MINUTES OF PROCEEDINGS

OF THE

Punjab Engineering Congress,

LAHORE.

1935.

VOLUME XXIII.

EDITED BY
MEMBERS OF THE COUNCIL.

Lahore :
PRINTED AT "THE MUFID-I-'AM PRESS."

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Punjab Engineering Congress

(ESTABLISHED 1912.)
(REGISTERED 1922.)

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RAI BAHADUR MANGAL SEN DHODY

President, 1934-35.

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ADDRESS.

OF

RAI BAHADUR LALA MANGAL SEN DHODY,

PRESIDENT

I have to thank all the members of the Punjab Engineering Congress for selecting me to be the President of your body for this year.

As such it is my very pleasant duty to welcome on your and my own behalf H. E. Sir Herbert Emerson, Governor of the Punjab, to open our Congress session, and also to convey to all the distinguished guests who grace the dais our heartfelt gratitude. They have all come at some sacrifice. The presence of H.E. the Governor, The Hon'ble Members and the Ministers and Heads of Departments of our Province shows that they appreciate the labour of the Engineers in carrying out work of public benefit and utility in the Province. In the case of other brother engineers from outside the Province we feel greatly honoured by their graceful act of coming to join in our professional discussions. They give us the benefit of their own wide experience and perhaps carry back pleasant memories of friendships formed and knowledge gained at first hand on some of our works and activities. They are one and all doing noble things for their own branches of work in their own Provinces. Their coming here to join with us is a compliment we do not easily forget.

I have to record with regret and sorrow casualties by death during the past year of the following who were or had been members of this Congress :—

(1) Mr. F. T. Bates, retired Chief Engineer, Panjab Irrigation.
(2) Mr. H. C. Richardson.
(3) Mr. Naunidh Rai.

The following engineers have retired from service during the year and we will miss them for many a long year both as engineers and friends.

Irrigation Branch :—

(1) Sir R. P. Hadow, Kt. C.I.E., Chief Engineer,
(2) Mr. A. Murphy, O.B.E., Chief Engineer.
(3) Mr. A. N. M. Robertson, Superintending Engineer.
(4) Mr. C. A. Colyer, Superintending Engineer.
(5) Mr. F. C. Glass, Executive Engineer.
(6) Mr. Amin Chand, Assistant Engineer.

B. & R. Branch:—

(7) R. S. Lala Swami Das, Assistant Engineer.

(8) Mr. A. M. Jafar, Assistant Engineer.

The Irrigation Branch has lost a galaxy of engineers who have left, each in his own place, a mark on the work he has done during his service.

The good services of the following members were recognised and rewarded by the Government by grant of titles of honour and distinction :—

Irrigation Branch :—

(1) Mr. F. J. Waller, Chief Engineer has received C.I.E.

(2) Mr. S. H. Bigsby, Superintending Engineer, has also been rewarded with a C.I.E.

(3) Lala Munishawar Chand, ex-Engineer has been given R.B.

(4) In the Hydro-Electric Branch Lala Banshi Ram Tandan formerly in the Irrigation Branch has been made a Rai Sahib as also Lala Gurcharan Dass Mehta in the Buildings and Roads Branch.

It has been usual to give a review of the past history or achievement of a particular branch of the P. W. Department in the Province but I would refrain from taxing your patience, though such a review may be of some interest to our outside visitors. I will content myself with a few brief remarks and a description of the most important works carried out or figures delineating progress of activities during the past year.

The Buildings and Roads Branch has carried out the construction of a new Council Chamber with subsidiary offices and also of a Bar Association block attached to the High Court at Lahore. In the matter of roads, they have carried out metalling of arterial roads No. 4 Pattoki-Bhai Pheru, No. 28 Lyallpur-Sargodha, and No. 6 Multan-Jehanian. They have very usefully widened out exits from Lahore on the Lahore-Amritsar and Lahore-Multan roads. The latter of these two is very interesting as experimental concrete tracks are being laid to various designs and specifications in seven short lengths to determine their utility and service under our traffic and climatic conditions.

