

THE ADVANCEMENT OF SCIENCE.

PERTH CONGRESS CONTINUED.

FEDERAL GOVERNMENT CONGRATULATED.

PERTH, Thursday.
The eighteenth annual Congress of the Australian Association for the Advancement of Science was continued to-day, when in addition to a meeting of the council of the association, several interesting addresses were delivered.

FEDERAL GOVERNMENT CONGRATULATED.

A meeting of the general council expressed keen appreciation of the action of the Commonwealth Government in constituting the Council of Scientific and Industrial Research, in making a provision of £250,000 expressly for carrying out research of scientific and economic problems of primary importance, in making an appropriation of £100,000 for an endowment, from the income of which grants in aid may be made to individuals or organizations already engaged in scientific research, or who may desire to begin special investigations, and in arranging for the appointment of State committees on which the responsibility for the carrying out of such research would devolve.

EXTENSION OF VETERINARY SCIENCE.

In his presidential address before the veterinary science section, Professor J. D. Stewart, Dean of the Faculty of Veterinary Science, gave a resume of the growth of veterinary science from the establishment of the first veterinary school in 1762 at Lyons, France. He referred to the importance of the science in Australia in preventing and eradicating animal plagues. There was a possibility of foreign diseases, such as rabies, being introduced into northern Australia by irregular traffic, and a complete veterinary survey of the Northern Territory and the north-west portion of the continent was needed. The animal quarantine laws should not be completely relied upon for protection. Greater security would be obtained by also expanding the veterinary organizations to assure rapid diagnosis and speedy application of repressive measures, should any epizootic escape or break through the quarantine cordon. The added protection appeared to justify the Federal Government assisting States to develop their veterinary services. Many diseases had established themselves, and exacted heavy toll from the pastoral industry. Efforts to combat many of those parasitic affections had been more or less unsatisfactory owing to ignorance of the life history of the parasite concerned, and as progress depended largely on the manner each country added to its quota of research, the desirability of special provisions being made in Australia for parasitological investigations was strongly to be advocated. It was unsafe to accept uncritically the results of research carried out in other countries. The establishment of research institutions in each State was strongly urged.

Desirable extensions of the application of veterinary science to increase production included animal genetics and improved methods of feeding, the lecturer added. After dealing with the necessity of evolving more suitable breeds of beef cattle for the better utilization of much of our tropical territory, he mentioned that while synthetic wool was not likely to compete with the fine wools of high quality, there existed a grave possibility of its affecting the sale of many coarse wools of low quality. The manner in which "artificial silk" had gained a permanent place on the market at the expense of the worm-silk industry afforded a lesson, and sheepbreeders should take advantage of the benefits to be derived from the scientific study of sheep breeding for wool production. Many other countries had generously provided for research in animal genetics. So far no action had been taken in Australia, but they could not afford to neglect it if they wished to maintain their position in the world's markets. The veterinary service of the Commonwealth was sadly undermanned, and the adoption of a system similar to that in Norway was to be recommended. As the most beneficial results were to be obtained by co-operative effort, stockowners should also assist by private contributions. While stockowners would directly benefit by better organization of the veterinary service, all members of the community would participate in the advantages that would accrue from the wider application of veterinary science.

INDUSTRIAL EFFICIENCY.

Before the social and statistical science section, Mr. C. H. Wickens (Commonwealth Statistician) read two papers, one on "Productive efficiency," and the other on "The allocation of the factory output." In the former paper he reviewed Australian statistics of primary and manufacturing production for the 17 years to 1924, and furnished an estimate for each class of industry of changes in the productive efficiency for each person engaged. He showed that the money value of such production had increased from £162,000,000 in 1903 to £339,000,000 in 1923, falling somewhat short of trebling in 17 years. The growth was in the aggregate due to substantial increases, each somewhat short

of trebling, in the agricultural, dairying, forestry, and fisheries groups of industries, to a fairly constant money value of mineral production, and to an increase in manufacturing production, amounting to slightly more than quadrupling. In 1908 manufacturing production represented 21 per cent. of the total production, whereas in 1923 it represented more than 30 per cent. A considerable proportion of the increase in money value was due to a change in price levels in the different groups of industries, and it was shown that for all the industries considered this change of level was approximately 83 per cent. from 1911 to 1923. The rate of increase for all persons engaged in primary and secondary industries had been less than that at which the population as a whole had grown, as such persons represented 19½ per cent. of the total population in 1908, but only 17½ per cent. in 1923. An investigation of census results for 1901, 1911, and 1921 indicated that there was a tendency for the proportion of the Australian population engaged in professional, commercial, transport, and industrial occupations to increase, and for the proportion engaged in domestic service and primary production, and the proportion of independent persons, to diminish, accompanied by an upward movement in the proportion of dependents.

