

## Ninth Annual General Meeting.

The Ninth Annual General Meeting of the National Institute of Sciences of India was held at 11 a.m. on Thursday, the 30th December, 1943, in the Physics Lecture Theatre of the University of Delhi. Along with the meeting a Symposium on the foundation of a 'National Research Council' in India was held on the same day and was continued on the 31st December, 1943.

The following Fellows of the National Institute were present:—

Sir J. C. Ghosh, *President, in the Chair.*  
Prof. S. K. Mitra, *Vice-President.*  
Prof. S. N. Bose, *Additional Vice-President.*  
Prof. J. N. Mukherjee, *Foreign Secretary.*  
Rai Bahadur S. L. Hora, *Editor of Publications.*  
Prof. S. P. Agharkar, *Honorary Secretary.*

Dr. S. K. Banerji.  
Dr. Ram Behari.  
Prof. F. R. Bharucha.  
Sir S. S. Bhatnagar.  
Dr. A. K. Das.  
Prof. B. B. Dey.  
Lt.-Col. E. A. Glennie.  
Dr. M. Ishaq.  
Dr. D. S. Kothari.  
Dr. K. V. Krishnan.  
Prof. K. B. Madhava.  
Prof. P. C. Mahalanobis.  
Dr. D. N. Majumdar.  
Prof. G. P. Majumdar.  
Dr. K. G. Naik.

Dr. C. W. B. Normand.  
Principal G. R. Paranjpe.  
Prof. C. S. Pichamuthu.  
Prof. Mata Prasad.  
Dr. B. Prashad (on 31st December).  
Prof. M. Qureshi.  
Dr. J. N. Ray.  
Dr. S. C. Roy.  
Prof. M. N. Saha.  
Mr. B. M. Sen.  
Dr. H. K. Sen.  
Principal J. M. Sen.  
Dr. P. V. Sukhatme.  
Dr. K. Venkataraman.  
Rao Bahadur B. Viswanath.

Besides the Fellows of the Institute, representatives of Government Departments, Organisations for Scientific Research, Learned Societies and Universities were present by invitation and participated in the Symposium. The meeting was also attended by visitors.

A list of representatives of scientific societies and institutions, Universities and Government Departments is given below:—

Society of Biological Chemists, India: Dr. K. V. Giri and Dr. S. V. Desai.  
Indian Chemical Society: Prof. B. C. Guha, Prof. B. B. Dey.  
Mining, Geological and Metallurgical Institute of India: Dr. J. Sanjana.  
Calcutta Mathematical Society: Mr. B. M. Sen, Dr. S. K. Banerji and Mr. S. K. Chakrabarty.  
Institution of Engineers, India: Mr. B. R. Kagal and Dr. Shiv Narayan.  
Physiological Society of India: Mr. N. M. Basu.  
Indian Botanical Society: Prof. S. P. Agharkar and Prof. F. R. Bharucha.  
Indian Physical Society: Prof. S. K. Mitra.  
Royal Asiatic Society of Bengal: Prof. M. N. Saha, Dr. R. C. Majumdar and Prof. S. P. Agharkar.  
Indian Lac Research Institute: Dr. H. K. Sen.  
Geological, Mining and Metallurgical Society of India: Mr. N. N. Chatterjee.  
Indian Statistical Institute: Prof. K. B. Madhava, Prof. P. C. Mahalanobis and Mr. A. C. Mukherjee.  
Indian Ecological Society: Prof. F. R. Bharucha.  
Indian Association for the Cultivation of Science: Prof. J. N. Mukherjee.  
Current Science: Prof. M. Sreenivasaya.  
Indian Psychological Association: Principal J. M. Sen.  
Survey of India: Dr. J. de Graaf Hunter.  
Indian Meteorological Department: Dr. C. W. B. Normand.  
Zoological Survey of India: Dr. Bains Prashad.  
Board of Scientific and Industrial Research: Sir S. S. Bhatnagar.  
Indian Central Jute Committee: Dr. J. S. Patel.  
Imperial Agricultural Research Institute: Rao Bahadur B. Viswanath.

Calcutta University: Prof. M. N. Saha.

Muslim University, Aligarh: Dr. R. M. Chaudhri and Dr. Omar Faruq.

