

valid from the date of publication and that any species thought to answer to the description would be available as genotype. An amazing decision for those professing to aim at stability in nomenclature considering that the right of such a genotype to inclusion in the genus might be challenged at any time.

All difficulties would have been met, and stability with continuity assured, by irrevocable decisions in all cases where genotype fixation, or the use of generic names, were uncertain under the original Article 30. It is quite certain that irrevocable decisions are necessary before an approximation to stability in nomenclature can be attained.

At the present time our knowledge of the insect world and of Diptera in particular, is far in advance of what it was fifty years ago, but we are deliberately making the study of insects more difficult by refusing to recognise that many of the birth-throes of Entomological Nomenclature are not worthy of recognition, and that continuity in the use of generic names is of far greater importance than blind adherence to rules framed by those who knew little or nothing of entomological history, and consequently often unjust in application.

DIPTERA: 1890-1938.

AN AMATEUR'S RETROSPECT.

By H. W. ANDREWS, F.R.E.S.

Although my recollections as a dipterist do not cover the full period commemorated by this Jubilee number, I can go back over the greater part of it, as it was in 1899 that I joined the Entomological Society of London, in that year under the Presidency of Mr Verrall, and, giving up Lepidoptera, began to collect Diptera.

In those days dipterists were far fewer in numbers than at present; at their head was the triumvirate of Verrall, Collin, and Yerrbury, of whom Collin alone is left. Other well-known names were Dr Mead, of Bradford, known by his monographs on *Anthomyidae*, Bradley and Wainwright at Birmingham, and Grimshaw and King in Scotland. I have, too, most kindly recollections of Mr F. C. Adams, of London and Lyndhurst, who gave me a lot of help as a beginner, both in types and identifications. Major (then Mr) Austen was in charge of the Diptera at South Kensington, where the British section was rapidly increasing in numbers and value through the donations of Colonel Yerrbury, who was one of those rare amateur entomologists who collect for others rather than themselves; but Austen was already becoming more and more occupied with the increasingly important medical and economic aspects of dipterology, which were soon to take up all his time.

Here I think it is fitting to pay a tribute to Mr Verrall, whose immense industry, endless enthusiasm and wide knowledge of palaearctic diptera, enabled him, practically single-handed, to establish order out of chaos and set the study of our native species firmly on its feet. His memory is kept alive amongst all entomologists by the annual "Verrall Supper," which, under the auspices of the Entomological Club, perpetuates the hospitality he, as a member of that Club, initiated as far back as 1887.

The chief difficulty for students then, as now, though now in far less degree, was the lack of reliable text-books in English. The three

volumes on Diptera in F. Walker's *Insecta Britannica*, published as far back as 1851-56, were the sole works dealing with British Diptera as a whole, and there were one or two monographs on single families in the magazines. A great standby was Schiner's "Die Fliegen," two volumes of the "Fauna Austriaca," from which those who, like myself, were not German scholars, could pick out diagnoses with the aid of a dictionary. Verrall's "List of British Diptera" (second edition) was a necessity, but it was solely a list of names. In such circumstances one's collecting naturally gravitated towards those larger and more conspicuous groups that could be easily identified, e.g., Tabanids, Asilids, and Syrphids. In 1901 there appeared the long expected Vol. VIII (the first published) of Verrall's projected series of volumes on British Flies, dealing with the *Syrphidae*. This work was a revelation to those accustomed to the meagre descriptions of the older books; indeed, if anything it was too elaborate, and I expect many besides myself skipped the minutely detailed descriptions and relied rather on the wholly admirable short paragraphs contrasting each species with its nearest allies. The next work of importance to come out was Wingate's "Durham Diptera" (1906). The title was misleading, as the book actually consisted of analytical tables covering most of the species mentioned in Verrall's "List," with those taken in Durham specially recorded. This was a most useful work, but naturally did not go far enough in doubtful cases. Verrall's next volume (Vol. V), dealing with the *Stratiomyidae*, *Tabanidae*, etc., came out in 1909, and was on the same scale of completeness as Vol. VIII. Since that date no book on British Diptera has been published so far as I am aware, but, especially since the War, there has been an increasing output of useful monographs on individual families published in the Magazines, or in the Transactions of Scientific Societies, notably those of Dr F. W. Edwards of the British Museum. With a view to helping students an annotated list of such monographs dealing with British Diptera was published in the *Entomologist's Record* in 1931, followed by a Supplement in 1935. There are also a number of Local Lists now in existence, mostly published by local Natural History Societies; some mere lists of names, others giving useful additional information. An up-to-date Analytical List on the lines of Wingate's work would be an immense boon, but in view of the costs of production and the small sale such a work could command, it is improbable that it will appear unless financed by some such Agency as the Ray Society. I must mention here that the above remarks on books deal with the taxonomic side of dipterology only, and of set purpose no reference has been made to medical and economic works.

Two main aids to diagnosis have come into general use during the last fifty years. Chaetotoxy, or the study of arrangement of bristles, first put forward by Baron Osten Sacken in his paper "An Essay on Comparative Chaetotoxy" in the *Transactions of the Entomological Society* 1884, and elaborated by Grimshaw in the *Entomologist's Monthly Magazine* 1895, has been a great boon, and has the advantage that it can be easily applied by anyone. Secondly, the study of the genitalia is being used more and more as a basis for the differentiation of species. This is not so easy a method to work as chaetotoxy, for, although in certain families the genitalia are conspicuous, they are, as

a rule, concealed, and the simplicity of the female genitalia compared with the complexity of those of the males practically confines this study to the latter sex. It is to be regretted, too, that almost every writer on the subject uses a different terminology.

