

### Scientific and Industrial Research in Australia and New Zealand.

AT the Imperial Conference now in session, among other important problems for discussion is that of Imperial co-operation in scientific research. By far the most promising schemes for advancement in that direction, in Australia and New Zealand respectively, are those recently evolved by Sir Frank Heath, Secretary to the Department of Scientific and Industrial Research, London, as the result of his recent visit to those countries, at the invitation of their Governments, which have now unanimously adopted the proposals he has laid before them.

In addition to internal development, the importance of the protection of new countries against the accidental introduction of insect pests alone, not to mention plant pests, has lately been emphasised by Dr. Edward M. Ehrhorn, the well-known entomologist of Honolulu. He has stated that the losses caused by insect attack on the principal crops of the United States amount to upwards of 1,000,000,000 dollars a year, "a sum more than sufficient to meet the entire cost of the Federal Government's annual expenditures." Most of these pests were accidentally introduced, and many could have been excluded by a scientifically controlled quarantine.

Already in Australia rust and other fungoid diseases have attacked the wheat, but their ravages have been greatly lessened by the breeding of rust-resisting varieties, as initiated by Farrer of New South Wales, and by the disinfecting of the seed wheat with copper compounds. Formerly the seed wheat was dipped, before being sown, in a weak solution of copper sulphate. This poisoned the fungoid spores and so saved much loss from rust, but it somewhat damaged the seed wheat. Now, in lieu of this the seed wheat is dusted with finely powdered copper carbonate, and this process alone, as compared with the earlier one, is increasing the value of the Commonwealth wheat yield by about 2,200,000*l.* per annum.

This discovery, of vast value to Australia, the United States, and other wheat-growing countries, has been the result of 'team work,' partly by native-born Australian workers, partly by men trained in the best schools of the homeland, and the whole improved by American investigators. If the increased value of the American and other wheat crops throughout the world, accruing from this discovery, be added to the 2,200,000*l.* a year gained by Australia, the total sum realised would repay, many times over, all cost of agricultural research. A far greater gain will follow when, as the result of scientific breeding of wheat, both rust-resisting and drought-resisting types are evolved. In view of such research, particularly in Australia, Prof. J. D. Watt, of the University of Sydney, considers the desired end is already in sight. What is true of scientific team-work applied to wheat, is true also of all the primary and secondary industries.

The key-note of the Australian and New Zealand research schemes is 'team-work': team-work within Australia and New Zealand themselves, and team-work within the Empire, but such team-work, to attain the best, must not be spasmodic. In Sir Frank

Heath's words: "What the industries want is a steady long-sighted policy of help and advice from the State in a national movement for the co-operative attack on scientific problems similar to that successfully initiated here [New Zealand] in the marketing of products overseas." Again, the report on the Australian proposals refers to the distribution of the Commonwealth's activities among the States according to their suitability for different sections of the work as "a means of convincing them that the national effort in scientific things is a pervasive instead of a centralised and bureaucratic influence."

In order to give effect to the proposals of the Commonwealth Government for the reorganisation of the Institute of Science and Industry, an Act was passed by the Commonwealth Legislature in June last which provides as follows:

A Commonwealth Council of Scientific and Industrial Research to be constituted, consisting of not less than nine members, three nominated by the Prime Minister, and appointed by the Governor-General, and including the official chairman of the council. This body is to be the executive during the six-monthly interval between the meetings of the full council. The remaining six members of the council come from the six States of the Commonwealth, each of these members being the chairman, for the time being, of the State Committee (advisory to the Council of Scientific and Industrial Research) in the particular State to which he belongs. In addition, the council may co-opt such other members as may be approved by the Minister on account of their special scientific knowledge. In order to give continuity to the policy of the council, the scheme provides that each of the three executive officers shall hold office for several years.

The Act provides for the State Committees to be constituted "as prescribed." Under the Government scheme, the chairmen are to be selected by the Commonwealth Government after consultation with the State authorities: three members appointed by the State Governments from the staffs of their scientific departments; three members representative of pure science, of which at least two must be from the local universities—such men to be selected by the National Research Council; these six members and the chairmen to co-opt three (or, exceptionally, more) other members representative of primary and secondary industries within the State.

The Commonwealth Council has already held several meetings, and consists of the following:

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| Executive | } | G. A. Julius, <i>Chairman</i> , President last year of the Institute of Engineers in Australia.                               |
|           |   | Prof. A. C. D. Rivett, Professor of Chemistry, University of Melbourne.   |
|           |   | W. J. Newbiggin, Managing Director of the firm of W. J. Adams & Co., Ltd., an engineer and member of the Chamber of Commerce. |

The remaining members are :

- Queensland.* Prof. H. C. Richards (Geology).  
*New South Wales.* Prof. J. D. Watt (Agriculture).  
*Victoria.* Sir David Orme Masson (Chemistry).  
*Tasmania.* Mr. Kearn (Pastoralist).  
*S. Australia.* Prof. T. Brailsford Robertson  
 (Physiology).  
*W. Australia.* Mr. Perry (Industrialist).