Delhi University: Sir S. S. Bhatnagar, Dr. D. S. Kothari and Rai Bahadur S. N. Mukherjee.

Travancore University: Prof. K. L. Moudgill.

Dacca University: Prof. S. N. Bose.

Osmania University: Prof. M. Qureshi.

Department of Chemical Technology, Bombay University: Dr. K. Venkataraman.

Sir Pheroz Kharegat (Vice-Chairman, Imperial Council of Agricultural Research), Lt.-Col. F. Cotter (Secretary, Indian Research Fund Association), Mr. C. O. Tattersall (Scientific Adviser to the Master General of Ordnance) and Lt.-Col. S. L. Bhatia (Deputy Director General, Indian Medical Service) were present by invitation and participated in the discussion in their personal capacity.

Prof. A. V. Hill, Secretary of the Royal Society of London, who arrived in India to advise the Government of India on scientific matters, also attended the meeting by invitation and took keen interest in the proceedings and participated both in the general discussion and in the proceedings of the Committee.

The National Institute is grateful to these representatives, visitors and to Prof. Hill for their co-operation and helpful advice.

#### PROCEEDINGS.

1. The minutes of the Nineteenth and Twentieth Ordinary General Meetings were read and confirmed.

2. The following Ordinary Fellows were admitted as per provisions of Rule 13:—

Dr. Ram Behari.	Prof. C. S. Pichamuthu.
Dr. A. K. Das.	Dr. S. C. Roy.
Prof. G. P. Majumdar.	Dr. P. V. Sukhatme.

3. The President appointed Rai Bahadur S. L. Hora and Principal J. M. Sen as scrutineers of the ballot papers for the election of the Council for the year 1944. The scrutineers reported that the following persons had been duly elected as Office-bearers and Members of Council for the year 1944:—

<i>President</i>	..	Sir J. C. Ghosh.
<i>Vice-Presidents</i>	..	Prof. S. K. Mitra and Mr. D. N. Wadia.
<i>Honorary Treasurer</i>	..	Rai Bahadur K. N. Bagchi.
<i>Foreign Secretary</i>	..	Prof. J. N. Mukherjee.
<i>Honorary Secretaries</i>	..	Prof. S. P. Agharkar and Sir Cyril S. Fox.
<i>Editor of Publications</i>	..	Rai Bahadur S. L. Hora.
<i>Members of Council</i>	..	Prof. P. R. Awati (Bombay).
		Dr. K. Bagchee (Dehra Dun).
		Prof. H. J. Bhabha (Bangalore).
		Dr. F. H. Gravely (Kodalkanal, Madras).
		Prof. B. C. Guha (Calcutta).
		Dr. B. S. Guha (Benares).
		Khan Bahadur M. Afzal Husain (Lahore).
		Prof. M. O. P. Iyengar (Madras).
		Dr. D. S. Kothari (Delhi).
		Dr. K. G. Naik (Baroda).
		Prof. V. V. Narlikar (Benares).
		Dr. C. W. B. Normand (New Delhi).
		Diwan Bahadur K. R. Ramanathan (Poona).
		Mr. B. Rama Rao (Bangalore).
		Prof. P. Ray (Calcutta).
		Principal J. M. Sen (Krishnagar).
		Dr. K. Venkataraman (Bombay).

4. The Honorary Secretary placed the report of the Council together with the audited statement of accounts for the year 1943 and budget estimates of income and expenditure for the year 1944 for consideration.

Resolved to accept these.

5. The President then delivered his Annual Address which also served to start the further discussion of the proposals for the establishment of a 'National Research Council' for India, which were adopted at the meeting held at Calcutta on the 27th and 28th September, 1943.

6. The President then invited persons from among the representatives present to express their views on the resolutions adopted at the September meeting.

Mr. N. N. Chatterjee (Geological, Mining and Metallurgical Society of India) supported in general the proposals for the establishment of a National Research Council and agreed to the scheme included in the resolutions passed in the September meeting. He further asked for special representation of the Geological, Mining and Metallurgical Society of India in the Research Boards.

Mr. B. R. Kagal (Institution of Engineers, India) supported the resolutions in general.

Dr. K. V. Giri (Society of Biological Chemists, India) approved the proposals in general and brought a proposal for the formation of a Water Pollution Research Board.

