

These several experiments emphasize two points. First, in the preparation of unsaturated hydrocarbons from aldehydes or ketones and the Grignard reagent it is desirable to use a slight excess of the latter. Second, the Grignard reagent can apparently be used with advantage in the purification of an ethylenic hydrocarbon when the suspected impurity is a compound with a carbonyl group.

No oxime could be prepared from the phellandrene used in this work. However, the compound very likely contained a small quantity of impurity which added ethylmagnesium iodide. This assumption is borne out, in large part, by an experiment made subsequent to the gas analysis, when phellandrene was refluxed in ether solution with 3 equivalents of ethylmagnesium iodide for 8 hours. On working up the reaction product in the customary manner, practically all of the phellandrene was recovered.

A study is now in progress of the reaction between disubstituted acetylenic hydrocarbons and the Grignard reagent.

Summary

It is shown that ethylmagnesium iodide does not add to several typical ethylenic hydrocarbons under varying conditions.

AMES, IOWA

NEW BOOKS

Inorganic Chemical Synonyms and Other Useful Chemical Data. By ELTON RICHMOND DARLING, Professor of Chemistry, James Millikin University, Decatur, Illinois. Second edition, revised and enlarged. D. Van Nostrand Company, 8 Warren Street, New York, 1922. vii + 119 pp. 18.5 × 11.5 cm. Price \$1.00 net.

The appearance of this book in a second edition indicates that it is filling a real need. This is not astonishing when consideration is given to the number of business men who in recent years have turned to books for information about chemistry.

To the condensed information regarding the elements, their discovery and the various names of their compounds given in the first edition, the author has now added 3 sections of comparatively great value; first, about 150 names of ores of technical importance with their formulas, classified by their valuable elements; second, 3 pages listing the physical properties of the metals, including atomic volume, specific gravity, specific heat, melting point (on both Centigrade and Fahrenheit scales), coefficient of linear expansion, thermal conductivity referred to silver and electrical conductivity referred to mercury; third, multiples of the atomic weights of the elements. These additions should increase the usefulness of the book greatly. Additions have also been made to the two lists of chemical synonyms.

The first edition of this book contained some grievous misstatements and a profusion of mere errors of composition. In the second edition, most of the necessary corrections appear to have been made. A number of simple errors may, however, still be found. The author is inconsistent in the use of such spellings as "sulfur" and "sulphur," "phosphorus," and the indefensible "phosforus," all of which are used. For some of the elements both fusing points and melting points are given, such as for cadmium (p. 51), which "fuses at 228° C., melts at 321° C." The valence of ferric iron (p. 64) is still given as 4.

Much of the book appears to have been reset, and the cover of the new edition is a marked improvement on that of the old.

WILLIS A. BOUGHTON

Vital Factors of Foods; Vitamins and Nutrition. By CARLETON ELLIS, S.B., F.C.S., Consulting Chemist, and ANNE LOUISE MACLEOD, Ph.D., Associate Professor of Chemistry, Vassar College. D. Van Nostrand Company, 8 Warren Street, New York, 1922. Price \$5.00 net.

One of the most remarkable phenomena of recent scientific discovery has been the development of the so-called vitamin theory of nutrition. Already several hundred scientific papers have been published on this very interesting theme. Manufacturers and promoters have greedily taken advantage of the public interest in nutrition and in this particular feature of it to flood the market with so-called vitamin products. In the present book the authors have very successfully collated the existing information of a scientific and commercial character, and arranged it in a most convenient form for reference. They have conferred a very distinct benefit on all who are interested in this subject either from the commercial or purely scientific point of view.

The fact that there are certain diseases which depend upon the character of the food has long been known; especially is this true of scurvy, the first dietary disease which was recognized. Attention is called to the fact that scurvy was known as early as Louis IX in the thirteenth century, the French army at that time suffering greatly from it. As early as 1593, Admiral Hawkins stated that not less than ten thousand seamen had died of scurvy within his personal experience. It was discovered that lemon juice was not only a remedy but a prophylactic for scurvy. The next recognized dietary disease is beriberi, or polyneuritis. I think the United States should have a great interest in this disease, because when our Navy discovered Japan—or rather opened Japan to so-called European civilization—polished rice was first introduced into that country. It was through the spreading of the use of polished rice that beriberi was produced. When this disease first broke out it was regarded as an infection. In 1880, the Inspector General of the Japanese Navy declared that it was of purely

dietetic origin. In 1897, the first scientific paper was contributed on the subject by Eijkmann, a Dutch physician. He pointed out that beriberi in fowls arose when they were placed on an exclusive diet of polished rice, and that the disease disappeared when rice polishings were given as food, or unpolished rice substituted for the white rice. Soon after the close of the Russian-Japanese war the Surgeon General of the Japanese Navy was in Washington. He spoke at one of the scientific *salons* given by the late Alexander Graham Bell on Wednesday evenings. I happened to be present and heard the surgeon's address. He described the terrible decimation which beriberi had caused both in the Army and Navy and among the poorer people of Japan whose diet was composed almost exclusively of dried fish and polished rice. He also called attention to the remedy which always proved effectual, namely, the feeding of the polishings of rice to those suffering from beriberi, or the use of unpolished rice as a prophylactic. Since that time the whole theory of dietary deficiency diseases has been studied by almost innumerable scientific and clinical workers all over the world. It is true that our present knowledge of vitamins is extremely limited. We do not even know their chemical composition nor many of their physical properties; they exist in quantities so small as to escape ordinary methods of detection. We do know through the experiments of Seidell that they, like alkaloids, attach themselves firmly to Lloyd's reagent, hydrosilicate of aluminum, and thus can be completely removed from liquid foods. The active principle can be recovered by the subsequent decomposition of the separated portion.

