

## MODERN VIEWS ON EMULSIONS

### The Theory of Emulsions and their Technical Treatment

By Dr. William Clayton. Fourth edition. Pp. vii+492. (London: J. and A. Churchill, Ltd., 1943.) 42s.

**T**HE problem of bringing the results of fundamental research to bear upon industrial practice represents one of our present-day difficulties, and one which is likely to be accentuated in the future. Dr. Clayton has therefore performed a very useful service in providing us with an account of emulsions which will undoubtedly interest both practical industrial chemists and also those concerned with elucidating the basic principles of these complex systems.

Regarding industrial emulsions, the author has wisely restricted his attention to certain types, and used these to illustrate the broad physico-chemical principles involved; so that, of nearly 500 pages, more than half is devoted to discussions on the wide range of relevant fundamental principles.

Within recent years, considerable understanding of these underlying principles has been acquired from the study of adsorbed and insoluble films at the air/water and oil/water interfaces, and in this edition the first two chapters now introduce these newer investigations. The major points discussed are surface and interfacial tension, the Gibbs theorem in relation to adsorption, foaming and insoluble monolayers, and an outline is given of the techniques available for the study of interfacial films.

Approaching emulsions from a rather different point of view, Chapter 3 deals with dilute emulsions as examples of oil hydrosols, in particular with the electrical double layer and its bearing upon emulsion stability.

Then follows an account of the various types of emulsifying agents, and methods of assessing their efficiency, succeeded by a chapter on emulsion properties such as viscosity, electrical conductivity, and optical. It is a pity that Pickering's oft-repeated statement, that 99 per cent oil-in-water emulsions can be obtained, is still given prominence, although this was disproved by Lawrence some years ago. A similar criticism can be made of the work of Newman, quoted on p. 228.

The numerous theories of emulsions which have been proposed are reviewed at some length in Chapter 4, and this leads naturally to the question of dual emulsions and of inversion of emulsion type. It is in these fields that considerable advances have been made in recent years.

The remaining chapters, with the exception of the last, are concerned essentially with biological and technical aspects of emulsions, and the author's acquaintance with the latter is well shown by his excellent treatment of these topics. The importance of emulsions in biology, particularly in relation to fat metabolism, needs no emphasis.

After the final chapter, outlining such physical measurements as surface and interfacial tension, determination of emulsion type, and size-frequency analysis, there follow two appendixes, the first concerned with the separation of technical emulsions, the second a summary of the important patents since 1934 in which emulsions are involved.

The references throughout the book appear to be extremely complete, and due recognition is given to all the innumerable workers in this most diverse and

fascinating field. In the opinion of the reviewer, however, a more critical, even if necessarily more biased, attitude might well have been taken in dealing with the more controversial of the fundamental questions, since due appreciation of the various, and often apparently conflicting, theories can scarcely be expected from the non-specialist.

The paper on which the book is printed is unusually good for these days, and the printing excellent, although a rather large number of small typographical errors were noted during perusal of the book. It is a pity that this, like the majority of war-time publications, is so expensive, particularly in view of the wide field which it covers and its consequent interest to so many.

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## THE BEHAVIOUR OF BIRDS

### Bird Display

An Introduction to the Study of Bird Psychology. By Edward A. Armstrong. Pp. xvi+381+22 plates. (Cambridge: At the University Press, 1942.) 21s. net.

**T**HE somewhat supercilious attitude of the laboratory zoologist to the study of birds, if less prevalent than formerly, is not entirely a thing of the past. The notion that to study a dead bird in a laboratory is a permissible occupation for a serious zoologist (though to study some more deserving kind of animal such as a protozoan or an echinoderm would be better), but that to study living birds in the field is mere dilettantism unworthy of a real man of science, dies hard. This kind of attitude is, in fact, only a particular example of the gulf between the laboratory and museum zoologist and the field worker which is happily being more and more effectively bridged at the present time. So far as the study of birds is concerned, the ornithologists themselves, or some of them, have afforded a certain excuse for the old sneer, but the work under review provides a very good illustration of the contribution which modern field ornithology is making to general biology.

It is in the field of behaviour in the wide sense that the study of birds has probably most to offer to the general biologist, and in recent times the critical study of the behaviour of wild birds has occupied the attention of biologists of first-rate ability, such as Huxley, Lorenz, and a number of others. The scientific investigation of bird behaviour centres very largely around those formalized activities which are embraced under the general term of display, and in this connexion the possibilities of mutually advantageous liaison between field and laboratory studies are happily exemplified in the relation, now well established, between the displays of birds and the physiological processes of reproduction.

In addition to the contributions of trained biologists in the realms of both fact and interpretation, a great number of intelligent amateurs have given careful accounts of display activities which they have observed, and these records are scattered through many journals and other ornithological works in a number of languages. The result is that a very considerable, though widely dispersed, body of material is now available for analysis and synthesis. On the purely descriptive side the known facts about the display