The total mileage of metalled roads under the Public Works Department is 2,719 miles of which as much as 2,123 miles or nearly 80 per cent. are tarred which is very satisfactory from the point of view of the engineers and the motoring public. Experience so far shows that for light traffic a water bound metalled road with two coats of No. 2 tar provides a satisfactory and economic surface, while "Premix" is being adopted for heavy traffic conditions. As necessary adjuncts to their roads the following bridges have been built on important communication roads :

Five new spans have been rebuilt after the heavy flood damage to the Chakki bridge on the Amritsar-Kulu road, one suspension bridge has been put across the Spiti river at Dhaukar on the Hindustan-Tibet road and two steel girder bridges have been built on the Kulu-Rotang Pass Road across the Phojal Nallah and at Beli Sajjan road. Lastly an arched bridge over the Chandra river at Koksar was built during the last year. All this shows that in spite of the stress of the times, a useful programme has been carried out.

On the Public Health and Electric service sides, the following major projects have been carried to completion while others are being carefully examined.—

1. Montgomery and Hafizabad drainage schemes and Bhiwani city water supply have been completed by the former and the latter have carried out electrical installations in Government buildings at the towns of Montgomery, Ludhiana, Gurdaspur, Phillaur and Sheikhupura. The total budget expenditure of the B. & R. Branch during the year amounts to Rs. 1,08,09,220 including establishment charges.

The Irrigation Branch has converted certain weir bays into Barrage type spans at the headworks of the Lower Chenab Canal at Khanki and have very large and extensive works in contemplation of anti-waterlogging nature involving large diversions of channels and con struction of protection bunds.

The supplies in the rivers were satisfactory both during summer and winter. These were distributed through a large net-work of 3,834 miles of canals and 17,818 miles of distributaries and achieved an irrigated area of 5,672,582 acres in *kharif* or summer crop and 6,344,873 acres in *rabi* or winter crop. Their figures of income and expenditure are :—

Under major Head	CXIII	Receipts	..	Rs. 6,21,99,532
Do.	Do.	Expenditure	..	Rs. 1,82,37,582.
Do.	Do.	Cc55 Do.	..	Rs. 40,86,907.

On the N.W.R. although no special large schemes have been taken up, a large volume of work has been carried out to bring the line, up to the standard required for modern engines with their heavy axle loads, greater speeds, and longer trains. Works required to deal with river attacks have also been constructed. The former class has included a programme of bridge girder strengthening, rebuilding old weak abutments and piers, with improved signalling for greater speeds and replacement of heavier type of rails. The approaches to bridges on the Sutlej at Giddar Pindi and Adam Wahan were severely attacked by floods and have been given either longer Bell bunds or new diversions. At Rohri and Kotri Bridges on the Indus river, the raising of bunds has been completed.

Hydro-Electric Branch.—The present installed capacity is put at 48,000 K.W. During year ending 31-12-34, 18,410,330 units were generated. Of these, Amritsar Municipal Committee used 5,327,005 units and nearly 2,741,898 units were sold for industrial, lighting and general purposes. Total load applied for by the end of December, 1934 was 20,453 K.W., thus making allowance for system losses quite 50 per cent. of the installed energy is already booked.

I will now review certain aspects of some problems that are of great importance at the present time. The first is the immensity of increasing population and its efficiency, the second is the vast expanse of the country and the provision of effective communications therein.

In the first of these, men who should shoulder most of the work are those o fthe Public Health Department and the engineers. They should assist each other to promote human efficiency. It is the Public Health man who enunciates the science of living on earth and it is the engineer who carries out necessary works to improve the conditions of living. It is a truism to say that health is wealth, I would modify it and say Public Health is Public Wealth. If more projects of general health projected by the Public Health Department and Engineers were carried out, their effect on human well-being and efficiency should be great. When large tracts of country are to be opened up the engineer comes with his road, railway or canal projects. When industrial development takes place the engineer comes with his factories, mills and stores. In all cases large masses of humanity are brought together and the duties of the Public Health and Engineering Departments increase many-fold. The above projects should be followed up by projects of drainage, general sanitation and good water supply. Without all these, human efficiency suffers as is being constantly brought out in the statistics of public health. People, however, seem to live in ignorance of happenings in their surroundings as Sir Oliver Lodge has remarked, "The ordinary run of men live among phenomena of which they care nothing and know less."

It should not be enough to carry out large projects in a half complete way. No projects should be considered complete unless the new conditions brought about by them, such as obstruction or flow of drainage, effect on subsoil flow, housing of masses of population, their sanitation and general needs are thoroughly studied along with the original projects and protective measures are considered and carried out simultaneously. We all must have come across many instances where new town extensions, factories, with congestion of population have occurred or where roads, canals or railway embankments hold up large bodies of stagnant water received from direct surface flow or otherwise to the detriment of public health, and also many instances where remedial measures when taken have been very tardy or too late.

