

trusteeship of Colonial territories which has marred the proceedings of the Trusteeship Council, and is making it a disturbing factor rather than one which promotes the goodwill and understanding upon which Colonial development and welfare depend. Great Britain is faithfully meeting its obligations under the charter of the United Nations Organisation in regard to the provision of statistical and other technical information on economic, social and educational conditions, and the Colonial Office has done well to make the position plain in its recent Memorandum on Information on Non-Self-Governing Territories (London: H.M. Stationery Office, 1948. Colonial No. 228. 1s. net).

International co-operation could do something to diminish the present difficulties in Colonial development, particularly in the attack on technical problems, and in such matters as transport. No doubt the help of independent international men of science would be valuable in overcoming prejudices such as those which hamper the eradication of the swollen shoot disease of the cocoa tree. But such collaboration is only possible in an atmosphere of goodwill, and where there is manifest the willingness to make impartial investigation and the comparative study of different Colonial systems which characterized the work of the permanent Mandates Commission of the League of Nations.

CHEMICAL STIMULI AND INSECT BEHAVIOUR

Chemical Insect Attractants and Repellents

By Prof. Vincent G. Dethier. Pp. xv + 289. (London: H. K. Lewis and Co., Ltd., 1947.) 25s. net.

INSECTS live in a world of tastes and odours. To understand their reactions to the varied chemical factors in their environment would be a long step towards comprehending their ecology and would provide a firm basis on which to build certain methods of control. It is around these theoretical and practical considerations that Prof. Dethier has written his book on the action of chemical attractants and repellents in the life of insects. Unfortunately, exact knowledge in this field is very limited, and the contributions of the applied entomologist are copious but wholly empirical. None the less, this book should serve a useful purpose in bringing together in one volume what is known of the role of chemical attractants in the feeding, sexual and egg-laying behaviour of insects.

The botany and chemistry of the essential oils of plants and the relation of these substances to the choice of food-plants is reviewed—from the classic work of Verschaffelt on the predilection of Pierid larvae for plants containing mustard oils to the recent detailed work of the author himself on the feeding habits of *Papilio* species in relation to the essential oils of Umbelliferæ and other plants. The chemistry of fermentation and the products of decomposition of protein and fat are considered alongside the extensive empirical literature on the production of attractants for the codling moth, fruit flies, blowflies and other insects. It is no fault of the author that this subject consists chiefly of lists of facts with few

guiding principles. There is a valuable chapter in which the varied types of olfactometers and venturi type flow-meters are described, together with the methods of controlling the molecular concentration of odorous substances and determining the thresholds of response. On the practical side, the use of attractants in devising traps—for sampling populations and timing the application of insecticides or for actually reducing populations—is described in detail; and the whole subject of insect repellents is reviewed.

At the beginning of the Second World War the standard mosquito repellent was still oil of citronella; but commercial firms in the United States had evolved three synthetic repellents: dimethyl phthalate, 2-ethyl-hexane-diol 1,3 (Rutgers 612) and α -dimethyl- α -carboboxydihydro- γ -pyrone (indalone). At great expense, large teams of American workers during the War tested thousands of additional substances; but the only practical outcome was the recommendation to use a mixture of the three named chemicals in the proportion of 6:2:2. No advances were made in the general knowledge of repellents. Indeed, the most valuable contribution in this field during the war years was the paper by Christophers¹, working almost single-handed; a paper which appeared too late for inclusion in Prof. Dethier's book.

The writing of this book was completed while the author was serving with the Armed Forces overseas. It has not been possible, therefore, for him to include certain recent ideas which go far to clarify thought on some of the fundamental questions involved. It has been pointed out by J. S. Kennedy that repellency is not a reaction but a change in distribution; and this altered distribution may be brought about in a variety of ways. For example, the author states categorically that D.D.T. possesses "no repellent qualities whatsoever". But slight D.D.T. poisoning causes excitation, and this in turn leads to such a change in distribution that insects are, in fact, strikingly repelled from buildings treated with D.D.T. Similarly the author ascribes the change of host plant by aphides at different seasons to physiological changes in the insect resulting in altered taste preferences. But it is becoming increasingly clear that the nutritional value of the host plant, as determined by the physiological condition of its foliage, may play a part at least as great as do specific flavours in inducing feeding and multiplication and so the building up of aphid populations.

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¹ *J. Hyg.*, 45, 176 (1947).

PROCESS CHEMISTRY FOR THE CHEMIST

Chemical Process Principles

By Prof. Olaf A. Hougen and Prof. Kenneth M. Watson. Part 2: Thermodynamics. Pp. xv + 437-804 + xvii-xlviii. 30s. net. Part 3: Kinetics and Catalysis. Pp. xv + 805-1107 + xvii-xlviii. 27s. net. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1947.)

THESE volumes consider process problems of a physico-chemical nature and they do not contain any detailed discussion of equipment, of selection of materials for construction or of mechanical design. As the majority of chemical engineers in Great Britain