Lt.-Col. E. Cotter (Indian Research Fund Association) stated that he was not in a position to state the official views of the Indian Research Fund Association as the subject had not been discussed by their Governing body. He, however, wished to point out that the I.R.F.A. was co-operating with other organisations like the Imperial Council of Agricultural Research and the Board of Scientific and Industrial Research and included their representatives in their Scientific Advisory Board. He personally felt that the results were satisfactory.

Prof. B. B. Dey (Indian Chemical Society) suggested the inclusion of the Electro-Chemical Industry in a relevant Board of Research.

Sir Pheroz Kharegat (Imperial Council of Agricultural Research) said that scientific research could not be separated from development if it were to produce practical results. The Imperial Council of Agricultural Research was co-operating with other organisations, and has a certain number of scientific committees on which they are represented. He further said that the work of the National Research Council should be mainly of an advisory character. Its aim should be to produce balanced development. It is better that we build such a body on the basis of already existing organisations rather than start an entirely new organisation.

Prof. F. R. Bharucha (Indian Ecological Society) put forward the plea for the establishment of a Soil Erosion and Forestry Board.

Prof. M. Sreenivasaya (Current Science) favoured the view that the Boards established should co-opt representatives of other scientific organisations to give the National Research Council a more representative character.

Dr. J. Sanjana (Mining, Geological and Metallurgical Institute of India) said that before he came to Delhi he did not know what exactly was going to be discussed. He added that in their Council meeting held in the first week of December at Calcutta, the Council members could not understand why certain resolutions had been adopted at Calcutta in the meeting of the National Institute of Sciences, why afterwards every other Institute had been asked for their opinion and why the question had been reopened at Delhi. He doubted the propriety of following such a procedure.

Speaking in his personal capacity, Dr. Sanjana supported the idea of having a Central Research Board. He made it clear that he did not like the proposed scheme which, according to his opinion, was rather unwieldy and which would cause a lot of trouble.

Supporting the President's observation, Dr. Sanjana laid stress on the training of Research Personnel, because it was no use wasting money on research if people doing research work did not know the elementary principles. He observed that as a Fuel Technologist he had come across some research work being done on fuel, which displayed complete ignorance of the men doing that research work.

As regards the representatives to be appointed in the Research Board, Dr. Sanjana was of the opinion that merit and merit only should be the consideration. He cited an instance of Mr. N. N. Chatterjee representing the Geological, Mining and Metallurgical Society of India, who had spoken before him and who had asked for a special representation for his Society. Dr. Sanjana asserted that he was not going to follow his example and that he wanted the Board to consist of able men, who should be there only because they deserve to be appointed in it.

Sir J. C. Ghosh said that Dr. J. A. Dunn who was the President of the Mining, Geological and Metallurgical Institute of India (of which Dr. J. Sanjana was only a member) supported the whole scheme in Calcutta and was well aware of what was

going to be done at Delhi. Dr. Sanjana replied that Dr. Dunn was present at the Council meeting in December, to which he had referred. He added that he was one of the Local Secretaries and not merely a member and that if at all Dr. Dunn had supported any scheme in Calcutta, he might have done so in his personal capacity only.

Principal J. M. Sen (Indian Psychological Association) advocated the proposal for the inclusion of psychological research in the Boards of Research.

Prof. S. K. Mitra (Indian Physical Society) discussed the proposal and gave his general support to these.

Prof. P. C. Mahalanobis (Indian Statistical Institute) was in general agreement with the proposals but stressed the importance of utilising the existing scientific institutions to the fullest extent for the co-ordination of scientific research in India. He also pointed out the need of proper organisation of the training of research workers. He thought the real bottle-neck in India would be the lack of sufficient number of trained research workers rather than money.

Prof. A. V. Hill (Secretary, Royal Society of London) suggested that the foundation of a National Research Council was essential for India in order to co-operate with scientific work being done in Great Britain. He agreed with the principle of establishing close relations between independent scientific research and Government organisations, and said that science should be distributed in all branches of Government, and should be suitably planned. As an illustration he explained how this was being done in Great Britain. He said that the Central Organisation was presided over by the Lord President of the Privy Council. Scientific Planning Committees report their activities direct to the Cabinet. Government appoint their representatives on the nomination of learned bodies. There is a special ministry dealing with science. Further he delineated on the usefulness of a National Research Council in India and said that Government will have to surrender a certain amount of their power if the Indian scientists are to be accepted as advisers and so will scientists have to be ready to work with the Government. For the present, Government should grant 6 crores of rupees to meet expenses of developments existing at present. Co-operation between scientists and Government was necessary.