In the Irrigation Department land along most drainage lines was demarcated and reserved from sale or allotment but there the matter

was allowed to rest. Not even a profile of such lines of drainage was surveyed and plotted to see if they were free from obstruction to serve their purpose. It is now being realized that the rapid rise of subsoil levels in the Punjab is in great measure due to obstruction of surface flow. This is hardly a surprise. If the regions of the great Panama Canal could be rendered free of pestilential Malaria by adequate drainage, it should be certainly possible to drain the alluvial soils of the Punjab. This would be accomplished if we were not so prone to give secondary places to these essential works. We should place in the forefront, works in connection with drainage, sanitation and water supply in each place large and small. Even in Lahore, the premier city of our Province, shortcomings in these respects are most marked, let alone the country villages where the bulk of our population lives. It is from the country-side that the major part of our revenue is derived but in the utilization of that revenue towards human efficiency they and their homesteads find only a secondary place. These vital essential works of uplift should be taken up in villages for it is they that should be raised in their standard of healthful living.

I would select in each district a number of villages well distributed over the tract where work of improvement in these respects will be taken in hand and carried out in full knowledge and co-operation of the people. Most of such works after completion could be maintained by local village unions and bodies who should receive reasonable allotments for the purpose from the General Revenues. It is by such methods of work that the village folk will be induced to stay on in the country. It is thus we can build from the bottom upwards. At present we improve the towns in many respects and the educated few from villages make an exodus to them. We build factories etc. near the towns and the uneducated country folk resort to them to find employment. It is thus that we have created difficulties in towns and depleted the country-side. Sir George Anderson recently said that, "The effect of past neglect in this direction has been to impoverish the country-side by sucking initiative and capacity from the villages into towns and the evil is accentuated by the fact that the village conditions, being what they are, very few of those who have been educated in towns return to serve the country-side."

It is only when our village conditions are improved, when factories in the shape of small industries are distributed over the country that the difficulties of towns can be reduced, and the well-being of the village people inaugurated in their own places.

Coming to the problem of communications in the country it is a happy sign that this matter is now getting the attention it has always needed. Those who live in villages keenly feel the lack of interest that has been shown in their road systems in the past. I will give one instance of a kind. Picture to yourself road widths of 8′ or 10′ which not only carry traffic at all times but which also serve in a great many places

as drainage lines during monsoon rains. They get deeply cut and ravined. The bottom of the path is reduced to a width of 2′ or so with a depth of 1′ to 3′ to the bottom and with side berms sloping both longitudinally and transversely. Along this bottom width a pack animal has to travel carrying large bulky loads of straw and fodder with i ts attendant owner tripping all the while now on the berm and then on the bottom width. It is such roads that need attention given to them wherever they occur. In canal colonies we provide field roads, village roads, inter-village roads and then in addition main and sometimes arterial roads but the other parts of the country are left to their primitive paths meandering round the small field boundaries resulting in waste of time and energy for the wayfarer. No engineering searchlight has been thrown on to the un-irrigated tracts and the District Boards and Civil Administrations have not had the time to look into these needs. Improvement in this direction is badly needed.

Travelling over the Northern Districts of the Province one is greatly struck by the uneven nature of the country. Here heavy ravining and retrogression of levels has gone on for ages and is still going on. Work of reclamation of land over such deteriorated tracts is very important. Here too subsoil water levels are dropping and in places wells are being thrown out of use. It is the engineer's place to advise people as to how they should control such deterioration and bring back to cultivation large areas that have been lost ; enormous valleys have formed and the apex of each valley can be easily controlled.

There is a large number of estates that suffer for want of good management. It is for the engineers to come forward and take up the work of improving them. The Government could set an excellent example by engaging engineers to help in the administration of large estates placed under the Court of Wards. Besides these there are large tracts of country where uncultivated areas exist for want of adequate enterprise. In all these where Government can raise funds by grants or loans they could lead ; elsewhere the educated public should launch such schemes with beneficial objects to put large masses of people in better circumstances than the various joint stock and insurance companies, now springing up all over the country, can do. At present a sort of lethargy prevails in the country and in estates large and small. Things are seemingly moving as life does not stand still, otherwise stagnation goes on and unemployment rules. Take arboriculture. Hardly anything is done except perhaps in canal colonies, roads are losing their avenue trees that had been planted by zealous men in the past, the District Boards are quick to make revenue by sale of old dry trees, but they seldom show initiative to plant new ones. A *kacha* road can be fairly well maintained at a small cost to suit its traffic conditions but it remains ruined as the disposal of its surface drainage has not been looked into by an engineer, no culverts are provided and no timely repairs are done.

