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SIR HENRY BARRACLOUGH,
a prominent figure in the engineering world of N.S.W., attending the Science Congress.

such very low emcieneies they could only suspect that there was unscientific design in their social structure. To deal with these difficulties would require men of constructive and organising ability, and probably no class of men was more capable of help in finding a solution than the engineer. Australia had not yet developed so all diseases is as virulent a form as the more industrial countries, but that respite was only temporary, and in the meantime they had a number of special troubles of

PROFESSOR H. E. WHITFIELD,
in charge of the Engineering Section of the Congress.

their own. A number of industries and manufactures were still unscientific and inefficiently conducted, and their Governments were wasting a large proportion of their money which they so eagerly borrowed. Candid friends told them that they had no "survival value," and that they were merely enjoying a temporary security behind British battleships. If the building was at present insecure they, as engineers and architects, wanted to inspect the foundations to see whether they were solid and properly laid. That their foundations were not very secure was shown by the fact that most of the simple materials required for food, clothing, and houses, were dearer in Australian than in other parts of the world, and that the producers of them were so frequenty crying out to the Government for financial help.

Cheapening of Primary Production.

There was no doubt, he added, that they should direct all the resources of science towards cheapening the cost of primary production. The pastoralists needed more water conservation, and the farmer required more help from the engineer and chemist. For the preservation of meat, milk, butter, fruit, and vegetables they needed much more co-operative effort for the provision of cold storage, dehydration, or canning. Respecting fruit and vegetables, they were still not much ahead of their friends the aboriginals, who gorged themselves in times of plenty, and at other times went without. They had already squandered a large part of their natural hardwoods, and only by a determined policy of reafforestation could the position be reprieved. Their organization of mining was generally wasteful. The costs of materials such as steel and cement also appeared to be unduly high as compared with European and American figures. Labour, in the sense of physical work, might be supplied by human effort or mechanical powers. The amount of work which could be done by a mechanical worker was probably about the same now as it had always been, and varied from 200 to 400 ft. pounds per minute, according to the nature of the work. Under modern conditions, man was about the most expensive means they could employ for doing physical work, whether he was a hard worker or not. A horse could do ten times as much work, and cost much less to keep. An engine could do a hundred times as much work for the same cost. That simple fact was generally recognized in America, but in Australia they still continued to employ men on work which machines could perform, and attributed their high cost to the laziness of the worker, and not to the "masterly inactivity" of their own brains. The same thing held good in the domestic sphere.

Mechanical Power.

As for mechanical power, Australia was well provided with coal, and had unlimited solar energy which could probably be utilized when coal became more expensive. Their chief need, in order to use labour and power to the best advantage, was more technical skill and better trained managers. Speaking of transport and communication, Professor Whitfeld said that Australia was a country with a lack of navigable rivers, and the difficulties of land transport had been, and still were, one of the greatest obstacles to material progress. The annual cost of transport was very high, and led to other evils, such as the crowding of industries and population into a few coastal cities. The railway system was hopelessly crippled by the diversities of gauge. Great sums had been wasted in making roads by using unsuitable materials and methods of construction, and by the failure to employ roadmaking machinery.

Closely connected with transport was the subject of communication. In America the ideal aimed at was to connect up the whole country in a network of telephones. Such a scheme would lead to a great saving of time and increase of efficiency

PROFESSOR D. B. ROSS,
President of the Western Australian Branch of the Association.

in rural districts. Their own progress in that direction was not very rapid.

In the present state of civilization in Australia, it was probable they had succeeded in producing about 3 or 4 per cent. of the amount of human happiness which was theoretically obtainable with the knowledge and resources at their disposal. That would suggest that they were a lazy, unscientific, spendthrift, pleasure-loving, quarrelsome race. They should blame for their troubles, not the Government nor the worker, nor the employer, nor foreign competition, nor the Japanese nor the Germans, but themselves. They should work more and spend less. They should endeavour to work together to increase national welfare, and to that end they should turn the strong light of impartial scientific investigation on to those main causes of their national inefficiency.

OUR CORRECT FOODS.

Vitamines and Fruit in Diet.