Rao Bahadur B. Viswanath (Imperial Agricultural Research Institute) supported the resolution stating that the National Research Council should act as a co-ordinating and advisory body.

At this stage (1 p.m.) the President announced that the general discussion of the proposals would be resumed at 2-30 p.m. after lunch. He would close the general discussion after about an hour and refer the proposals to a Committee consisting of the Fellows of the National Institute and the representatives of scientific organisations, learned societies, Universities and Government departments present.

When the meeting resumed at 2-30 p.m. the President again invited persons present to express their views.

Prof. K. B. Madhava (Indian Statistical Institute) stressed on the point of training personnel for research work.

Dr. H. K. Sen (Indian Lac Research Institute) emphasised on the view that if the Government and people identify themselves completely for the well-being of scientific research in the country, then only will the National Research Council be able to function and produce concrete results.

Prof. J. N. Mukherjee (Indian Association for the Cultivation of Science) and Prof. K. G. Naik expressed their general approval of the resolutions. They suggested that a more comprehensive and detailed resolution be adopted for the better functioning of the National Research Council.

Rai Bahadur S. L. Hora (Department of Fisheries, Bengal) also expressed his approval to the proposals.

Prof. S. N. Bose (Dacca University) said that there was undoubtedly need for money and men, but only those people who were fired by enthusiasm could do the work.

Prof. K. L. Moudgill (Travancore University) said that the only thing which was likely to succeed in developing scientific research in the country on an all-India basis was the establishment of a body like the National Research Council. This body should

not supplant the existing agencies but should co-ordinate their efforts. Also it is inevitable that progress should be by stages and, therefore, even if we cannot get all the funds and the backing which we require, we should not wait till ideal conditions supervene but should organise the Research Council leaving the door open for collaboration between the many agencies which have already been in the field.

Dr. J. S. Patel (Indian Central Jute Committee) also spoke on the utility of a National Research Council.

Dr. J. de Graaf Hunter (Survey of India) while endorsing the desirability of a National Research Council stated that he would have liked to have had such an organisation as an advisory body when he worked in a Government department (Survey of India).

Prof. M. Qureshi (Osmania University) said that a National Research Council should be established as early as possible, as then only will it be possible to co-ordinate the activities of well-established scientific organisations. He said that greater emphasis should be given to this aspect in the resolutions adopted. There should be scope in the National Research Council for fundamental and basic research and training of personnel. He said that a Committee should be appointed from among the representatives and Fellows of the National Institute to formulate a more comprehensive resolution in such a way that liaison between Provinces and States will be established and the National Research Council worked as a co-operative organisation.

Dr. K. Venkataraman (Chemical Technology Department, Bombay University) said that the present time and conditions of the country were most suitable for the foundation of a National Research Council.

Mr. C. O. Tattersall (Scientific Adviser to the Master General of the Ordnance) welcomed the proposal to form a National Research Council and expressed the opinion that most Government departments looked forward to such a development.

As regards the application to the welfare of the country of the results of research, Mr. Tattersall said that scientists should not take too pessimistic a view. They themselves would very often be in a position, in virtue of their appointments and occupations, to press forward fruitful applications. It was clear that better planning of industrial development was essential to make full use of research work, particularly to ensure that the most urgent research problems were given priority. However, pending better planning a survey should be made of the immediate requirements and those researches prosecuted which had the best chances of early application to national development. It was clear that in the development of natural resources, agricultural, mineral, etc., there was plenty to be done by a National Research Council without waiting for the full organisation of industrial planning.

The greatest obstacle to effective application of research, Mr. Tattersall continued, was indiscriminate buying. In India private individuals and Government departments were all somewhat indiscriminate buyers on a European or American standard. It was essential, therefore, that Government should be moved to ensure standards of quality in production. Otherwise there would be a great waste of research effort and expenditure. There was much waste today when a technological institute, for example, trained a young chemist to manufacture a standard product, when provincial authorities subsequently assisted him to found a small factory and then, within his potential area of business, bought inferior commodities with Government money so that the Government trained man found it impossible to make use of his training and had to produce poor quality stuff in order to get any business.