During the period under review the number of species recorded as occurring in Britain has very greatly increased and there must now be nearly twice as many as were known in 1890. During his lifetime Verrall published in the *Entomologist's Monthly Magazine* three separate lists of "A hundred new British species of Diptera" in 1886, 1894, and 1911. In the preface to the second edition of his "List of British Diptera" (published in 1901 and containing 2800 odd names) he says: "About 300 species have been added to the old List." Since his death Collin must have added between 300 and 400 species to the "List," Edward even more, and every monograph published has recorded further additions in the family or group concerned.

Compared with the increase of recorded species, comparatively little progress, omitting pathological and economic subjects, has been made in the study of the bionomics of British Diptera. Probably the fact that the majority of our dipterists are amateurs who have not at their disposal the time requisite for successful investigation, and the concealed early stages, as parasites or otherwise, of so many Diptera, compared for instance with Lepidoptera, accounts for this. Mention should be made, however, of the publications of Dr Keilin and others of the Molteno Institute, Cambridge; also of Dr Hobby's writings on Predacious Diptera; Mr Hamm's on the courtship of certain Empid flies; and various papers by Mr Niblett and Dr Varley on the life histories of Trypetids.

It was not to be expected that the Diptera would escape being infected with the virus of "revised nomenclature," and many old familiar names universally known and easily recognised are now set aside by the modern school of dipterists, both in this country and more especially on the Continent. I am not an expert on this subject, but personally I much regret that such changes can be made by comparatively few individuals able to attend Congresses, and should like their decisions to be made subject to a subsequent referendum of known students of the Order of insects affected, before coming into effect.

Although the *Entomologist's Record* does not profess to deal with "Applied Entomology" no review of the progress of dipterology can be considered complete without some reference to its pathological and economic aspects, for it is precisely during the past fifty years that Diptera more than any other Order of insects have come to the front as directly affecting man himself. The association of Diptera with such diseases as malaria, yellow fever, sleeping sickness, and filariasis, to mention the more important, has led to the most intensive study of the various species concerned in all stages of their life histories, and the bionomics of such species have been studied from all angles, whilst the output of literature has been fully commensurate with the volume of research. On the economic side progress has not been on quite the same scale, but here also there has been considerable increase of knowledge since 1890, especially as regards such diptera as attack domestic animals and fruit crops. Mention, too, should be made of the establishment in 1913 of The Imperial Bureau (now Institute) of Entomo-

logy, which acts as a clearing-house and headquarters for Applied Entomology throughout the Empire, and of its off-shoot, the Laboratory at Farnham Royal (established in 1927) which deals annually with many species of diptera in the course of its work of breeding beneficial parasites.

ECONOMIC ENTOMOLOGY.

By T. BAINBRIGGE FLETCHER, R.N., F.L.S., F.R.E.S., F.Z.S.

In most branches of Entomology the progress during the last half-century is a development of previous lines. Economic Entomology, however, has witnessed a revolution in that time. In 1890 the United States was the only country in the world which maintained anything worthy of the name of a staff of Economic Entomologists and even there the Federal Staff was small, with a budget of only some £6000 a year. Nowadays almost every small colony throughout the world has its Government Entomologist and larger countries have a proportionally larger staff (the Federal Service in the U.S.A. now includes several hundred trained workers*). This increase in Government workers has been due directly to the recognition of the great losses caused by Insects, by native pests to home-grown crops, by new pests introduced from other countries, and by insect vectors of human and animal diseases. The damage to crops and stored products by native insect-pests has always been present and may be very serious, especially in warmer countries; that due to pests introduced from other countries became accentuated with the speeding-up of oversea transport and the introduction of new plants from one country to another; that due to insect vectors of disease has only been realized within the last half-century. Although the rôle of the mosquito in carrying the flarial worm causing elephantiasis was discovered by Sir Patrick Manson in 1879, it was not until 1898 that Anopheline mosquitos were definitely incriminated as vectors of malaria; thereafter, progress was relatively rapid and revealed the part played by mosquitos in the carriage of Yellow and Dengue Fevers, by Tsetse Flies as carriers of Sleeping Sickness and Nagana, by Fleas in connection with Plague, by Lice in the transmission of Typhus, and other similar cases, which have largely revolutionized the practice of Tropical Medicine. The recognition of the great importance of insect-borne diseases in the Tropics led directly to the foundation of the Schools of Tropical Medicine in Liverpool, London, Hamburg, and other centres, and, of course, to the practical application of the new knowledge of the control of such diseases as Malaria, Plague, and Yellow Fever. The history of Medical Entomology has been told and re-told in numerous text-books and general accounts and there is no space even to summarize it here, but it may be noted *en passant* that such groups as the Mosquitos, Fleas, and Lice, almost wholly neglected fifty years ago, have received an enormous amount of attention, biologic and taxonomic, resulting in an immense mass of literature. Van der Wulp's *Catalogue of the Diptera of Southern Asia* (1896)

*The appropriations for the U.S. Bureau of Entomology in the decade 1921-1930 amounted to 31,804,716 dollars, in addition to special appropriations of 10,000,000 dollars for Corn-borer Control in 1927 and of 4,250,000 dollars for Mediterranean Fruit-fly in 1929.



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