In addition, the following two members have been co-opted :

- Queensland.* Prof. E. J. Goddard (Biology).  
*Melbourne.* Prof. H. A. Woodruff (Veterinary  
 Science).

Thus, both the Commonwealth Council and the State Committees are widely representative. Great freedom of action is given to the council by placing it immediately under the Prime Minister, not as one of his departments, but as an advisory council to him.

Annual estimates for the special work of the year have to receive the sanction of the Commonwealth Parliament in the usual manner, but the financial provision, of far-reaching importance, adopted by the Parliament is as follows : The appropriation from the consolidated revenue fund of the sum of 250,000*l.* to form a trust account, the capital and interest to be used for the purpose of scientific and industrial investigations. A further sum of 100,000*l.* has been appropriated out of the consolidated revenue fund as an endowment fund (of which the executive of the council are trustees), the interest on which is to be used : (1) to assist persons in their scientific research ; and (2) to train students for scientific research. The Commonwealth Parliament also voted 29,000*l.* to clear off all debts left by the old Institute of Science and Industry. In addition, the sum of 50,000*l.* was asked for by the council for the particular work to be undertaken within the present financial year.

At the instance of the Prime Minister, the Right Hon. S. M. Bruce, the Cabinet gave immediate effect to Sir Frank Heath's recommendations for facilitating the further training in the homeland of the most promising young Australian scientific workers by sending four such, at once, to be trained for two years in research institutions, chiefly those attached to the Department of Scientific and Industrial Research, London. Four additional students are about to be nominated for training abroad. An allowance of 150*l.* is made to these students for their passages to and from Australia, and the salary is 300*l.* a year with an additional provision of a sum up to 100*l.* for each student for travelling while abroad. Reciprocal arrangements have now been made for the reception of students from the homeland at centres of research in Australia and New Zealand. This excellent provision is not the least important of the plans for securing good team-work within the Empire.

The field work of the council this year will be as follows : Cold-storage problems in co-operation with the British Food Investigation Board, with special reference to beef ; liquid fuels, treatment of fuels for saving oil and other products by low-temperature distillation, Bergius process, etc. ; forest products,

continuation of researches on making paper pulp out of timber, utilisation of gums, resins, tannins, etc. ; animal diseases and pests, blow-fly and buffalo-fly pests, diseases of cattle, sheep, and horses ; plant diseases and pests, researches for checking the spread of prickly pear (29,000,000 acres in Australia now overrun by this pest).

The chairman of the council, Mr. Julius, is expected to arrive in England next year to discuss scientific and industrial problems of mutual interest to the homeland and to Australia. Thus, so far as Australia is concerned, the new council is already going strong.

In regard to New Zealand, on the recommendation of the Prime Minister, the Right Hon. J. G. Coates, the Parliament has adopted practically all of Sir Frank Heath's scheme as follows : An Advisory Council of Scientific and Industrial Research is to be formed, under the Prime Minister, for the general utilisation of science for the advancement of New Zealand's industries. It is also to co-ordinate and see to the proper maintenance of the Geological Survey, Magnetic Survey, Meteorological Office, the Hector Observatory, the Samoan Scientific Service, and a State Laboratory for Standards and Tests to include the present Dominion Laboratory. An agricultural college is to be built and an institute of dairying to be established to collaborate with it. Expensive buildings are not suggested, but much of the initial research work is to be done at the college laboratories. It is suggested that the Dairy Products Control Board share with the Government the cost of maintaining such a research institute.

In regard to forestry problems, of great importance to the Dominions and the Empire, in view of the alarming decrease in the supply of soft woods (Great Britain now imports 40,000,000*l.* of timber annually) it is recommended that a forestry institute be created, later, by the Government, assisted by the timber milling companies, and that meanwhile a general report on the whole question of the New Zealand forests be obtained from the ablest forester available. With regard to fuel resources, and how best to utilise the somewhat friable coals of New Zealand, a research student is to be sent at once to the Fuel Research Station of the Department of Scientific and Industrial Research at Greenwich. Then there is the hydro-electric problem : it is estimated that New Zealand has a potential supply of no less than five million continuous horse-power.

So much for the primary industries. For the secondary industries, two technical field officers are to be appointed to assist co-operative research associations, and particularly to advise the smaller industries. Arrangements are to be made for a scientific library to comprise the chief public and university libraries as well as some private libraries. New Zealand is advised to link itself up with the International Research Council by establishing a local National Research Council ; and to found National Research Scholarships and grants to professors and others for research work.