Mr. Wickens estimated that for 1923 the productive efficiency for each person engaged in all branches of industry was 7½ per cent. higher than in 1911. In nine years of the 17 years under review the 1911 standard of productive efficiency for each person engaged was either practically reached or exceeded. Of the remaining eight years four fell short of the standard by less than 5 per cent. These were 1916, 1917, 1920, and 1923. Two other years, 1908 and 1918, fell short by less than 9 per cent., while of the remaining two 1919 fell short by nearly 13 per cent., and 1913 by nearly 13 per cent. These last two were years of severe drought, as was also 1918.

In the other paper, Mr. Wickens furnished an estimate of the total capital employed in the manufacturing industry in Australia, which he gave, for the year ended June 30, 1925, as £302,600,000, compared with £117,700,000 in 1913. For the year 1924-25 the total value of factory output was estimated at £380,800,000. A comparison of the item "interest and net profit" with the amount of invested capital previously estimated, indicated for the six post-war years, 1919-20 to 1923-24, an average per cent. of interest and net profit on capital of 15.8 per cent.

BOTANICAL FIELD OPEN.

In his presidential address on "Past and future development of botanical science," Professor A. J. Ewart said that Australian trees were the tallest in the world, excepting those of California (which were of equal height). The latest theory of the ascent of sap in them was that the water was hauled up by the leaves from the roots by coloring water columns in the vessels acting like minute unbreakable ropes. Regarding the eradication of weeds by poisons, much work had recently been done upon the nature of the action of poisons, and on the influence of temperature and of neutral salts upon poisonous activity. If some of that work were confirmed and extended, they might be on the verge of discoveries that would enable them to use poisons and poisonous sprays to discriminate between definite economic plants and noxious weeds and to enable the latter to be prevented from growing without affecting, or even with benefit to the former. A few isolated instances of the kind were already known, as for instance the eradication of charlock in grain crops by spraying with copper sulphate, and the destruction of weeds in a buffalo grass lawn by the use of ammonium sulphate. Hitherto work on the eradication of weeds had been carried out mostly on empirical lines, without regard to basic principles, and hence without any possibility of improving modes of treatment.

In regard to Australia generally, the lecturer proceeded, most botanical work had been on systematic lines, naming and describing the flora of the continent. In Western Australia, and particularly in North Western Australia, this was still the most urgent work to be done, and it was upon scientific work of that nature that new partially explored countries should concentrate attention. It was very regrettable that so much of the botanical exploration of Western Australia had been done from outside, and that the State had spent so little upon it. Later botanical work in Australia would probably follow the same lines as in older countries, but a strong tendency might be expected towards oecology, because of their special climatic conditions, and to

economic botany and plant pathology, because of their dependence upon agriculture and forestry as their chief industries. Particularly in Western Australia it was from work in those directions that botanical researches might contribute most markedly to the material progress and welfare of the State.

WEAK EYES OF GENIUS.

The President of the Australasian Optometrical Association (Mr. Kett), in the course of an address on the training of opticians, stated that to-day three out of every 10 persons actually wore glasses for other reasons than as a concomitant of advancing years, while on the whole seven out of 10 required them. The social and economic demands on people's eyes were greater to-day than ever before. The malign influence of disordered visual function upon health could find no better illustration than in the lives of many of the greatest writers and thinkers of the past century. A list of men and women whose lives and work were most seriously affected by eye strain would include Darwin, Huxley, Browning, Carlyle, de Quincey, Swift, Balzac, Tchaikowsky, Feaubert, Berlioz, George Eliot, Wagner, and Nietzsche. In all these instances the health was impaired, and work restricted. The present position in Australia with reference to the training of opticians was most unsatisfactory.

In the course of a discussion the opinion was expressed that if opticians honestly and conscientiously attempted to send up for medical examination all cases which, in their opinion, presented conditions departing from the normal, the sight-testing optician would receive the support of the medical profession.

Testing School Children.

