

evaporate; third, there is no danger from fire—and this is an item, for people will smoke and throw matches about, and how impossible it is to keep everything covered up; fourth, it does not require expensive apparatus to contain it; fifth, it takes up very little room; and, sixth, I believe the results are very much better.

ART. XXVII.—On some Tick-parasites of the Kiwi.

By W. M. MASKELL.

[Read before the Wellington Philosophical Society, 20th January, 1897.]

Plate XVII.

I HAVE to bring under the notice of the Society two animals of the "tick" family, discovered upon native birds during the year. The first, on the North Island kiwi (*Apteryx mantelli*), was given me by Sir W. Buller, and came, as I understand, from the forest-ranges at the back of Mount Egmont. The other, on the South Island kiwi (*Apteryx australis*), was given to me by Sir J. Hector, and came from Dusky Sound.

These two forms belong undoubtedly to the genus *Ixodes*, Latreille, or true "ticks," as will be seen from the characters given presently. In this genus there is great difficulty in establishing specific characters, as almost all the organs are extremely similar in all the forms, and the differentiation of species, unless founded upon extremely minute points, has to depend a good deal upon size, colour, or the animal-host, none of which is, in my opinion, very reliable; for the size of a tick is often dependent upon the quantity of food it has taken, the colour is frequently deceptive, and some ticks frequent several kinds of animals. These pests are found in many lands, some on human beings, such as the Garapata, of South America; others on dogs, or sheep, or cattle, such as the dreaded and murderous cattle-tick, of Texas and Queensland.

The family *Ixodidae* has been divided by some naturalists into various sections, such as *Ixodes*, *Argas*, *Amblyomma*, *Hyalomma*, &c. The distinctions relied upon, however, seem to be not altogether satisfactory, with the exception, perhaps, of *Ixodes* and *Argas*, the others being probably only sub-genera or varieties of *Ixodes*. The separation of *Argas* is founded upon two sufficient characters—first, the position of the mouth-organs, which are not protruded in front, but hidden beneath the body; and, secondly, the absence of a shield on the back of the head, which is very noticeable in *Ixodes*. Indeed, Mr. A. Murray puts the genus *Argas* into the Gamasids,

not considering it a true tick; other writers, however, do not take this view.

There is one point of interest in connection with our New Zealand forms of these parasites. I do not find that in other countries a true *Ixodes* is found on anything but mammals and reptiles: cattle, sheep, dogs, snakes, deer, &c., are the usual victims. Some species of *Argas* are found on birds. But all the ticks so far reported as probably indigenous to New Zealand and the neighbouring islands infest birds. In 1884 I reported a true *Ixodes* on the penguin, which Mr. T. W. Kirk afterwards found also on a gull. Mr. Kirk reported another in 1886 on the albatros; and now I have two more on the kiwi. It is a recognised fact, I believe, that ticks live amongst grass and trees as well as on animals, and attach themselves to an animal as it passes by. It is in this way that they spread so rapidly, and that a whole country becomes a nest of "tick-fever." I suppose that birds also pick up these parasites from the ground or from shrubs. In our forests, therefore, it is presumable that ticks exist pretty frequently, and that other birds may hereafter be found to harbour these undesirable guests.

Ticks are usually not attractive to the sight, irrespective of their propensities. Some, however, are ornamented in various ways, as, for example, the specimen of a cattle-tick from Natal which I exhibit to you this evening. If it were not that this (which is not the same as the Queensland tick) is a most diabolical brute, one might almost characterize it as handsome.

Order ARACHNOIDEA.

Sub-order ACARINA.

Family IXODIDÆ.

Genus *Ixodes*, Latr.

Body covered with a tough leathery skin, which, in the female, is capable of extension. Dorsum bearing, at the cephalic extremity, a more or less elliptical shield. Mouth-organs consisting of a tubular rostrum with two palpi, protruded in the adult in front of the head. Eyes absent. Feet, eight in the adult, six in the young; claw double, with a caruncle or pad beneath.

The distinctive characters of the genus, separating it from *Argas*, Latr., are the protruding rostrum of the adult, the dorsal shield, and the pad beneath the claws.

Ixodes apteridis, sp. nov. Plate XVII., figs. 1-6.

Female when full-grown reaching $\frac{1}{2}$ in., but the size is dependent upon distention with food; some specimens seen

are only about $\frac{1}{8}$ in. The colour, dorsally, is a dirty-white or very pale buff, with a slight nacreous tinge; ventrally, the same, or a little lighter; the dorsal cephalic shield is brown. The feet and the rostral palpi are orange, the rostrum itself pale-yellow.