In his presidential address to the sanitary science and hygiene section, Dr. J. S. Purdy, of Sydney, said, although there was no actual evidence of physical deterioration—the average span of life had been advanced 10 years during the present generation—conscription in Great Britain and the United States showed that only three out of every nine men of military age were found fit. Heredity was the main factor in giving health, but environment, and especially diet, played an important role. The people of Australia, Canada, New Zealand, and South Africa demonstrated that improvement had tended to the return to the previous inherited physical mean as the result of living a free open-air life with an abundance of good fresh food. The superior physique of pastoral peoples was chiefly due to a diet of milk, maize, meat, fruit, and other fresh foods, rich in vitamines and mineral constituents. Scientists no longer assessed the value of a food on its chemical composition alone, but on its actual properties, especially as to their vitamine contents.

Causes of Ill Health.

Deficiency of vitamines and lack of balance in the diet was responsible for much of the gastro-intestinal ill health, and lack of general tone prevalent in cities, and made people more susceptible to infections, such as influenza and common colds. Among some of the Sydney City Council employes a course of yeast, milk, cod liver oil, and lettuce or oranges, had a marked effect in getting rid of boils, assisted in more rapid healing of wounds, and in under-nourished youths induced to give up cigarette smoking to an increase in weight. There were three types of vitamines. The first was to be found in fresh milk, butter, animal fats, oils, liver, kidneys, and other cellular organs, and in green leaves. The second type came from the germs of seeds, yoke of eggs, yeast, peas and beans, and those given previously, and possessed specially preventative and curative properties in such diseases as berri berri, lack of appetite, retardation of growth, and lack of general tone. The third type was found in green leaves of plants and fresh fruit. Milk was relatively poor in this vitamine, and for that reason it was essential to add orange, tomato, or swede turnip juice (all of which were rich in that vitamine) to milks, especially in the artificial feeding of infants.

Value of Sunshine.

The fact that rickets was comparatively rare in a marked form in Australia was mainly due to the abundant sunshine, as well as the fact that few children had a diet very deficient in the anti-rachitic vitamine. Fruit juices were, generally speaking, sources of all vitamines. Referring to scurvy the lecturer said that it had now no terrors for explorers, who were provided with orange and lemon juice, or who, as was the case with Stefansson, resorted to the eating of reindeer, seal, and bear meat occasionally raw. Although fruits were poor sources of protein and fat, they possessed, as a rule, mild laxative qualities. Unfortunately fruit contained little calcium, and therefore a fruit diet had to be supplemented by milk or other calcium-bearing food. Fruit, such as tomatoes, gooseberries, and strawberries were said to be beneficial in bronchitis and asthma. Strawberries, raspberries, currants, blackberries, and oranges were said to be indicated in rheumatism. The apple was reputed to be an excellent brain and nerve food, and also splendid in retaining the health of teeth and gums. Remarkable results had been claimed from grapes in certain wasting diseases and in Bright's disease. The juice of the pineapple was beneficial to diseased mucous membrane. Outside of meat, nuts were the greatest source of protein. They were a splendid food, supplying proteids, fats, carbo-hydrates, and salts in a concentrated form of little waste. The practcie of a light, or no lunch, was one that should be encouraged. Nutrition on scientific lines was more important in the prevention of diseases than any other contribution of preventive medicine, insofar as it tended to raise the vitality of man. While they could not choose their parents, most of them in Australia could choose their food. If careful to include milk from pasture fed cows, lettuce, oranges, tomatoes, and other vitamin and mineral-containing foods, they need not worry much about what else they ate. At least one orange, one apple, or some fruit should be eaten by everybody every day. As a health insurance they required a well-balanced diet and to eschew fads, to chew their food, and not forget to eat fruit.

SAILING DIRECTIONS.

Charting Australian Coastline.
By Capt. K. J. Davis.

In the geography section the President (Capt. J. K. Davis) delivered an address on "Sailing directions." Before discussing other matters, Capt. Davis said he wished to pay a tribute to the memory of the Hon. John Lewis, a former President of the South Australian Geographical Society, and to Mr. Thomas Gill, whose tireless and unostentatious work in behalf of the society he was associated with for many years was well know nin Adelaide. By Imperial Order-in-Council of July, 1923, under the British Settlement Act of 1887, the island and coast of the Ross Sea had been proclaimed a British possession. As that portion of the antarctic was originally discovered by Sir James Clarke Ross, sailing from Hobart in 1840, in H.M. ships Erebus and Terror, and had been the scene of so much British heroism and endeavour, it was only right that the islands and coasts of the Ross Sea should form part of Oversea Britain. A Norwegian whaling expedition to the Ross Sea left Hobart during the latter part of November, last year, under the command of the veteran pioneer, Capt. C. A. Larsen. The expedition successfully penetrated the pack ice belt which guarded the entrance to the Ross Sea, past the 78th parallel of south latitude, and established a base at Discovery Bay, an inlet of the great ice barrier. Whaling proceeded throughout the summer season, and at its close the fleet returned safely to New Zealand, having obtained 17,000 barrels of oil. Some idea of the prospective value of the fisheries which the enterprise of the Norwegian expedition had inaugurated might be learned from the recently published report of the inter-departmental committee on research and development in the dependencies of the Falkland Islands, April, 1920, in which the total value of the whale prdoucts of South Georgia during the year 1917-18 was shown as £1,100,000. The success of the whaling industry in the Ross Sea and on the antarctic coastline south of Australia depended upon the practicability of utilizing the factory ship in those waters, and the first attempt to do so appeared to have met with a fair measure of success. While it was regrettable that British enterprise had not attempted to develop that industry, Australians would not grudge those hardy Norsemen the success which had rewarded their courage and enterprise.

