Carnegie Institution to it, and this should be taken into consideration. But it may also be noted that Harvard University and the Massachusetts Institute of Technology have close relations and if the projected union had been formed, the strength of the institution would have been 109.5, in place of the 89.5 assigned to Harvard.

The members of the National Academy of Sciences in the zoological sciences who are at Harvard and Columbia are printed here, biophysics, biochemistry and vital statistics being included. In order to show the exact situation the lists of members of the academy are given also for the other sciences.

This information is printed not in order to exalt Harvard, but rather in the interest of Columbia. The economic evolution of the modern world should now establish the greatest of universities in New York City. If Columbia can not become worthy of this position, it must be the work of the state and the city.

During the ten years of Seth Low's administration many distinguished professors were called to Columbia and it attained a rank nearly equal to Harvard, the number of leading scientific men in the two universities then being 60 and 66.5. During the last twenty-five years Columbia has been losing ground, not only in the sciences but also in other fields. President Butler himself remarks in his annual report for 1925 that Columbia University can not replace "older scholars of distinction and large achievement" because "a choice must be made from a larger or smaller group of mediocrities." This situation is in part due to the attitude expressed by a prominent trustee who wrote[1] in 1921: "It is very difficult to discharge professors once employed. They make common cause and howl about academic freedom. We have had trouble along this line in Columbia, where they taught sedition and disloyalty, and that enabled us to get rid of eight or ten at the time."

Trustees and administrative officers must learn that the greatness of a university is not in building, nor in endowment, nor in number of students, but in men and in the freedom and the opportunity given to them.

J. MCKEEN CATTELL

REPORTS

ADDRESS OF THE PRESIDENT OF THE AUSTRALASIAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

IN his presidential address to the Australasian Association for the Advancement of Science at Hobart, on January 16, 1928, Mr. R. H. Cambage referred to the great need for the further application of science to primary production. This, he said, embraced such fundamental utilities as the production of grain, fruit, butter, wool and meat, and he stated that it was a matter for satisfaction that the Commonwealth and State Governments, as well as private bodies, were showing increased appreciation of the value of science to these problems.

He mentioned that a few years ago a thorough knowledge of dairy bacteriology and its application to the production of butter had resulted in increasing the output of first grade butter in New South Wales from 48 to 96 per cent.

When referring to wheat he said: "It is difficult to find anything among the primary products of Australia which owes more to science than wheat production. This is a matter of national concern, and it is most comforting to know that the great pioneering work carried out by William James Farrer is not only being continued at departmental experiment farms and universities, but with most progressive results. New and better drought and rust-resisting varieties of wheat and other grain are being produced, and experiments are being made for the purpose of breeding rust and flag-smut-resisting plants which will also have other good characters."

Mr. Cambage referred to the action of the pastoralists in arranging for the Australian Pastoral Research Trust to receive a contribution at the rate of two shillings a bale of the 1927 wool-clip, with the hope of raising £200,000, for scientific research in connection with the industry. This action he regards as a most definite advance in Australia in the recognition of the benefits of science.

He commended the recent action of the Federal Government in inviting five leading pastoralists to act as a committee to enquire into the conditions of the pastoral industry in Australia, and advise on the best methods of conserving the national wealth represented by the industry. It provides, he stated, further evidence that the authorities concerned are quite alive to the necessity of abandoning the old happy-go-lucky methods of trusting to chance in regard to seasons, but rather look for the introduction of some reasonable scheme of insurance that may have for its object the avoidance of excessive losses rather than the making of enormous profits.

He concluded the first portion of his address by saying that it is the desire of the Australasian Association for the Advancement of Science, which includes New Zealand, to inspire and stimulate a science sense in the public mind, and this, he thought, could best be done by demonstrating how the principles of

[1] "A Barton Hepburn: His Life and Service to his Time." By Joseph Bucklin Bishop. New York, 1923. Page 293.

pure science may be applied successfully to familiar economic problems.

In the second part of his address Mr. Cambage discussed the "Origin and Development of Portion of the Australian Flora." He summarized the position as follows:

There appear to be more genera common to Africa and the eastern half of Australia only than to Africa and the western half of Australia only, so that evidence of a direct land connection between these two countries is meager. It is thought that many genera which are common to Africa and Australia have reached these countries from the same source in the north, and have then developed in response to environment.

