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 sursoundings 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.

1.72 gms. of this material in order to introduce 0.5 mgs. of iron—a quantity exactly equivalent to the iron fed as $FeCl_3$. In addition the ash of the dried beef liver was prepared by incinerating the material in porcelain dishes in an electric furnace at 650°–750° C. After incineration to an ash the ash was digested in strong HCl for six hours at room temperature, diluted with water and the insoluble residue filtered off. The filtrate was evaporated almost to dryness, taken up with water, and diluted to a volume, 1 cc. of which was equivalent to 1.0 mg. of Fe. This solution was not perfectly clear.

This HCl extract of liver ash was fed to anemic rats at a level which introduced 0.5 mgs. of Fe daily. It was administered by directly stirring it into a portion of the daily allowance of whole milk. The results from the use of these materials in contrast with the $FeCl_3$ from iron wire were indeed very striking and showed unmistakably that 0.5 mgs. of iron from these sources is distinctly potent in restoring to normal the hemoglobin content of the blood of anemic rats. The detailed data which led us to the above conclusions, together with a further analysis of this problem, will be published later. At this time we only wish to re-emphasize the fact that nutritional anemia induced by a whole-milk diet is an inorganic deficiency and that the *ash* of liver as well as the *ash* of certain plant materials is a potent source of the correctives.

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SOCIETIES AND ACADEMIES

THE GEOLOGICAL SOCIETY OF AMERICA

At the annual meeting of the Geological Society of America, held in Cleveland, December 29, 30 and 31, 1927, the following officers were elected for the year 1928:

President: Bailey Willis, Stanford University.
First Vice-president: Alfred C. Lane, Tufts College.
Second Vice-president: William H. Collins, Geological Survey of Canada.
Third Vice-president: August F. Foerste, Dayton, Ohio.
Fourth Vice-president: Esper S. Larsen, Harvard University.
Secretary: Charles P. Berkey, Columbia University.
Treasurer: Edward B. Mathews, The Johns Hopkins University.
Editor: Joseph Stanley-Brown, New York, N. Y.
Councilors (1928–1930): George R. Mansfield, United States Geological Survey; William E. Wrather, Dallas, Texas.

Thirty-one fellows were also elected, bringing the total membership to 559.

The Cleveland meeting had the largest attendance in the history of the society, with a registration of 374. One hundred and eight titles of papers were listed on the program, and four general addresses were delivered. Abstracts of all papers presented had been printed and distributed in advance of the meeting.

The Penrose medal, given for outstanding achievement in geologic science, was presented to Prof. Thomas Chrowder Chamberlin, of Chicago.

The annual meeting of 1928 will be held in New York City.

Charles P. Berkey,
Secretary

INDIANA ACADEMY OF SCIENCE

The Indiana Academy of Science held its 43rd annual meeting at the University of Notre Dame, Notre Dame, Indiana, on December 1, 2 and 3, 1927.

The officers in this meeting were as follows: *President,* Frank B. Wade, Indianapolis; *Vice-president,* F. J. Breeze, Muncie; *Secretary,* Ray C. Friesner, Indianapolis; *Asst. Secretary,* W. P. Morgan, Indianapolis; *Treasurer,* M. W. Lyon, Jr., South Bend; *Editor,* John J. Davis, Lafayette; *Press Secretary,* Harry F. Dietz, Indianapolis.

The meetings of the academy proper were preceded by the annual informal meeting of the entomologists of Indiana on December 1. At the regular meetings of the academy the number of papers presented in the various sections were as follows: general, 6; bacteriology, physiology and hygiene, 6; botany, 27; chemistry, mathematics and physics, 35; geology and geography, 18, and zoology, 16.

The annual public lecture was given by Dr. Wilfred H. Osgood, curator of zoology, Field Museum of Natural History, Chicago, who spoke on "Nature and Man in Abyssinia," illustrating his lecture with motion and still pictures.

The officers elected for the ensuing year were: *President,* E. G. Mahin, Notre Dame University, Notre Dame; *Vice-president,* W. N. Hess, DePauw University, Greencastle; *Secretary,* Ray C. Friesner, Butler College, Indianapolis; *Asst. Secretary,* W. P. Morgan, Indiana Central University, Indianapolis; *Treasurer,* M. W. Lyon, Jr., South Bend; *Editor,* John J. Davis, Purdue University, Lafayette; *Press Secretary,* Harry F. Dietz, Department of Conservation, Indianapolis.

Harry F. Dietz,
Press Secretary