The total grants for the last-named services are not to exceed 2000*l.* a year, while the initial cost of the council, apart from office charges, etc., is estimated to be about 7000*l.* a year. A scientific officer is to be attached to the Office of the High Commissioner of

New Zealand in London to act as a liaison between the Department of Scientific and Industrial Research and the new department in the Dominion.

The universities, the New Zealand Institute, and the Cawthron Research Institute all find places in the scheme, as well as the Department of Industry and Commerce. The Advisory Council is to be constituted much as in the Commonwealth, with this important exception, namely, that in view of the smaller distances to be travelled in New Zealand as compared with Australia, the meetings of the council are to be held monthly, the executive being left in the hands of the secretary of the council, a well-trained man of science, Dr. E. Marsden, until recently assistant director of education, formerly a fellow of the University of

Manchester and professor of physics at Victoria College, University of New Zealand. A bill to give statutory effect to the above recommendation has recently been carried by the New Zealand House of Representatives.

Thus, in New Zealand, as in Australia, in the future application of science to the development of industry, the watchword is 'team-work,' as for the nations around the Pacific who meet triennially in the Pan-Pacific Science Congress, no less than for the League of Nations. For any work worth the doing the first essential is to find the man, and surely in the selected teams of Australia, and in the leader of the New Zealand Councils for Scientific and Industrial Research, the men have been found.

### News and Views.

THE preliminary programme of the third Pan-Pacific Science Congress, which is to be held at Tokyo from Saturday, October 30, until Thursday, November 11, contains a provisional scheme and time-table of the work of the congress, a list of the excursions which have been arranged, lists of sailings, and other matter useful to those who propose to attend the meeting or to contribute to its proceedings. His Imperial Highness Prince Kotohito of Kan-in has consented to act as patron, and H.E. the Prime Minister of Japan will be president of the congress. There is a long and distinguished list of honorary vice-presidents, which includes the diplomatic representatives of the chief Powers, a number of the Japanese Ministers of State, and heads of universities. The arrangements for the meetings have been in the hands of an organising committee appointed by the Japanese National Research Council, under the auspices of which the congress is held. A change has been made in the organisation of the meeting itself to promote solidarity of feeling and action. There is no doubt that the change will also greatly facilitate the conduct of business in a congress covering so wide a field. The different branches of science have been classified into two broad divisions, the physical sciences and the biological sciences, instead of into sections and sub-sections for each branch of science as in previous congresses. Divisional meetings and joint divisional meetings will take the place of the sectional meetings. At these, discussions will take place between allied branches of science on subjects of more or less common interest, in other words on border-line problems. Sectional meetings will continue to be held, but taking quite a subordinate place—for the contributions of a special nature which from their scope are unsuitable for discussion at a divisional meeting.

THE character of the discussions at the congress must, to a great extent, depend upon the number and nature of the communications offered, but the organising committee has drawn up a provisional list of subjects. In the joint divisional meetings it is proposed to hold a symposium on certain plans for international co-operation in the study of the more important scientific problems of the Pacific, and,

secondly, to survey the present state of knowledge of the physical and biological oceanography of the Pacific. The subjects suggested for divisional or sectional discussion cover a wide range in all branches of science, from astronomy to economic geography, agriculture, and medicine, in all cases with special reference to the Pacific. It is noticeable that there is a considerable bias in favour of topics which have a practical application. In the physical section meteorology, earthquakes, and the study of volcanoes take a prominent place. In the biological sciences the fauna and flora of the Pacific are to be discussed in relation to distribution, as well as from the practical point of view of protection, and, where appropriate, in relation to economic development. Anthropology is well represented in the discussion of the antiquity of man in the Pacific, the anthropometry of races of the Pacific, the study of Ainu, Papuans, and pygmies, the culture of the East Indies in relation to the question of 'diffusion,' and the relation of food, clothing, and houses to climate. A series of excursions has been arranged to suit the special interests of members of the congress extending from October 18 until November 19, which will include visits to Aizu villages, the famous shrine and temple at Nikko, Hakone volcano, Fuji, coal and copper mines, hot springs, cretaceous, tertiary, pliocene, and other geological formations in various localities, the old Imperial Palace and the University at Kyoto, as well as other places of importance for the study of the fauna and flora or the commercial and industrial activities of Japan. After the official excursions are over, facilities will be afforded for a longer stay if desired.

PROF. R. RUGGLES GATES, who has just returned to London after a visit to Russia, gives us some interesting information as to the position of some scientific work and institutions there. In the course of his letter he says that much valuable work is being done in the various plant-breeding stations which he visited. These included Tammisto, near Helsingfors, Finland, as well as Khibiny in Russian Lapland, north of the Arctic circle, which is devoted chiefly to the production of northern vegetables and oats for fodder; Peterhof and Desto Selo, near