Pyrallid genera *Ephestia* Guenée and *Plodia* Guenée had been worked out satisfactorily⁹, but, even in this group, it has recently transpired that one of the commoner species is, in fact, a species-complex. In other groups, the work carried out at the British Museum has shown that, as was expected, yet other species-complexes are present. This is the position with such well-known insects as the 'large tabby moth', *Aglossa pinguinalis* (Linnaeus); the 'honey moth', *Achroia grisella* Fabricius; the 'corn moth', *Tineæ granella* (Linnaeus); and the 'white-tip clothes moth', *Trichophaga tapetzella* (Linnaeus), and it is highly probable that, were more adequate material available for study, the position of other species would be found to be similarly complicated. In some of these species-complexes, the two or more closely related species fly together, whereas in others it would seem that the overlap in the distribution is of a comparatively recent date; the latter may constitute examples of geographical races becoming established as separate species. In the British Museum there is a paucity of material from America; but the impression has been gained that the apparently similar New World forms are by no means always so closely related to the Old World species as is generally supposed.

Often the differences in the genitalia between these closely allied species are small although constant, but, judging by the position in groups of which a sufficiency of specimens is available, it is usually possible to correlate some distinctive features in the wing pattern with these differences in the genitalia. With certain species, at present, an examination of the male genitalia is the only certain means of identification, particularly with rubbed specimens which often constitute the material available.

The important question arises as to whether the species of moths in these species-complexes, which differ constantly almost only in the genitalia, exhibit differences among themselves in the earlier stages, and in the larval food and habits. As yet, we have little exact information on this subject; but it may be remarked that, of the four closely allied species in the *Tineæ granella* complex, although *T. granella* (L.), *T. infimella* Herrich-Schäffer and *T. cloacella* Haworth are so similar in wing pattern that identification of a single specimen may be impossible without recourse to examination of the genitalia, only the larvæ of *T. granella* and *T. infimella* have been found infesting grain, although all three species, together with the quite similar *T. ruricolella* Stainton, are known to utilize certain species of fungi as the larval food material. Moreover, it appears that *T. granella* prefers wheat, while *T. infimella* favours rye; although this latter species is a pest of stored wheat in Scandinavia, it has not yet been found infesting grain in Britain. A dissimilarity in larval behaviour is found in the two rather similar species of *Ephestia*, *E. sericarium* Scott (= *kühniella* Zeller), well known as the 'Mediterranean flour moth' or 'mill moth', and *E. elutella* (Hübner), the 'cacao moth'. The mill moth is a notorious pest in flour mills throughout the world, the larva feeding on flour at all stages in the milling process and constructing webbing which eventually impedes the operation of the machinery to such an extent that fumigation of the mill is necessary. On the other hand, the larva of *E. elutella* attacks the whole wheat grain, but shows a partiality for the germ: this species is also a well-known pest of other food products such as dried fruit, cacao beans, etc.

Much work remains to be carried out in this field of economic entomology, but it is clearly essential that the taxonomic studies should first be completed. It is a waste of time to attempt to investigate the life-histories and habits of living material consisting of a complex of unresolved species. Although the work at the British Museum has placed the systematics of the food products moths on a reasonably firm foundation, there are still a few threads to be unravelled, and, doubtless, quite a host of names remains to be added to the lists of synonyms.

It may be added as a matter of interest that recent work on the chaetotaxy of the lepidopterous larvæ infesting stored food products carried out at the British Museum by Dr. H. E. Hinton¹⁰ has shown that, with a number of species, identification of the larvæ is easier and more certain than is the case with the adult moths.

¹ Wheeler, L. Richmond, *Entomologist*, **76**, 89 (1943).

² Rambur, P., "Faune entomologique de l'Andalousie," **2**, 312 (1840-42).

³ Corbet, A. S., *Proc. Roy. Ent. Soc. Lond.*, (B) **7**, 166 (1938).

⁴ Pierce, F. N., "The Genitalia of the Group Noctuidæ of the Lepidoptera of the British Islands" (Liverpool, 1909), followed by similar monographs on the other major groups.

⁵ Petersen, W., *Stett. ent. Z.*, **91**, 1 (1930).

⁶ Rothschild, Lord, and Jordan, K., *Nov. Zool.*, **9** (supplement), 1-972 (1903).

⁷ Corbet, A. S. and Tams, W. H. T., *Proc. Zool. Soc. Lond.* (B), **113**, 55 (1943).

⁸ Hinton, H. E., and Corbet, A. S., "Common Insect Pests of Stored Food Products", British Museum (Natural History), Economic Series, No. 15 (1943).

⁹ Richards, O. W., and Thomson, W. S., *Trans. Ent. Soc. Lond.*, **80**, 169 (1932).

¹⁰ Hinton, H. E., *Bull. Ent. Res.*, **34**, No. 3 (in the press) (1943).

OBITUARIES

Prof. Isidor Traube

THE death of Isidor Traube at Edinburgh at the age of eighty-three brought to a close a life of great significance to present-day exponents of physical and colloid chemistry. Born at Hildesheim of Jewish parents (his father was a merchant), Traube entered the University of Berlin in 1879, where he studied chemistry under A. W. Hofmann and physics under Helmholtz. Later he worked in the physiological institute of Du Bois Reymond, and was awarded his doctorate for a thesis in the field of organic chemistry. After a period of military service, which appears to have been little to his liking, he became for a period assistant to Berthsen. Contact with Bunsen and Hermann Kopp turned his thoughts to the then embryonic science of physical chemistry and in particular to the phenomena of solution, adhesion and cohesion, to the study of which so much of his life was later to be devoted.