Need for a Survey.

Capt. Davis then traced the evolution of sailing directions from the earliest times down to the present day. In the case of Australia the coastline was fairly well-known, but the interior was a terra incognito. Capt. James Cook headed the list of maritime explorers in the southern hemisphere. He finally laid to rest the myth of the vast southern continent, and proved that if any such land mass existed around the south pole it did not extend beyond the Antarctic circle, and in some places did not reach it. He revealed to the world the first definite information of the eastern coastline of Australia, and a full account of the coastlines of the islands of New Zealand. In January, 1801, Flinders took command at Sheerness of H.M.S. Investigator, a sloop of 334 tons. The charts of Capt. Flinders were still used in the Gulf of Carpentaria, and other places on the Australian coast.

An accurate survey of the Australian coastline, remarked the speaker, was part of the development of the Commonwelth, and should be carried out under an organized scheme approved by the Fedral Parliament, the necessary outlay being provided by a definite yearly approbation. It was because as a seaman he had learned the immense importance of that work to the mercantile marine that he ventured to ask for the support of that section of the Australasian Association for the Advancement of Science in bringing the subject under the notice of those best able to forward it. The recent decision of the Commonwealth Government to proceed with the hydro-electric survey of the Great Barrier Reef would be good news to geographers and scientific men, and most of all to those who were charged with the navigation of large modern vessels in that region. One of the last chapters in the sailing directions would have been written when in the conrse of time Australia's enormous coastline was accurately laid down on their charts, and as a result of the work of the surveyors its remotest parts were as easily accessible to shipping as was St. Vincent's Gulf to-day.

VETERINARY SCIENCE.

Cancer in Domesticated Animals.

Dr. Sydney Dodd, in his presidential address in section L (veterinary science), gave an address on "Cancer in domesticated animals." While paying tribute to the work on the great cancer problem now being carried out by various investigators in Australasia, he stressed the fact that the co-operation of the veterinary profession had not been invited by those bodies responsible for directing such work. Cancer existed in their domesticated animals, just as it did in human beings; yet there were a number of obscured facts concerning cancer in animals that did not square with what was observed in man, especially with what were considered by some to be contributing causes to cancer formation. He pointed out that results in research work nowadays were brought about by team work rather than by individual effort, and that different branches of science could not afford to work in watertight compartments. Dr. Dodd drew attention to the evidence of the incidence of cancer in various species of animals, and showed that it was much more difficult to collect reliable statistics than was the case in human beings, because in many instances the animal was destroyed as soon as the owner became aware of what was wrong. Moreover, in live stock the question was an economic one, whereas with humans it was one of sentiment very often, since one did not destroy a human being in civilized countries as soon as he was dissecovered to be suffering from a disease that might be incurable or which might unfit him for work.

Causes of the Disease.

Continuing, the speaker gave figures concerning the occurrence of cancer in horses, cattle, dogs, and so on, and mentioned the interesting fact that parts of the body in which cancer was a common occurrence in man were in the domestic animals very seldom affected with that disease. He also showed that the reverse was sometimes the case, i.e., cancer of the eye was common in horses and cattle, whereas it was by no means common in man, and he raised the important question as to the reason for that great difference. It was interesting to note that one form of cancer in man became more common with advancing age, being rare in youth, but more frequent in old age. The same thing was seen in animals, but it was difficult to draw any useful comparison between animals in that respect, since most meat-supplying animals were killed in the prime of life; but they could make some comparison in regard to domestic pets, such as dogs and cats which might be allowed to live to old age. Cancer