I have thus briefly indicated a few matters of importance that should be handled in preference to many a large project of luxury expenditure that does not benefit the masses. Luxuries can follow and not precede essentials.

A most elaborate survey of such needs of the country is called for and thereafter a progressive line of action laid down over a number of years so that results of efforts and progress made can be watched. A science of corporate living and work should be introduced into our school and college curricula.

I should like to see many engineers in municipalities, District Boards and other councils not merely as paid servants but as members of these bodies to be really helpful to them in their various activities of public life, rather than as mere consulting engineers round every street corner in Lahore. It is pleasing to see a housing corporation started in Lahore with beneficial objects of service. But for the larger work in the country, I would urge that the Public Health Circle is made into a secretaryship with its own Chief Engineer at its head and sufficient staff to carry out these works in rural reconstruction, in rural roads, in rural land reclamation, in rural sanitation and in control of rural drainages.

The Revenues of the country should in a great measure go to improve the initial conditions of living in sufficient health and conveniences, with a free gift of education. If such works are taken up in the country and spread over a number of years, they will be helpful to the masses by the wages they will earn to supplement their agricultural income and improve their surroundings. President Roosevelt, in advocating the abandoning of the dole system, spoke in favour of a long range permanent policy including slum clearance, rural housing and highway afforestation aiming at security of livelihood and decent homes. He stressed that despite their efforts in the dole system they had not weeded out the over-privileged nor effectively lifted up the under-privileged.

When Government carries out such schemes they will carry the masses with them. Since my retirement I have lived in my home village in the country and with the people and know at first hand what they need done for them.

Sir Malcolm Hailey at one of his parting addresses said, "The effective progress in the Province depends on improvement in the conditions of life in all its aspects in the rural area," and Sir Herbert Emerson in his recent speech at Lyallpur has laid great stress on rural agricultural uplift saying that, "Rural reconstruction admits no limit and the economic and social uplift of every section of the rural population comes within its scope."

I shall now offer a few brief remarks regarding small industries. The natural resources of the country are great but we need to know how and where to begin. In my visit to Japan during 1934 summer, I tried to see something of the industrial side of that country, and I shall place before you only categorically some of the points that struck me as the main contributory causes of the phenomenal progress made in that country.

(1) It is easy to develop Hydro-Electric power in the most remote places. This is possible owing to the existence of small snow fed perennial rivers in a country where low mountains and steep falls abound close to populated tracts.

(2) This motive power is made available for industrial purposes in all homesteads in their neighbourhood.

(3) The people are artists by nature and their education in Technical and Arts schools enables the young mind to expand and develop freely. The teaching staff is very liberally supplied in their institutions. At one place I was told there were 38 Professors and 31 Assistant Professors at a technical college for 500 students.

(4) Cottage industries are greatly encouraged and are very suitable to people who are ready to make small articles such as toys and simple component parts.

(5) In all universities and technical colleges highly equipped laboratories are provided for research work in machinery, art, industrial chemistry and the like.

(6) Traffic rates are kept very low as double track railways, both Government and private, run over all parts of the country.

(7) Timbers of useful kinds and raw materials produced in the country are available close at hand in the country where hills and towns exist close to each other in a narrow width of land.

I would just mention a few of those small industries that may appeal to aspirants for industrial advancement in these days of extreme unemployment.

Automobile parts, bandaging material, buttons, bolts and nuts, chains, chemicals, clock manufactures, dye-stuffs, paints, veneers, floor-coverings and linoleums, rope-making, rubber goods, sand-paperand toy.

Before I close I wish to pay a tribute to those engineers of the past, European and Indian, who have successfully carried out large works and made our Province great in the engineering world, it is now left to engineers of the coming generations to make it greater still.

It is with great pleasure that I now ask H. E. the Governor to declare the Congress open.