Lt.-Col. S. L. Bhatia (Deputy Director-General, Indian Medical Service) said that although the formation of a National Research Council was important it should first be considered how the existing organisations were going to be fitted in the new scheme. Perhaps the work might better be done by Joint Committees. In the proposed scheme medical research should be placed in the forefront of all scientific research.

The general discussion was closed at 4-30 p.m. and the meeting adjourned till 3 p.m. on the 31st December, 1943, to consider the resolutions proposed by the Committee.

The Committee met at 5 p.m. on the 30th December, 1943, in the same room and discussed the various proposals. The draft resolutions were considered clause by clause and adopted after discussion. The meeting terminated at 7 p.m. after adopting the draft proposals for placing before the general body of Fellows and representatives.

These resolutions were considered by the general body at the meeting on the 31st December, 1943, and were adopted after discussion and modification.

The resolutions as adopted at the meeting are given below:—

#### NATIONAL RESEARCH COUNCIL.

(1) That it is necessary to establish at an early date a National Research Council of India under the statutory authority of the Government of India.

(2) The purpose of the National Research Council shall be—

- (a) to plan and watch over the main lines of research and technical developments in accordance with national needs to see that the application of science to the public welfare is adjusted to some consistent plan, to advise the Government on a common policy and to ensure that available resources for research and developments are distributed to the best advantage of the country,
- (b) to advise and help relevant authorities and institutions regarding the training and supply of scientific personnel for pure and applied research, and
- (c) to distribute grants for promoting approved researches, for the maintenance of selected research scholars, for scientific publication and other purposes.

#### Constitution.

(1) The President of the National Research Council shall be a member of the Viceroy's Cabinet.

(2) The National Research Council shall consist of scientific and technical experts: (a) partly nominated by non-official scientific organisations, Universities and scientific institutions of University rank, and (b) partly appointed by the Government of India. The Committee was of the opinion that the majority of the members of the National Research Council should be non-officials. A Vice-President shall be elected by the National Research Council from amongst its own members.

#### *Boards of Research.*

For the performance of its functions, the National Research Council shall, in consultation with non-official scientific organisations, Universities and scientific institutions of a University rank, scientific departments of the Government and Federations of Chambers of Commerce, constitute the following Boards of Research, each of which will be responsible within its own particular sphere for giving effect to the policy of the National Research Council:—

- (i) Board of Scientific Research (Mathematics, Statistics, Physics, Chemistry, Botany, Zoology, Geology, Geography, Psychology, etc.).
- (ii) Board of Agricultural Research (Soils, Crops, Animal Husbandry, Fisheries and Forestry).
- (iii) Board of Medical and Public Health Research including Medical Science.
- (iv) Board of Engineering Research including Mining, Metallurgy and such other Boards as may be considered to be necessary.

The President of the National Research Council shall appoint the Chairman of each Board in consultation with the National Research Council. The Vice-Chairman shall be elected by the Board from amongst its members.

The Committee was of the opinion that in constituting the Boards of Research, the existing scientific organisations and departments should be fully utilised.

#### *Research Committees.*

For the purpose of its work each Board will be authorised to constitute Research Committees for all important subjects, to settle the objects of the research, indicate the

individuals or organisations which could undertake the several component parts of the enquiry, receive and co-ordinate the information, make it available to those who will turn it to advantage to form national plan into which all who are in a position to contribute information can fit the particular lines of research. Governing Bodies of the National Research Laboratories when established shall be constituted in consultation with the relevant Research Committees.

II. The National Research Council shall work in close co-operation with the development organisations in the country.

III. To enable effect being given to the policy of scientific development determined by the National Research Council the Government should make an annual grant of not less than 6 crores of rupees in the initial stages.

In closing the proceedings the President thanked the Fellows and representatives present for their co-operation in the deliberations. He expressed his special thanks to Prof. A. V. Hill for the keen interest taken by him in the deliberations and the helpful suggestions made by him.

Prof. A. V. Hill thanked the National Institute for giving him an opportunity to meet the scientists of all opinions in India in their deliberations.

Dr. H. K. Sen moved a vote of thanks to the chair for bringing the meeting to a success.