The male may be recognised by its smaller size (about $\frac{1}{8}$ in.), its darker orange-red colour, and apparent absence of the dorsal shield, which, however, is represented by a protuberance of the same orange colour.

The skin of the female is marked with great numbers of very delicate transverse striæ, set close together; the shield is smooth, and exhibits no pits or spots. There are no hairs, either dorsal, marginal, or ventral, on the body. The dorsum has two longitudinal grooves extending from near the shield to near the anal extremity; ventrally there are two similar grooves and a median terminal shallow depression in which is situated a small tubercular anal organ. The feet are rather long and strong, seven-jointed, terminated by two slender claws having beneath them an elliptical pad. On each side of the body there is a large circular spiracle. There are no eyes. The rostrum is protruded, cylindrical, straight, covered with longitudinal series of small recurved hooks; the palpi are four-jointed, curved inwards, and slightly clavate, with a few hairs at the tip.

The mouth and foot of the male do not appear to differ from those of the female.

Hab. In New Zealand, parasitic on the North Island kiwi (*Apteryx mantelli*). Found in the forest-ranges inland of Mount Egmont.

Ixodes aptericola, sp. nov. Plate XVII., figs. 7, 8.

Body of female reaching nearly $\frac{1}{8}$ in. in length. Colour a dull dirty yellow, both dorsally and ventrally, with a very small brown dorsal shield; feet and mouth-organs orange-red. Skin marked with numbers of transverse striæ, which are rather coarse and strong. There are two ventral longitudinal grooves, but apparently none on the dorsum. Feet and palpi as in *I. apteridis*, but the rostrum has only a few hooks at the tip and none on the shaft. The body has no dorsal, marginal, or ventral hairs, and the very small shield exhibits no pits or marks.

Hab. In New Zealand, on the South Island kiwi (*Apteryx australis*), Dusky Sound.

The large size, the colour, the absence of dorsal grooves and rostral hooks, and a few other particulars distinguish this from *I. apteridis*. It differs from *I. eudyptidis*, Mask. (1884), on the penguin, also found in Dusky Sound, in the absence of hairs on the body and of pits on the shield.

I imagine that both these forms are new; and, as remarked above, the occurrence of members of this genus seemingly only on birds in and around New Zealand is somewhat interesting.

EXPLANATION OF PLATE XVII.

- Fig. 1. *Ixodes apteridis*, female, dorsal view, about seven times natural size.
 Fig. 2. " male, dorsal view, about ten times natural size.
 Fig. 3. " mouth-organs, magnified.
 Fig. 4. " rostrum, highly magnified.
 Fig. 5. " foot, highly magnified.
 Fig. 6. " spiracle, highly magnified.
 Fig. 7. *Ixodes aptericola*, female, dorsal view, about five times natural size.
 Fig. 8. " rostrum, highly magnified.

ART. XXVIII.—*Further Coccid Notes: with Descriptions of New Species, and Discussion of Points of Interest.*

By W. M. MASKELL, Registrar of the University of New Zealand, Corr. Mem. Roy. Soc. of South Australia.

[Read before the Wellington Philosophical Society, 20th January, 1897.]

Plates XVIII.—XXII.

THE following paper contains, perhaps, fewer "novelties" than some of my former ones, but such species as *Lecanium mirificum*, *Inglisia fossilis*, or *Sphærococcus socialis* are as interesting as any yet known; and I think that if my identification of *Monophlebus burmeisteri* is correct, as I believe it is, we have here a valuable addition to our knowledge of Coccids.

I am greatly indebted to Messrs. Koebele, French, and Lea for the numerous specimens which they have sent me. Those from Mr. Koebele are especially interesting as showing the wide range of many species already known—e.g., *Aspidiotus ficus* and *A. destructor*, *Parlatoria zizyphi*, *Eriochiton cajani*, *Icerya seychellarum*, &c. Some of these, such as *E. cajani*, *Ceroplastes rubens*, are doubtless indigenous in many lands; others, such as *A. ficus* or *P. zizyphi*, have probably been introduced by the modern extension of traffic. Fifteen of the species mentioned in this paper have been received from Mr. Koebele, from China, Japan, and adjacent countries: of these, I find that only three can be considered as new; but, in fact, the collection of Coccids in the extreme oriental region is