Art. XXXII.—*Description of a Species of* Phreatoicus *from the Surface Waters of New Zealand.*

By Charles Chilton, M.A., D.Sc., F.L.S., Professor of Biology, Canterbury College, New Zealand.

[*Read before the Philosophical Institute of Canterbury, 6th December,* 1905.]

In my paper on the subterranean *Crustacea* of New Zealand published in 1894 (Trans. Linn. Soc., vi), when discussing various questions in connection with the three species of *Phreatoicus* known at that time, I said, "The questions suggested may perhaps be some day solved by the discovery of species of *Phreatoicus* still living above ground in the mountain-streams of the Southern Alps, places where very little search of the kind required has hitherto been made" (*l.c.*, p. 202). I am not sure that the questions under consideration are very much nearer solution now than they were then, and certainly no species of *Phreatoicus* has yet been found among our Southern Alps; but in making the statement quoted I little anticipated that within the next twelve years so many species would be found in other places.

At that time there was known only the one genus, with three species—two found underground in New Zealand, and the third on the Mount Kosciusko plateau, in Australia. Now, thanks to the researches of Mr. G. M. Thomson, Professor Baldwin Spencer, Mr. T. S. Hall, and particularly of Mr. O. A. Sayce, we are acquainted with five species of the genus *Phreatoicus*, and with no less than three other closely allied genera, each with one species. All these additional forms, however, were from Australia and Tasmania, and up to 1902 no surface form had been recorded from New Zealand. In that year, however, Mr. (now Professor) H. B. Kirk brought me specimens of a *Phreatoicus* found in a fresh-water lagoon in Ruapuke Island, in Foveaux Strait. These were exhibited at a meeting of the Philosophical Institute of Canterbury on the 26th November, 1902 (see Proc. N.Z. Inst., xxxv, p. 564), but no description has as yet been published. In the present year (1905) specimens of the same genus were found at Mosgiel, and afterwards at Woodhaugh, both places being near Dunedin. These have been very kindly handed over to me for examination by Mr. G. M. Thomson.

The occurrence of the species at Woodhaugh reminds us how little we really know of the smaller animals even of places that have been fairly well searched, for Mr. Thomson and myself, and probably many others, have made many collections from this locality without coming across the species in question, although it is by no means a particularly small one, some of

the specimens being nearly 1 in. in length. Judging from Mr. Sayce's experience in Australia, it is quite probable that other forms are still to be found from the streams and fresh waters of New Zealand, and I shall be grateful to any collectors who will send me any shrimp-like creatures they may find under stones or in moss in such situations.

From the description given below it will be seen that the species now to be described, though found in surface waters, is a blind one, and that it is whitish in colour, in these respects resembling the two subterranean species occurring in the underground waters of the Canterbury Plains.

Phreatoicus kirkii, sp. nov.

Specific Diagnosis.—General appearance of the body and appendages very similar to that of *P. assimilis*. Eyes not visible. Body rather stout and compact, the segments of the pereion fitting closely to one another; pleura of the 2nd to 5th segments of the pleon largely developed, fully as deep as their segments and concealing the pleopoda, rounded below and with the inferior margin and the lower part of the hind margin thickly fringed with long setæ; 5th segment as long as the 3rd and 4th together; inferior margin of the 6th segment with six curved setæ which increase in stoutness posteriorly, the last being very stout; the projection at the end of the last segment narrower (as seen in side view) than in *P. assimilis*, longer than broad, tipped with two or three stout setæ and bearing also several more slender ones; below this the hind margin on each side is irregularly convex, and bears numerous short setæ of varying degrees of stoutness. Surface of body with a fair number of slender setæ arranged singly or in small tufts, and becoming more numerous posteriorly, especially on the last segment of the pleon. Lower antennæ scarcely half as long as the body; flagellum of about twelve joints, not much longer than the peduncle. Pereiopoda as in *P. assimilis*, rather short and very spiny; the 1st forming in the male a powerful subchelate claw of the same general structure as in *P. assimilis*, but with the anterior produced portion of the meros armed with one stout seta and a few slender ones in place of the thick brush of fine hairs found in *P. assimilis*; 4th pereiopod of male shorter than the 3rd and specially modified. In the female the 1st pereiopod has the subchelate claw much smaller and like that described for *P. typicus*, and the 4th pereiopod is similar to the 3rd. The last three pairs of pereiopoda with the basa considerably expanded. The mouth parts are practically the same as in *P. assimilis*, the lower lip having the lobes rounded, and the inner lobe of the first maxilla bearing only four plumose setæ.

Colour.—Whitish.

Length—cephalon, 2·5 mm.; pereion, 8·5 mm.; pleon, 6·5 mm. Depth—pereion, 2 mm.; pleon, 3·5 mm.

Hab.—Fresh-water lagoon on Ruapuke Island.

The description given above applies to the Ruapuke Island specimens. Those from the neighbourhood of Dunedin differ considerably in general appearance, having the segments of the pereion longer, so that the appendages are more separated, and there are also some minor differences. I was at first inclined to consider them as a separate species, but the resemblances in the appendages are so close, and the differences rather in the proportions of the body—characters difficult to estimate precisely, and perhaps partly due to shrinkage caused by the preserving-fluids used—so that I propose to consider them as a variety.

Phreatoicus kirkii, var. dunedinensis, nov. var.

Differing from the type in having the segments of the pereion rather longer, more slender, and more separated; the dorsal surface of body, especially of the last segment of pleon, with more numerous setæ; pereiopoda more slender, the basa of the last three pairs less expanded.

Colour.—Whitish.

Length—cephalon, 2·5 mm.; pereion, 13 mm.; pleon, 7 mm. Depth—pereion, 2 mm.; pleon, 3·5 mm.

Hab.—Streams at Mosgiel and Woodhaugh, near Dunedin.

Mr. Sayce has laid considerable stress on the proportion of the length of the pleon to that of the cephalon and pereion combined in the various species of *Phreatoicus* and allied genera. If we take the measurements given above and work them out as Mr. Sayce has done we find that in the typical specimens the pleon is $\frac{59}{100}$ of the combined length of cephalon and pereion, while in the variety *dunedinensis* the corresponding fraction is only $\frac{45}{100}$, the difference being thus considerable. Measurements of this kind are, however, not easily made with the same accuracy in all cases, and they vary to some extent in different individuals, and certainly these fractions in the present instance would lead one to think that the specimens from the different localities differ more than they really do.

It will be seen that the present species is very closely allied to *P. assimilis*, and that in the lower lip and the inner lobe of the first maxilla it agrees with this species and with *P. australis* and *P. shephardi*, and differs from *P. typicus*.

In the structure of the last segment of the pleon, and in some other points, it may be considered to be intermediate between *P. australis* and *P. assimilis*.