Mr. N. N. Chatterjee, on behalf of the representatives of scientific organisations of the country, thanked the National Institute for taking up steps and initiating a discussion regarding the establishment of a National Research Council in India.

On behalf of the National Institute the President again thanked those present for their co-operation with the National Institute for bringing forward the resolutions regarding National Research Council.

#### APPENDIX I.

The resolutions adopted at the Symposium meeting held on the 27th and 28th September, 1944, had been circulated to the Members of Council of the National Institute and to the participating organisations and universities and also to various Government departments for an expression of their views thereon. A gist of the views communicated by them in writing is reproduced here:—

The Physiological Society of India fully endorsed the scheme of formation of a National Research Council.

The Calcutta Mathematical Society agreed with the general principles laid down in the proposed constitution and requested that adequate consideration should be given to the importance of Mathematical Research in the solution of the various scientific and technical problems.

The Society of Biological Chemists, India, approved generally the proposals for the formation of a National Research Council under the statutory authority of the Government of India to perform more or less the functions formulated in the proposals. They further instructed their representatives to make the following proposal from Dr. G. J. Fowler at the Symposium:

'I would propose the appointment of a Water Pollution Research Board similar to that which functions in Great Britain. This Board should be responsible for the collection and provision of all necessary information concerning the varied problems of water pollution research. The exact relationship of such a Board to the present departments of the Government of India is a matter for Government decision, but such a Board would be a centre to which all important schemes involving expenditure or public money on works of sewage disposal and purification could be referred and under whose auspices public enquiries could be held and with whom the final decision as to the adoption of any such scheme would rest.'

The Director, Geological Survey of India, in his letter stated that so far as the Geological Survey of India was concerned, it being a Government department, would naturally work with the various Boards to the best of its ability. This collaboration should of necessity only be in connection with the raw materials of the mineral industry and presumably take the form of estimating reserves of minerals required by the proposed industries. His opinion was that the first desideratum was to decide what Research Laboratories were to be constituted, to appoint the Directors and then to co-opt the Directors on to the various Boards of Research. The Directors would then intimate the suggested lines of research and the Boards would decide whether these were practicable, and suggest other lines for discussion. He further stated that the number of members recommended for the Council and the Boards of Research appeared to be too large and were likely to be unworkable. It was generally either one or two men who did the work of a Committee and large Boards were only likely to hamper and hold up the work of the two or three interested and energetic ones of the Committee.

Principal P. Parija said that he was in entire agreement with the proposal. But he was not sure how the existing bodies such as the Imperial Council of Agricultural Research were coming into relation with the proposed National Research Council. He suggested that Imperial Council of Agricultural Research be recognised as the Board of Agricultural Research.

Indian Tea Association intimated that they were not able to nominate any representative or act on any Board or Committee owing to the call up for military duties of several scientists employed by the Association.

Indian Psychological Association stated that proper place should be given to researches in Psychology (General and Applied) in the proposed Board of Scientific Research. The Society urged that among the sixty members of the National Research Council there should be a fair representation of psychologists.

Royal Asiatic Society of Bengal generally approved the proposal for constituting a National Research Council.

Sir R. N. Chopra wrote that he agreed that the formation of a National Research Council was absolutely essential with a Governing Body and Boards of Research and Research Committees.

Dr. F. H. Gravely viewed that to call one of its subsidiary Boards the 'Board of Scientific Research' would seem to imply that the Boards dealing with Agriculture, Medicine and Engineering were dealing with subjects that were not scientific—which was surely not intended. He was not sure whether the intention was that the Board so called should be for science generally, pure science, or physics, chemistry and biology, or something else. But whatever was intended should be clearly indicated in the name. He found a little discrepancy in the statement that 'the National Research Council shall constitute the following Boards of Research from among its own members' and the subsequent statement that it should 'co-opt eminent scientific workers in all branches in consultation . . . .'. Perhaps what was meant was that the Board, as first constituted from members only should have power to co-opt up to a maximum of 50, possibly subject to approval by the Council. But whatever was meant should be made perfectly clear.

Mr. B. Rama Rao in his letter said that among the Boards of Research proposed, it was desirable to include Board of Mineral Industries Research.