The problem of naming these bodies is fully summarized in the book. There is still no recognized universal system. In all the nomenclature used that suggested by McCollum is probably more generally adopted than any other. McCollum avoided the necessity of calling the article a vitamin by naming it fat soluble "A" and water soluble "B." This is, of course, "passing the buck." The opinion of the authors is, and I think this is a proper opinion, that the term "vitamin," especially if spelled without the final "e," has come to stay, and thus the nomenclature of Funk is the one most universally recognized. It seems to me that the water soluble "B" should be "A," because it was known and recognized a long time before the so-called fat soluble "A." Moreover, fat soluble "A" as it exists in the leaves of plants, where it is most abundant, is found in that part of the plant containing the least fat, while the seed of the plant, containing the most fat, is sometimes free from it. I am of the opinion that the definitions fat soluble "A" and water soluble "B," will not be long maintained, because they do not sufficiently characterize the nature of the product. The only justification for the use of fat soluble "A" is that it is concentrated in milk and is found principally, but not exclusively, in the fat thereof.

The fact that vitamins are not synthesized in the animal body is clearly brought out by the authors. That they are exclusively products of vegetable synthesis is now, I believe, an undisputed fact. In the animal organism, which is found capable of storing vitamins, they are found particularly in the vital organs, such as the kidneys, and in the fat which surrounds the intestines. They are not abundant in other parts. That lard is practically free from vitamins, and that tallow other than that from the places mentioned, is also deficient in or quite free from vitamins, is another reason for believing that "A" is not properly characterized as fat soluble.

As to the number of vitamins, there is still a large disagreement. Most experts at least recognize three, which may be called "A," "B" and "C," "A" being the growth factor among the vitamins and a protection against xerophthalmia, "B" against polyneuritis, and "C" against scurvy. There is still doubt as to whether there is a special vitamin protecting against rickets, or any one special vital factor in foods which protects against pellagra.

Among the leaves, those of clover and alfalfa seem to have the greatest store of vitamins, especially "A." The sympathies which have heretofore been extended toward Nebuchadnezzar when he was turned out to grass have probably been misplaced. Agricultural investigation has shown that alfalfa is indigenous in the neighborhood where Nebuchadnezzar reigned. When confined to an alfalfa diet it is possible that he had the time of his life and was in much better physical condition than when he had the refined dishes of kings. The experience of Daniel and his fellow Jews is likewise confirmatory of the common belief that the food of the poor is from the wholesome point of view much better than that of the rich. The summaries of the effects of heat and oxidation and long keeping on vitamins give in a condensed form some very helpful information to all students of nutrition. The article on the concentration of vitamins, which has been so vigorously pushed commercially, also gives the existing status of these tabloid vitamin foods, in a somewhat more favorable attitude, however, than I think is justified. It is perhaps pardonable, but hardly desirable, that all chemical papers should be quoted on the same basis of authority. The abstractor is not likely to understand the difference between a paper written from a purely scientific point of view and one that has been written from the point of view of service to a client. For instance, the contention of Richardson that oleomargarine is just as rich in "A" as butter fat is just as prominently featured as the overwhelming testimony to the contrary. In the same manner Hawk's recommendation of "Susto" is given without any comment. "Susto" is described under Propaganda for Reform in the Journal of the American Medical Association, October 28, 1922, p. 1538, under the caption, "The Conception and Birth of a Nostrum." According to the label, Susto is a "Vitamin Tonic

Food in Concentrated Form." The advertisement also states, "Your doctor will tell you that Jefferson Medical College is one of the world's greatest medical schools, and that Dr. Hawk is one of the greatest nutritional authorities." I wish the authors would read this article in the Journal of the American Medical Association before they get out the second edition of their work.

The article on pellagra is an admirable portrayal of the present attitude of scientific opinion regarding it. One point is particularly interesting to me. Murlin found that the quantity of hippuric acid excreted by pellagrins, especially those kept on a corn-vegetable diet, was from two to three times the quantity excreted by a normal man on a normal diet. He suggests that this may be a factor of some importance in connection with the disease. As pellagra has existed largely in that part of the country where preserved foods have been most generously employed, the presence of benzoate of soda in food products may be questioned from another point of view. Benzoate of soda produces the same effect of increasing the quantity of hippuric acid that Murlin has found to be the case in pellagrins.

After quite a careful reading of the book I do not discover a single typographical error. My final judgment of the work is this: That while not the most original, it is the most useful and helpful of all the books published on this subject up to the present time.

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