their appendices. At one time during the year I was doubtful of being able to bring forth even two or three papers, but thanks to the assistance of my Council for the past year and our printers, Messrs. Northern India Printing and Publishing Company, we have been able to bring up five papers for discussion. They are, however, devoid of pictures and plans, which go a long way to improve their get up and usefulness.

There is one other matter to which I should like to draw your particular attention, Sir, and that is the importance of our public bodies, cities and municipalities engaging trained Engineers. There is no reason why the technical skill and detailed training of Engineers should not prove of extra value in such works, as administration of Municipalities, Corporations, and Municipal Industries or as Director of Industries Department, which are now generally filled by non-technical men. I wish to make a plea on behalf of this Congress that the Punjab Government may consider the claims and suitability of trained Engineers for posts as Presidents, Administrators or Executive Officers of Municipalities and Corporations. After all 75 per cent of the work in Municipalities is Engineering and it would raise the status of this Engineering profession generally if it was regarded as essential to have engineering training as qualifications for these posts. I trust, Sir, that you will use your influence with the Punjab Government to bring about this very desirable improvement.

Before I conclude I wish to record on behalf of this Congress our deep regrets on the death of R. B. L. Ram Rakha, Superintending Engineer, Punjab Irrigation, a member of this Congress.

I also desire to congratulate on behalf of the Congress, the Engineering Officers and our friends who have had Honours conferred on them during the past year :—

Knighthood

Sir Arthur Griffin, General Manager, N. W. R. (Non-member).

C. S. I.

Mr. A. St. G. Lyster, I. S. E., Chief Engineer, Irrigation Department.

C. I. E.

Mr. A. M. Sims, Chief Engineer, N. W. R. (Non-member)

Mr. R. Trevor Jones, M.C., I.S.E., Chief Engineer, B. and R. Branch

Dr. E. McKenzie Taylor, M.B.E., Director, Irrigation Research.

M. B. E.

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Rai Bahadur

Mr. P. C. Taela, Divisional Executive Engineer.

Mr. P. C. Bahl, Divisional Executive Engineer.

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Sardar Sahib

S. Hukam Singh, P.S.E.

Khan Bahadur

Sh. Mahbub Ilahi, Executive Engineer.

Mr Abdul Ghafur, I.S.E., Executive Engineer.

I will now ask, you, Sir Manohar Lal, to be pleased to declare the Congress open.

SPEECH

OF

DR. SIR MANOHAR LAL, M. A.

Minister for Finance.

I consider it a high privilege to be called upon to inaugurate your annual Conference to-day. I can lay claim to no qualifications for this honour. Others who have preceded me in previous years could perform their task with just confidence because of their intimate official association with your many activities. They could speak from the abundance of their knowledge and with due authority.—But you, sir, have referred to me in kind and generous terms, I take it, deliberately to lighten my path.

Let my first word be of appreciation of what your service in its several branches has done for this province and outside. An engineer plans and designs and makes—he is the creator of wealth, because he harnesses the forces of nature in the service of man. In this supreme undertaking we can unhesitatingly affirm that your achievements in the past have been striking and ample, and the high quality of your work in the present continues with undimmed success. Punjab engineering has become proverbial for sound and solid work, and in irrigation particularly, because of its special opportunities and fresh problems, has made a name in a wider world. You have built for yourself a world-wide reputation, but you are not afraid to live up to the high ideals and difficult standards set up in the past. You constitute a fearless and progressive body of men, ever anxious to discover new methods of adding to the wealth of the province. I gather that no details howsoever wearisome are beneath your careful notice, and the volumes of your proceedings bear ample witness to your devoted attention to questions of theoretical significance. It is in this happy combination of theory and practice that lies the secret of your achievement and of your undiminished advance. I am no engineer, my occupations have lain far from the most elementary scientific study, but, even so, I have not failed to observe how close is your applicatian to well-planned scientific theory and patient study of all possible of relevant factual material. Two outstanding examples of these, as they strike me, are your minute inquiry into the problems of water-logging and extension of Thur, and the fascinating and fruitful investigations of the Irrigation Research Institute. Whenever I have visited the works at Malikpur, it has always brought me a live thrill. These are examples picked up at random by one wholly uninitiated—scores must spring to your mind—

many probably not on so large a scale, but each of importance in its own field. These two examples are also typical of the direct manner in which huge economies can take place—wealth saved from destruction, nature's devastating hand stayed, and cheaper and sounder works constructed.