Dr. M. S. Krishnan wrote that under the heading 'Constitution' it might perhaps be stated that the National Research Council should recommend to the Government of India a panel of names considered suitable for appointing as President. One of these might be chosen by the Government as the President. Otherwise it might happen that a President would be appointed purely from the administrative point of view. According to him 'Board of Engineering Research' was a vague term. In ordinary sense it might include mechanical and electrical engineering. Two other Boards were necessary, one dealing with mineral substances including fuels and metals and alloys, and the other to deal with biological and biochemical subjects. He considered that the number of members as suggested, namely 50, was unwieldy. Very large Boards rarely function efficiently. The number of Boards would have to be worked out. Comparatively small and compact committee be formed with representation on it to the Indian Science Congress and the two Academies of Science.

Bombay University favoured the formation of a National Research Council.

Travancore University approved in general the proposal for constituting a National Research Council.

Indian Chemical Society fully endorsed the proposal for constituting the National Research Council and approved the functions laid down in the resolution. They suggested that the majority of members shall be elected by non-official scientific organisations. There should be representation of the Indian Chemical Society in the National Research Council. Regarding the appointment of President of the National Research Council they suggested that the National Research Council should, out of its members, select a panel of names not exceeding four from whom the Government of India would be pleased to appoint the President.

Agra University viewed that the establishment of a National Research Council for India has been long overdue. The need of proper attention to the post-war scientific, industrial and agricultural problems has made the formation of such a Council almost imperative. They considered that the proposal was sound and called for detailed discussion in a more representative meeting.

Imperial Council of Agricultural Research wrote that the work contemplated in respect of Agricultural Research (soils, crops, and animal husbandry) was already discharged by the Imperial Council of Agricultural Research and a duplication of that work was therefore not called for. This Council would, however, welcome collaboration with other scientific, medical, public health and engineering research organisations.

Mr. D. N. Wadia sent a memorandum which he prepared long ago advocating the establishment of a Mineral Research Board in India (*vide* Appendix II).

Calcutta University wrote that they welcomed the proposals for co-ordinating scientific researches in India.

Indian Physical Society wrote that they were in entire sympathy with the proposal for the formation of a National Research Council. In view of the long services of Indian Physical Society to the cause of Physics they would like to be strongly represented in the formation of the National Research Council. The Society empowered President and Secretary of the Society to write to the National Institute for a sum of Rs.5,000 towards the publication of the *Journal of the Indian Physical Society*.

Inter-University Board of India suggested that the matter be referred to the Academy of Sciences and the Indian Science Congress.



Annamalai University and Dacca University also considered that it was desirable that a National Research Council was constituted and that the proposals made have been conceived on sound lines.

The Head of the Teachers' Training Department of the University of Calcutta wrote a letter suggesting formation of a Board of Educational Research.

Mr. N. N. Chatterjee (Secretary, Geological, Mining, and Metallurgical Society of India) placed a memorandum giving the views of the Geological, Mining and Metallurgical Society of India on the subject. The Society welcomed the idea of starting a National Research Council under the statutory authority of the Government of India, where it should be represented, and in the Boards of Research should there be specific mention of geological, mining and metallurgical research; and Government should be persuaded to adopt a suitable and favourable mineral policy in India.

## APPENDIX II.

### PROPOSAL FOR A CENTRAL BOARD OF MINERAL RESEARCH AND ADVICE ON MINERAL TECHNOLOGY.

*By D. N. WADIA, Mineralogist, Ceylon Government.*

The present memorandum adduces grounds for establishing a Board of Mineral Research and Advice in conjunction with the four Boards proposed to be constituted under the National Research Council at the Symposium held in Calcutta in September, 1943.

A grave desideratum in the development of the country's mineral resources is lack of an authoritative body for giving technical advice and help to the small miners or organisations on matters connected with exploitation of minerals and their development for commerce. The absence of such facilities has led to *export in the raw condition* of increasing numbers and quantities of vital ores and minerals with, in many cases, absurdly low returns. Mineral products, which come under this category, are:—

Manganese ores.

Mica.

Ilmenite (ore of Titanium).

