If nothing more, they point out a promising method of detecting and measuring associational preferences among animals which may be readily trapped.

The evolutionary theories of Darwin and Wallace were largely founded upon personal observations of geographical distribution. The modern student of genetics, on the contrary, carries on his studies for the most part in the laboratory and the breeding pen. It is significant, therefore, that Bateson,[3] perhaps the foremost living Mendelian, devotes a considerable portion of a recent volume to the problems of geographic variation. And one can hardly read that volume attentively without being convinced that the field naturalist holds the key to some of the most important secrets of nature. It is not improbable, therefore, that works of the sort here reviewed will come to receive more serious consideration from those who are concerned primarily with the problems of organic evolution.

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Chemical Technology and Analysis of Oils, Fats and Waxes. By DR. J. LEWKOWITSCH. Edited by GEORGE H. WARBURTON. Vol. II. 1914. Pp. 994. $6.50.

The first volume of this work appeared in this country while the author lay dead. While the death of an eminent chemist is always to be regretted, in this case there was an additional reason for regret—the delay, or worse yet, the possible non-appearance of the remainder of the treatise. The delay has been so slight as not to be noticed and the editorial work has been most satisfactorily performed by Mr. Warburton, who for seventeen years was associated with Dr. Lewkowitsch in his analytical practise.

This volume has been increased in size by thirteen per cent.; important additions have been made in the articles on linseed, tung, soy bean, cocoanut oils and candelilla wax, as well as minor additions to other portions to bring them thoroughly up to date.

The work may fairly be described as monumental; nothing would seem to have escaped attention. Even the toxicity of the different chlorides with two atoms of carbon has been given, as having a bearing on their technological uses.

Notwithstanding the very full table of contents, the reviewer misses, and must wait a year perhaps for, an index which it would seem advisable to include in each volume. Similarly the reviewer is inclined to question the advisability of including the large amount of statistical matter about the commercial side. That, it would seem, might well form the subject of a single volume, like the author's "Laboratory Guide to the Fat and Oil Industry" and be revised and brought up to date more frequently. If the work continues to grow as it has in the past, it would seem worth while to consider its publication by some society, as its compeer "Beilstein" has been taken over by the German Chemical Society.

A. H. GILL

[3] *Op. cit.*

SPECIAL ARTICLES

THE NITROGEN NUTRITION OF GREEN PLANTS

IT is the teaching of botanists that green plants obtain their nitrogen chiefly in the form of nitrates, though ammonium salts may be utilized to some extent by certain plants at least. Exceptions to this general rule are those plants provided with root-tubercles (and bog plants and others which have mycorrhiza?). These plants obtain their nitrogen in the form of organic compounds made for them by the bacteria growing in the tubercles.

That nitrogen circulates throughout the structures of plants in organic combination is certain. There does not appear to be any reason why similar compounds which are soluble and diffusible (amino acids?) should not be taken up through the roots of plants and utilized as such. It appears to the writer that this must very probably be the case. Arguments in favor of this view are:

1. The nitrogen nutrition of the leguminous