Greatly impressed by the experimental results of Raoult, Traube's speculative mind early recognized the relation between the gas laws and Raoult's empirical laws relating to dilute solutions; he was aware also of the implications regarding the dissociation of the electrolytes to which many of Raoult's data referred. Unfortunately for Traube, instead of publishing his interpretations of these results (his paper would have anticipated van't Hoff by two years), he communicated them (1884) to Lothar Meyer, then professor of chemistry at Tübingen. Meyer, unimpressed by the accuracy of the Frenchman's data, which in his opinion required further substantiation, cautioned the young Traube against hasty publication. The papers of van't Hoff and Arrhenius were published in 1886-87.

After a short interval in Heidelberg, Traube migrated to Bonn, where he worked as assistant at the Agricultural Academy. It was there that he began his studies of the viscosities and surface tensions of liquids. So early as 1891 he expressed the opinion that the molecules forming adsorbed films at the surfaces of solutions obey equations of state analogous to those of three-dimensional gases, the area per molecule being the analogue of the molecular volume, and the lowering of surface tension that of the gaseous pressure. This time Traube anticipated the march of scientific opinion not by two but more nearly by thirty years, for it was not until the impetus given to the study of surface phenomena by Hardy, Langmuir and Harkins had made itself felt that the correctness of his view was firmly established by Adam (1921), Volmer (1925) and others.

Already in 1885 Traube had shown that with members of a homologous series dissolved in water (for example, the lower alcohols or the alkyl acetates) equal lowerings of the surface tension of the water were produced by concentrations which decreased *geometrically* about three-fold for each additional CH_2 . In much later work he extended a form of this generalization (Traube's rule) to adsorption at liquid/liquid and solid/gas interfaces, although he was careful in this last case not to confuse the affinity or free energy of adsorption, to which the rule would apply, with the saturation capacities of the surface, to which it would not.

Traube found a practical outlet for these discoveries in the assessment of the fusel oil contents of spiritous liquors. He also applied his theories of film formation and surface activity to explain the viability of drugs in living tissues (1904). Ever since its formulation, Traube's theory of drug action has exercised a profound influence on pharmacological research, and perhaps to-day more than holds its own against the rival lipid solubility hypothesis of Overton and

Meyer. Traube's other studies included such diverse subjects as the molecular volumes and intrinsic pressures of pure liquids (1895-1920), the theory of critical phenomena (1902), colloidal gold, the theory of catalysis (1913), the stability of matter in the submicronic state of division (1928-29) and the froth flotation of minerals and of organic chemicals.

A careful experimenter and possessing an exceptionally penetrating mind, Traube was never over-elaborate either in his laboratory techniques or in his formulation of theories. Unlike those of his great contemporaries, Nernst and Ostwald, his writings were never pontifical, and, so far from their becoming current dogma, it was left to later generations of chemists to appreciate their essential merit.

After holding for a third of a century the title of 'extraordinary' professor at the Technische Hochschule, Berlin, Traube came as an *émigré* to Britain in 1934. He settled in Edinburgh, where he was welcomed as a guest of the University. Active-minded to the last, he completed shortly before he died the manuscript of a book of reminiscences. To this and to his surviving daughter, Dr. S. Boas-Traube, I am indebted for the biographical details given in this note.

D. H. BANGHAM.

WE regret to announce the following deaths:

Mr. J. S. Addison, deputy chairman of Courtaulds, Ltd., and chairman of the scientific advisory committee of the Empire Cotton Growing Association, on December 15.

Mr. Edward A. Martin, formerly secretary of the South-Eastern Union of Scientific Societies, on December 14.

Mr. H. F. Witherby, M.B.E., the well-known ornithologist and publisher of works on natural history, on December 11, aged seventy-three.

NEWS and VIEWS

A Programme for Reconstruction

THE statement, "Forward—By the Right", issued by the Tory Reform Committee (Pp. 16. Tory Reform Committee, House of Commons, London, S.W.1), is of considerable interest to scientific workers as indicating principles and objectives on which there is a large measure of general agreement, however widely opinions may differ as to the measures by which the objectives are to be attained. Eight principles are enunciated and illustrated: national unity; empire unity; the interdependence of nations; the full development of resources; the practical approach; individual freedom; trusting the people; and finally, that of first things first. Much general support will be found for the view that in Imperial affairs attention should be transferred from abstract questions of political status to such practical problems as Imperial defence, air and sea transport, broadcasting and communications, education, research, economic development and migration. In regard to the interdependence of nations, it is urged first that those military organizations for consultation and joint action which exist between the United Nations should be maintained, and also those organizations such as the Middle East Supply Centre which could be adapted to the needs of peace and assist in removing the

causes of dispute. The International Labour Office and the Hague Court should be revived and such joint enterprises as are exemplified in the Hot Springs Conference developed. While mutual co-operation and understanding between the British Commonwealth, the U.S.A., the U.S.S.R. and China must form the basis for establishing a framework of stability, the final framework of any world organization will require a broad foundation.

Under the development of resources, the Statement, after emphasizing the necessity of a policy of full employment, including Empire development, agriculture and the development of exports, calls for the devotion of far greater resources in men and money to scientific and technical research, including provision in the educational system of Great Britain for the increased numbers of trained scientific workers required. On the question of planning, the Statement is not clear, but it emphasizes the necessity both of ample statistical and other information as a basis, as well as ensuring that the objectives of policy command general support. Dealing with public control, it is advocated that the public interest should be the decisive test; private profit is not accepted as the sole test of public advantage. The peacetime essentials are regarded as, first, the retention

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