It is difficult to estimate the loss, both direct and indirect, the country has undergone in the last three decades by the unrestricted export of these commodities in a nude unmanufactured state. Besides these three minerals (which happen to be in exportable surplus) there are some 12 others, easily won by the simplest mining operations, in which India can be self-supporting, but which suffer from an additional disability. These latter are practically neglected, partly because no export markets exist for them, but mainly because of absence of any information, technical advice and facility for factory-scale experimentation. The present state of mineral industry is thus far from satisfactory, for though in the amount of its annual mineral production India can stand comparison with many other industrialised countries, in the treatment and utilisation of most of the products of its mines the country's industry is decidedly backward. One can even accuse it with justification of frittering away valuable mineral deposits for just any returns it can get from well organised foreign markets. Shyness of capital and lack of technical knowledge may have been sufficient causes for this unsound practice some decades ago, but these no longer exist today and the hard lessons of the last four years war economy demand quick readjustments in our *laissez faire* attitude and in the irresponsible and unorganised state of the mining industry in which it is possible for our miners and traders to dispose of valuable national assets in such raw-materials as manganese, coal, mica, ilmenite, chromite, steatite, refractory materials, etc.

Minerals being the base factors in any programme of industrial planning and reconstruction, this unhappy state of affairs should now give place to the normal economic state where the raw materials exploited by mining should be refined and processed to the highest stage of manufacture possible under local conditions preparatory to their export to the consuming countries. This highly desirable end is attainable with the help of institutions and personnel available in India at the present time. These need to be brought together and co-ordinated in a central bureau for mineral research and advice, modelled somewhat on the lines of the Imperial Council of Agricultural Research, in its early stages, but which should ultimately be designed on the lines of the Mellon Institute of the U.S.A. This institute should work in liaison with the Geological Survey of India, which has already a competent staff of men with long training in geological and mineral investigations, and with those Universities that possess well-equipped post-graduate geology, mining and metallurgy departments. One of the functions of the Institute or Board will be advisory and consultative, freely accessible to professional interests, miners and mineral manufacturers; the main functions, however, will be undertaking of specific researches and secondly, watching over the wider interests of the country, outlining broad principles of mineral policy, conservation, system of barter, tariffs, etc. The most important mineral research items in India today are: geophysical prospecting, improved methods of coal and mica mining, fuel research to minimise uneconomic use of coal and its by-product recovery, improvement of low-grade ores, and their domestic treatment, the refining and processing of minerals to finished or semi-finished products, such as, titanium paints, electro-smelted aluminium, special cements and glasses, fertilisers, mineral salts and drugs, extraction of sulphur from natural sulphides and sulphates, mica and asbestos goods, setting up of pilot-plants and designing of simple technique for village industries in nitre, alkali, *reh* salts, etc. Fully equipped test-houses, furnace-room, machine-shops, and

laboratories should be attached to the Institute with adequate working staff, the personnel of which it is possible to recruit locally, except for a few specially trained mechanists and technicians.

The Governing Body of the Institute will be a board composed of heads of related scientific Government departments, representatives of Universities, and leaders of mineral and metallurgical interests. The governing board should be unfettered of Government control, as in the case of the Department of Scientific and Industrial Research of Great Britain, but it should preferably be a statutory body.

All problems relating to mining and utilisation of mineral products may be referred to the Institute for consideration and review. In conjunction with the official Geological Survey, it may act as the Mineral Adviser to Federal and Provincial Governments, pointing out defects, suggesting improvements and eliminating waste, over-production, etc. which are all too common features in the mining enterprise of most countries of the world, but which are glaringly patent in Indian mines. Above all an Institute of this calibre and scope should be able to take stock of the natural resources of India and arrive at a reliable and balanced estimate of their actual and potential reserves, proved and possible reserves, their merits, deficiencies, and by careful adjustments of various limitations, try to aim at maximum state of mineral sufficiency that can be attained. The next step would be to so adjust mineral tariff as to stop the free export of key-minerals and metals without a compensatory return, or barter of equally essential minerals and metals of which India is in deficit, and to fix their quotas, etc.

The location of the Institute should be such that it may remain in direct and live touch with the mining, engineering and manufacturing centres of India, museums, and laboratories of Government and University science departments, statistical bureaux and the offices of the Geological Survey. Calcutta, though not central in situation, fulfils many of these conditions and has been from the beginning of mining industry in India a centre of mining and mineral trade activity. It lies on the border of India's richest mineral province and, within a radius of 500 miles, it has eight important research laboratories of University rank, besides the magnificently equipped Jamshedpur laboratory of Messrs. Tata's, the most advanced centre of metallurgical research in India.