In a paper on mental tests and scholastic examination, Professor Mackie, of Sydney University, declared that the work of testing and examining a school had not received much attention. There was no satisfactory book on school examinations, and articles in educational journals rarely dealt with the topic. During the past few years, however, the great development of tests of general ability and of scales for measuring school attainments had directed some attention to this side of the teacher's work. The practice of education would respond to the stimulus of study, research, and experimentation quite as profitably as would medical practice or primary industry and the education departments of the Australian States should provide funds for this very necessary work. Professor John Smyth, of Melbourne University, dealt with the subject of intelligence tests of new students at the Teachers' College in Melbourne. These tests, he said, were used to separate normal from subnormal children, and to determine whether a boy of average or super-average intelligence was placed in the right class at a school. The question arose which similar tests should be applied in the selection of pupils for secondary schools, colleges, and universities. The professor showed that other factors than intelligence had to be taken into account, such as interest, confidence, the emotions, and moral qualities.

At the close of the paper a number of general conclusions were stated, among them being:—1. A student who was ranked in lowest 25 per cent. of secondary students by test scores was unlikely to do more than pass work in a university. 2. University courses of those students, whose test score lay below the medium score of their group should be chosen with great care. 3. When it was proposed to raise students from a primary course to a secondary the intelligence test scores of those students could be accepted as a reliable indication of their ability. Another conclusion was that students of a group, however large, could be tested and rated within an hour.

Before the engineering and architecture section Sir Charles Rosenthal gave an address on "Nation building." He emphasized the close relation of engineering and architecture to national development, and said that Australia—the youngest of the nations—had a proud record of harbour and river work, roads, bridges, and railways, which had made the opening up of huge areas possible. Members of both professions rarely received adequate reward for their services, but to the man who loved his profession the knowledge that his services were being employed for the general good of the community, and that engineering and architectural monuments were continually being erected testifying to his skill, was a magnificent reward. He would be glad to see more of such men taking their rightful place in the Parliaments. Their counsels would be of the greatest value, and their influence incalculable in assisting to guide the destinies of the nation.

NEWS 2.9.26

Prof. T. G. B. Osborn, D.Sc., Professor of Botany at Adelaide University, has been appointed a delegate from the National Research Council to the third Pan-Pacific Congress, which will be held in Japan in October. Prof. Osborn will leave Adelaide at the end of this month.

PUBLIC TEACHERS.

ANNUAL CONFERENCE OPENED.

The thirty-first annual conference of the South Australian Public Teachers' Union was opened at the Price Hall, Grote street, on Thursday evening. The President (Mr. H. M. Lushey, B.A.) occupied the chair, and there was a good attendance.

The Chairman welcomed the Minister of Education (Hon. L. L. Hill), and congratulated him upon his appointment as Premier. (Applause.)

The Teachers' College Male Quartet, comprising Messrs. A. Slater, E. Wilkins, L. Andrew, and E. Sexton, rendered the part-songs, "Holy night" (Beethoven) and "In a gondola" (Kar Linders). Mr. F. L. Gratton was accompanist.

The President's Address.

The President presented his annual address. He said it was their purpose to bring together as many people as possible,



MR. H. M. LUSHEY.

who were sufficiently interested in the educational welfare of the State to take an active part in fostering a spirit and an atmosphere of education. A new sense of hope was dawning in that realm, the nature of education was being understood, its real value to the body politic was being grasped, and because those aspects of progress were so prominent, they were of sufficient importance to form the basis of a presidential address. The first and fundamental change lay in the meaning and interpretation of the word "education," which formerly implied the mere acquisition of knowledge. The school, in consequence, was regarded simply as the place for acquiring piles of knowledge, much of which proved to be quite inadequate, and very often of no practical use at all. Merely "to know" was to be educated, and from that arose the examination system as a means of measuring the educational efficiency of boys and girls. But they had come to see that the formal examination was not the best test of the many qualities which made for an educated citizen. Education must be based on the laws of psychology. To know the right was not necessarily to do the right.

Development of Character.

The German system of education, he continued, was merely to know, and they had evidence of where their consciences led them; the American idea was to do, but ultimately the dollar was the power there that moved to action; the British ideal had now come to be the development of character. They held that child was body, mind, and soul, and that education stood for the harmonious development of that trinity. That changed aspect of education was gradually making its way round the world, and following in its wake was the Montessori movement, the principles of which, it was hoped, would revolutionize education. The same principles appeared in another guise in the upper grades, under the name of the Dalton plan, but that scheme had not yet been tried out sufficiently to enable a just estimate of its value to be made. Still another plan had shown itself, and was known as the play way, which was in keeping with Montessori principle. Those methods stood for the new values in education, and they stood at the threshold of the change. Progress was inevitable, for it already had the momentum of universal acceptance behind it, and in a generation the change would doubtless be complete. South Australia was not lacking in those matters, and the Director of Education had given

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