SPEECH

BY

HIS EXCELLENCY SIR HERBERT WILLIAM EMERSON, K.C.S.I., C.I.E., C.B.E., I.C.S., GOVERNOR OF THE PUNJAB.

I am most grateful to you, Mr. President, for the kind manner in which you have welcomed me on behalf of the Council and members of the Punjab Engineering Congress. As a layman, I feel considerable difficulty in facing a gathering of experts, and in attempting to address them on matters, of which I possess no technical knowledge. But no one who has spent nearly 30 years in the Punjab, as I have done, can fail to be conscious of the great debt which the Province owes to her Engineers, or to recognise the great part which they must always play in her prosperity. The system of Government may change : Ministers may rise and fall : but, if the Province is to advance, her Engineers must continue to maintain the high level of achievement and efficiency which has distinguished them in the past. The importance of this is perhaps not sufficiently realised. Their work is taken for granted, and the assumption is apt to be made that what is now will so be hereafter. In the course of political discussion, there is a tendency to overlook the case of the technical services, or at least to under-estimate the extent to which they are bound up with the prosperity of the Province. It has become the fashion to deprecate too great a regard for efficiency ; and it is not infrequently implied that, if political interests conflict with the preservation of existing standards, then the latter must go to the wall. This is not a doctrine which may be accepted in regard to any branch of the administration, and, perhaps least of all, in respect of the technical departments. The issues at stake are too big for any assumption of this kind. To take the most striking example it is impossible for any responsible person to view the future of the Punjab apart from her canals. They are the fountain of her prosperity : the source on which at least half the population depend for their well-being : the corner-stone of provincial finance : the origin of the beneficent activities, which, despite the economic depression, still characterise the administration. Not long ago, when the question of a reduction of water rates was under consideration, there was a school of thought which advocated acceptance of the principle that the canals, for financial purposes should be regarded as a self-contained unit, and that the revenue derived from them should be restricted to a figure which would yield a maximum percentage on the capital investment. It required very little examination to show that

the adoption of a principle of this sort would not only kill any idea of further progress, but would result in a contraction of existing activities which would put the clock back for many years. The truth is, of course, that, in our canals, we have an asset that cannot be divorced from the resources of the Province as a whole. Their great importance is shown by the casual effect on provincial finances of a good or a bad canal year, and one cannot contemplate without the gravest misgiving any deterioration in their administration, which would add a permanent element of loss to the vagaries of nature.

The same is true, though perhaps to a smaller extent, of other engineering works. The Hydro-Electric Scheme is rapidly widening the circle of those whose means of subsistence depends on its continuous efficiency. Good roads have become a part of our general economy, and no falling off from the standard of maintenance can be without serious results to the rural population. Many other instances could be given ; but the moral of it all is clear. The Punjab has to keep up the technical excellence of her engineering services, or slide down an inclined plane which will lead to ruin. True as this is for every province, it is particularly applicable to the Punjab. From whatever direction we may approach the subject, the conclusion is the same. The truth, is, indeed so elementary that I cannot believe any future government will wish, or can afford, to ignore it. This, however, will not relieve the Services themselves of the duty of being satisfied with nothing less than the highest ideals, or of maintaining unimpaired the existing standards of integrity and efficiency. In this, your Congress will play a worthy part, and not the least important of its functions will be to guard jealously the traditions of the past.

My predecessors have, on several occasions, dwelt on the scope for co-ordination between the various departments charged with engineering work. The last time Sir Geoffrey deMontmorency addressed the Congress, he surveyed, with his usual thoroughness, the points of contact between different interests, and he made suggestions as to how they could be explored and developed for the public good. I have no intention of traversing the ground which he so ably covered ; but there are one or two aspects of the question which I should like to mention. Desirable as co-ordination was during the days of plenty, it has become a necessity in these hard times when money is so short, that it is essential to make the best use of what there is. No department of Government can afford to regard itself as self-contained, or to pursue its course regardless of what others may be doing. That way lies waste of energy, waste of money and waste of time ; and, if the Province is to progress, we can afford to waste none of these. There has to be greater community of effort, if we are to escape some at least of the evil results of financial famine. I am convinced that there is far more room for this than is generally imagined. Take, for instance, the ordinary daily administra-

