

## KED-FLIES

THE ked-flies are blood-sucking Diptera, ectoparasitic on certain of the ruminant artiodactyls. Since species occur on domesticated sheep and goats, they are of veterinary significance though not yet incriminated of acting as vectors of actual disease; occasionally they bite man. Information about these flies has been somewhat scattered, and a recent monograph<sup>1</sup> of the group by Prof. J. Bequaert of Harvard is, accordingly, very welcome. Prof. Bequaert has already published many shorter papers on the Hippoboscidae, of which the Melophaginae or ked-flies are a sub-family; his monograph of the ked-flies is thus the outcome of prolonged study.

The ked-flies show many interesting adaptations to their ectoparasitic mode of life. They are tough, leathery, compact and somewhat flattened creatures. All are viviparous, producing larvæ that are fully developed and ready to pupate one at a time. The female reproductive organs are much modified, in a manner very similar to that of the tsetse flies (*Glossina*), for the retention of the larva and its nourishment.

The Melophaginae comprise four genera, *Neolipoptena*, *Lipoptena*, *Echestypus* and *Melophagus*. Species of the first three genera occur on a variety of goats, antelopes, deer, etc. They are all winged on emergence from the puparium, but the wings are cast when the flies have reached a suitable host. The mature larvæ, on being extruded by the females, apparently fall from the hairy pelts of their hosts and pupate on the ground. The only British representative of this group is *Lipoptena cervi* L., the ked of the red deer<sup>2</sup>.

The genus *Melophagus* contains only two species. One of these, *Melophagus ovinus* Linnaeus, the sheep ked, is common in the British Isles<sup>2</sup>. This species is now widespread, having been transported on its principal host, the domestic sheep. It does not, however, survive in all climates. Other hosts from which it has been recorded are the Marco Polo sheep and the Alaskan mountain sheep; but Bequaert<sup>1</sup> states that the ectoparasites of these two sheep have never been properly investigated and that the records are dubious. The other species, *Melophagus rupicaprinus* Rondani occurs on the chamois. The adults of *Melophagus* are completely wingless. In the case of the sheep ked the larvæ do not normally fall to the ground but pupate in the fleece of the host and stick there. Powers of flight are thus not required by the adult when it emerges from the puparium. Nothing is known of the life-history of the chamois ked but, as Bequaert points out, the chamois has an undercoat of short wool beneath the visible pelt of longer hairs.

Bequaert discusses the probable evolution of the Melophaginae. He considers that the family Hippoboscidae appeared in the Cretaceous and that they were originally all ectoparasites of birds. He thinks that the passage from birds to the artiodactyls took place when the latter began to arise in the Lower Eocene. There are no fossil Hippoboscidae but, taking the family as a whole, 65 per cent of the recognized genera and 88 per cent of the recognized species of recent Hippoboscidae are parasitic on birds. Furthermore, no recent Hippoboscidae have small mammals as their hosts; and at the time when the Hippoboscidae appear to have arisen (late Mesozoic) there was a variety of birds but only small mammals. The plumage of any bird offers good protection to larger ectoparasites like the Hippoboscidae, while

smaller mammals can usually kill larger ectoparasites in the pelt.

It would seem that the fate of recent Melophaginae is intimately linked up with the fate of the artiodactyls, since they have left the birds and have become highly specialized for an ectoparasitic existence on these mammals. This order of mammals has a great past in the Oligocene and the Pliocene, but it is now on the wane. Bequaert suggests that the Melophaginae may disappear within the next century should the present decline of their wild hosts continue; efficient insecticides may cause the species on the domestic sheep to suffer a like eclipse.

A century hence, naturalists may be consulting Prof. Bequaert's monograph for information about an extinct sub-family of the Diptera.

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<sup>1</sup> Bequaert, J., "A Monograph of the Melophaginae, or Ked-Flies, of Sheep, Goats, Deer and Antelopes (Diptera, Hippoboscidae)". *Entomologica Americana*, 22, 1 (1942).

<sup>2</sup> Edwards, F. W., Oldroyd, H., and Smart, J., "British Blood Sucking Flies", 118 (1939).

THE INDIAN FAUNA DURING  
1942-43

AN interesting tabular statement is given in the *Indian Forester* (70, No. 4, April 1944. Civil and Military Gazette Ltd., Lahore) of the animals shot in some of the Indian Provinces and States during 1942-43. Of British India, only Madras appears to have sent in no figures. The Indian States are confined to Jammu and Kashmir.

The protection of some of the species which two score years ago were in grave danger of becoming extinct has to some extent been safeguarded through the advent of the game sanctuary. Rhinoceros was one of the animals threatened. During 1942-43, only two rhinoceroses were killed in the whole of India, in the province of Assam. Of gaur or bison, 25 only (Madras sent in no returns, unfortunately) were shot, the greater number in the Bombay Presidency (9) and the Central Provinces (8), while none of its close relative the goyal or mithan was killed; nor any banting or tsine. Of wild buffalo, another animal the numbers of which were seriously decreasing, only four were shot in Assam. Wild elephants, killed in British India at least, do not really afford much light on the numbers extant in the different provinces, for the individual public are only allowed to shoot or trap any animal specially proscribed as dangerous or, in the second case, with a special permit from Government. Thirty-two are shown to have been shot in the several provinces; there is a footnote to the statement, however, which says that a few sambar, barking deer and wild elephants—a curious assemblage—were killed by military units in Chittagong District, Bengal.

Turning to the Carnivora, a total of 219 tiger and tigresses were shot, the greater number in the Central Provinces and Berar (65), and the United Provinces (91); of leopard or panther 173 were shot, the United Provinces again heading the list of kills with 54, the Central Provinces 44, and Bombay Presidency 32; the hunting leopard or cheetah is confined, so far as animals shot are concerned, to Coorg (31), and Jammu and Kashmir (15), a curious record in distribution of the animal possibly due to incorrect diagnosis. The records of wild dog (28 shot only) are