Research in the Fat Industry

By G. D. ELSDON

IT cannot be claimed that the advance in the knowledge of the chemistry of fats since their constitution was first elucidated by Chevreul at the beginning of the 19th century has in any way kept pace with their importance or with the value that such information would have for the analyst or technologist. During the period when the chemistry of natural products was receiving such widespread attention, the time covered by the classical researches of Emil Fisher on carbohydrates and the proteins, the subject of fats failed to attract any organic chemist of outstanding ability, with the result that the main lines of advance were in those portions of the subject which were of temporary interest from the analytical or industrial standpoint, and the more fundamental questions were more or less neglected.

There are signs that a different atmosphere is to be expected. In their address to the Society of Chemical Industry at Liverpool in 1924, Dr. E. F. Armstrong and Mr. John Allan made a strong and eloquent plea for the revival of interest in the Chemistry of the fats. Another very significant indication of the increasing realization of the importance of the subject is the recent appointment of Dr. Hilditch to the Campbell-Brown Chair of Industrial Chemistry in the University of Liverpool, an appointment which has as its avowed object the study of fats from all points of view. The importance of this latter fact cannot be over-emphasized and much work of fundamental importance and far-reaching value is to be expected as a result.

It cannot even be claimed that in that branch of the subject which has attracted most attention, the analytical side, the position is at all satisfactory. To take only one point: It is doubtful whether we have any means of deciding definitely whether a given fat is entirely vegetable or whether a portion is animal. For years analysts have been in the habit of basing their opinions on the phytosteryl acetate test, but the fairly recent work of Steuart (*Analyst* 1923, 48, 155) whose conclusions are supported by others, has thrown a considerable amount of doubt upon even this. In fact it may be said definitely that this test cannot prove the presence of animal fats in mixtures containing vegetable oils. Much more work needs to be done and, of equal importance, that already done on isolated oils needs to be correlated. It may thus very easily happen that increasing knowledge will, at first, add to the difficulties of the analyst, but there is not much doubt but that finally only good can follow extended research in all branches of the subject. In any case it is obviously most undesirable that any test should be founded on faulty information.

The difficulties of the analyst may also be increased, as indeed they have already been, by the fact that new methods of cultivation affect the characteristics of natural products. It is by no means impossible that the fairly narrow limits between which individual natural products have been found to vary, depends not so much on the nature of the plant or animal from which the product is obtained, as on its

environment. This is particularly true in the case of the animal fats.

It is possible that for a long time too much attention has been given to the fats from the point of view of their being sources of mixtures of fatty acids rather than as mixtures of glycerides. Nearly all the usual analytical methods refer not to the glycerides *qua* glycerides but to the fatty acids contained therein. Thus Valenta was apparently working along the right lines with his acetic acid test, a method which although now somewhat despised, yet in a modified form may be adopted at some future time. The possible value of work on glycerides is shown by the fact that fats containing identical fatty acids may have entirely different physical properties due to the presence of characteristic mixed glycerides, and progress along these lines may be anticipated. The difficulties are great—how great only those who have attempted to fractionate mixtures of glycerides can realize.

The delights of pure research into problems of basic importance are not for the busy technologist—he must continue to confine his attention to the problems of immediate if ephemeral importance. He can, however, support in many ways those whose efforts are likely to be applied to such problems of pure chemistry.

The benefits of pure research, especially on a particular subject attacked with vision and pursued on the broadest of lines, have been proved on many occasions. It is for the Industry not only to support, but to encourage and initiate such research in its own field, which will undoubtedly be for its lasting benefit.

The Yellowing of Drying Oils

AT a meeting of the Oil and Color Chemists' Association, a paper by Dr. R. S. Morrell (past president of the Association) and Mr. S. Marks, on "The Yellowing of Drying Oil Films," was read. During the last year, said Dr. Morrell, Mr. Marks and himself had been investigating the yellowing of white paints with drying oils when kept in the dark, and it had been found advisable to review the changes occurring during the oxidation of drying oil films, in order to decide, if possible, which component of the oxidation products was producing the changes in color.

Materials Investigated

A number of paint films were prepared with white lead (stack), zinc white, titanium white, timonox, arsenious oxide, and tin dioxide. The changes in color of the films, which were kept in the dark in a moist atmosphere at the ordinary temperature, were observed, using yellow and red Lovibond's tintometer glasses. The paint films were compared against a film of zinc white and Reeve's poppy seed oil as standard. The amount of oil mixed with the pigment was as small as possible, and any increase in the amount was accompanied by greater changes in color. From the results obtained in the white lead experiments, there seemed to be an indication of a maximum yellowing and reddening in six months, and afterwards a diminution, but longer trials were necessary in order to decide this. The influence of the nature of the oil used agreed with the results of