tion of a district. During my first tour of the Province after taking over my present post, I was shocked to find the appalling ignorance which prevailed among officers of one department, regarding the work which those of other departments were doing. Often, their objects were the same ; but it had become a habit to pursue them along parallel lines and to refuse to allow the right hand to know what the left was doing. The habit was almost universal. I do not wish to suggest that the technical departments were worse than the others : on the other hand, I am afraid that I had no reason to suppose that they were much better. A start has been made in correcting this tendency, and, in many districts, regular meetings are now held between officers of all departments, at which not only problems common to all are discussed, but means are sought, and often found by which one department can help the others. Even in the short time during which this practice has been in vogue, results have been achieved, which could not have been secured even in double the time at far greater cost, even if secured at all. I believe that the officers of the engineering departments of the local Government are, generally speaking, co-operating in this movement. If any are not, I hope the heads of the departments concerned will twist their tails to some effect. The opportunities of co-ordination in the higher spheres of administration are not the less important, because they are not a matter of every-day routine. To take one or two simple examples. Not long ago, I visited a departmental workshop, where they were generating their own electricity, although power from the Hydro-Electric Scheme had lately become available. I asked the Engineer in charge whether he was satisfied that this was economical. "Oh, yes," he replied, "if I took power from the Hydro-Electric Scheme, my budget expenditure would be considerably increased." "Perhaps so," I said ; "but what about the net result to Government?" "That," he said, "would decrease ; but that is not my concern." I explained to him in forcible terms that it was very much his concern, and it was not long before he was helping to increase the revenues of Government. This is perhaps an extreme case, but is typical of the point of view which departmentalism breeds. The departments are so many and so immersed in their own affairs that they find it difficult to realise that their interests are joint. To take another illustration. Waterlogging is now primarily the concern of irrigation engineers and research workers ; and I take this opportunity of acknowledging the great services they have rendered, and are rendering, to the cause. But the more successful they are, the more will be the necessity of enlisting the help of others, in order to secure the full fruits of their labours. Small natural drainage channels will have to be opened up to give ready access to the main drains; and, since this must be done by the owners and occupiers of land, and not by Government, the Revenue Officers must be brought into the scheme ; for they are the people who can best secure the co-operation of private persons. Again, the drainage of waterlogging areas does not always mean the immediate return to culturable conditions. In some cases, there can be no return. In others, the productivity of the land depends on the system of

cropping, the use of particular manures and other factors. Here, the agricultural expert must come in; and, only if he works in harmony with the engineers, will the best results be attained. Yet again, we have been hearing a great deal of late of competition between the railways and motor traffic, and it is clear that the great development of the latter has created new problems for the administrator. There can be little doubt that, had it been foreseen, our road system would be different from what it is. It is equally evident that the existence of this new factor imposes on the local Government and local bodies new opportunities and obligations for closer co-operation with the railways. More care has to be devoted to the framing of road programmes than in the past; and, although it may not always be possible to meet the wishes of the railway administrations in full, I can certainly promise that their point of view will receive the fullest consideration. While there are certain roads to the completion of which the local Government is committed, there are many alternatives in the way of feeder roads, and, in deciding which of those should be constructed or metalled, it is to the general interest of the Province that new facilities for motor transport should be given in directions where railways are not available, rather than that a dual system of transport should be created where the railways already go far to meet existing needs. In this connection, it is the intention of the local Government to carry out a review of their programme, and to see how far changes are desirable.

The examples I have given are obvious ones, and it would not be difficult to suggest many others, had I the time. One purpose of this Congress is to provide opportunities for the discussion of problems of common interest to engineers engaged in a fascinating variety of work throughout the Province. It is a clearing-house of ideas, and its value as such cannot be overrated. You have, no doubt, many questions for discussion of a highly technical character, beyond the comprehension of a layman like myself ; but, in this country, the engineer is also an administrator, and not the least merit of your annual gathering is that it provides opportunities for the informal exchange of ideas relating to your administrative functions. If I might make a suggestion, I would commend for your consideration the setting aside, each year, of a small portion of your time for the discussion of ways and means, by which you may help each other is securing the maximum co-ordination. My suggestion is not intended as a criticism of existing standards of co-operation which, I realise, are high, but is prompted by the experience that an hour's friendly discussion is of greater value in the solution of difficulties than many reams of Secretariat or departmental noting.

I have now the pleasure of declaring the Congress open, and, in doing so, I am confident that your proceedings will contribute not only to the volume of scientific knowledge, but will be of practical benefit to the Province.