You have spoken pointedly of the engineer as the link between abstract knowledge and the hard facts of life, a link between man and his needs. This, if I may venture to say with all respect, stresses a most valuable aspect of an engineer's real duty ; it also brings into prominence the kinship between the engineer and the economist. Economics has been sometimes defined as the study of man and his needs, and the manner in which man satisfies his needs. Our fields thus lie near each other and while I can lay no claim to any 'knowledge', I can fully appreciate your methods of producing wealth and satisfying man's needs. In this connection you have emphasized how the engineer practises economy by his close study of costs. This brings cheer to the mind of a Minister of Finance, and perhaps you would permit me to mention a secret. We all know how the engineer is, by the ignorant world, blamed for not keeping to his estimates, and spend greatly more than a private individual particularly in putting up houses and other buildings for his own use. A hasty world is apt to ignore why estimates might well be exceeded, and how standards established by your services have to be maintained at a high level. I wish, however, to say in all secret that I have never shared the uncritical detraction by the public, and have in the Finance Department, always viewed with indulgence and general approbation, your schemes. It is also well known that the proposals of our biggest engineering branch—the Irrigation Branch—are usually accepted in their entirety by the Government. We bestow the fullest care and affection on the goose that lays the golden eggs.

You are the makers of our wealth. If the Punjab enjoys abundance in corn, and the growing prosperity in cotton, it is due to you. But a Finance Minister cannot forget that you have not always looked ahead like hard headed students of costs ; and at least one of your enterprises, you all know to which I am referring, still remains something to which the name of a large white animal is given.

It is gratifying to learn and to realize that you are all knit together in one all comprehending war effort, the whole of your expert productive energy is directed to the one object of achieving victory. That was but expected, the congratulations of the province are due to you for the eminent success your whole-hearted effort has achieved in every direction. In building aerodromes, in making new roads and widening old ones and in producing more food, your success in every field

of activity is notable—and while this is being done, permanent sources of wealth continue to engage your attention without the least detriment.

You, Sir, with your intimate knowledge of engineering and the province's needs, have detailed at length the year's performances of the various branches of your service. Into this elaborate inquiry I could not be expected to follow, but on all this performance you deserve the warmest gratitude of every Punjabee and of the Government which represents him. In you at this time, we see typified more clearly than ever the zealous friends and the true servants of the province. It has been often remarked that while in peace time in Britain two sides are allowed in politics, in war-time there are only patriots and traitors. Always the builders of wealth, always true patriots, you are even more emphatically so to-day. I make no doubt that with your fine heritage, you will continue to add further distinction to your proud and glorious traditions —for as your achievements are great, greater is the call of duty on you.

One reference in your address, I would ask for particular leave to stress. In speaking of the million and a half acres of increased food crops, you mention with just pride to the increase due to irrigation and remark that this increase alone would be sufficient to feed the whole Indian Army of well over a million men for two years. This is cheering message that must bring assurance and encouragement to every Punjabee home. May we hope that through your efforts the days of food scarcity are over, and food will be available in adequate quantities at prices within the means of all. The Engineer can but help to produce, in the further great task of making food available you have a great role to fill. May you be able to do so in the discharge of your high and onerous office ?

One word more before I close. In your quest for building up a stronger Punjab you must realise every day that in the general economy of India, the Punjab occupies a poor place in minerals. Without adequate mineral resources certain most important types of industry cannot be built up, and the economic development of the province is destined largely to be only one-sided. In the measure in which you can face this grave fact and discover methods of escaping from its serious implications, must lie some of the most important scope for your future activity—the past represents an undoubted secured treasure, the immediate present would offer you unstinted laurels.

Sir, I have now great pleasure in declaring the Congress open.