From available evidence it would seem that, at least since Cretaceous time, the northern hemisphere has had a greater land mass than the southern, and, as a result, there has been more room for plant development in the north than in the south. Probably the Pleistocene and even earlier glacial periods have been instrumental in permitting many genera to pulsate across the tropics from temperate northern regions, and in the process, and after arrival in the south, there have been much radiation, development and evolution. Although there probably has been more migration to Australia from the north, there is evidence in some cases of secondary radiation from the south, especially in the genus *Eucalyptus*.

It seems undoubted that some genera common to Australia and New Zealand have reached both countries from the north, some species coming down the east coast of Australia, while others have gone by way of New Caledonia and adjoining islands to New Zealand. Except for a land connection between northeastern Australia and islands to the north, perhaps as late as Pliocene time, Australia has long been isolated from the rest of the world. There appears to be more evidence in favor of a former land connection between Antarctica and South America, and perhaps New Zealand and Australia, than between Africa and Antarctica.

Studies of the many changes which have taken place in the history of the world's flora, of its adaptability to environment, its response to changes of climate and soil, its ability to overcome many adverse conditions, all combine to impress one with the conviction that the marvelous act of creation not only embodies the initial giving of life, but also provided inherent power and initiative for the necessary development and evolution required for the persistence of that life, in harmony with its varying surroundings and dominating influences.

SPECIAL ARTICLES

NUTRITIONAL ANEMIA ON WHOLE MILK DIETS AND ITS CORRECTION WITH THE ASH OF BEEF LIVER

IN an earlier article[1] we published data showing that experimental anemia in rabbits induced by the feeding of a whole milk—Fe_2O_3 diet could be corrected by the addition of the *ash* of lettuce or of cabbage. In the case of animal tissues, both dried liver and dried "spleen-marrow" were found to be potent if fed at a level of 2 gms. per animal per day as a supplement to the whole milk—Fe_2O_3. The daily administration of the *ash* of 2 gms. of dried "spleen-marrow" delayed the onset of anemia to some extent, but appeared inefficient over a long period of time.

This paper deals with experiments on the use of the *ash* of beef liver as a corrective or preventative of nutritional anemia. Rats were used as the experimental animal. They were selected at 50–60 gms. in weight and placed on screens with whole milk as the sole diet. They were weighed weekly and hemoglobin determinations made periodically by the Newcomer method. When the hemoglobin readings had reached 6–8 gms. per 100 cc. of blood, and the evidence was sufficient that the animal had become anemic but not beyond the possibility of response, the use of the experimental ration was begun. The animals were then fed on screens in separate cages and individually. The normal hemoglobin content of rat's blood may be taken at 12–14 gms. per 100 cc. of blood. After the animal was placed on the experimental diet weekly weighings and periodic determinations of the hemoglobin were continued.

In experimental anemia induced by whole milk feeding there is iron starvation as one of the factors in operation. To determine how effective additions of iron salts may be in the correction of this anemia $FeCl_3$ was prepared from standard iron wire of highest purity. Two gms. of iron wire were dissolved in dilute HNO_3, the solution of ferric nitrate evaporated to dryness, taken up in excess of HCl, the iron precipitated with NH_4OH, filtered and washed thoroughly until free from chlorides. The precipitate was then dissolved in the theoretical amount of HCl necessary to convert the Fe to $FeCl_3$. In order to obtain complete solution of the $FeCl_3$ an excess of .42 gms. of HCl was added and the solution made to a volume, 1 cc. of which equaled 1.0 mg. of Fe. The $FeCl_3$ was fed at a level of 0.5 mgs. of Fe per animal per day without a resultant correction of the anemia.

We next turn to beef liver and beef liver *ash*. This material was dried at 65° C. over a period of 6–7 days and then ground to a fine powder. In certain experiments the dried liver was fed directly by suspending it in the whole milk. Iron determination on the dried liver showed that it was necessary to feed daily

[1] E. B. Hart, C. A. Elvehjem, J. Waddell, R. C. Herrin, *J. Biol. Chem.* 1927, LXXII 299. Iron in Nutrition. IV. Nutritional Anemia on Whole Milk Diets and its correction with the Ash of Certain Plant and Animal Tissues or with Soluble Iron Salts.