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with one another nor with the sex, no structural difference is apparent. Now the thoracic dorsum varies greatly; of the seven males, one is clear red (typical *rufa*), one has side-lines just in front of the scutellum, one has side-lines complete but no middle one (this is typical *macrogramma* by comparison with Speiser's full description), one has side-lines and a faint middle one in front, one has all these lines well marked, one has all the lines broad and even confluent at the middle of the disc, and another has the lines reddish but a little dark behind. Of the four females, one is quite immaculate, one has only the faintest trace of the lines in red, one has the lines all present but faint, the last has all present and very strong. The author is quite sure that Speiser's *macrogramma* is a dark-lined form of *rufa*. As regards the two species of Loëw (*rufa* and *lateralis*), some doubt may arise. Loëw evidently had single specimens only (*rufa* is described from a ♀, *lateralis* from a ♂; see B. E. Z. 1874, xliv. p. 194). The main difference appears to be dark flecks in the antennal pits in the latter species and (possibly) less hairy arista. It is impossible to be sure of the true distinctness of these three species, and hence the author considers all the red *Loxoceras* with entirely black third joint to be *L. rufa*, Loëw.

S. RHODESIA: Salisbury and Chirinda Forest (G. A. K. Marshall, Camb. Coll.). NATAL: Durban (F. Muir, Camb. Coll.).

XXI.—*Further Notes on the New Zealand Amphipod Hyale grenfelli*, Chilton. By CHAS. CHILTON, M.A., D.Sc., M.B., C.M., LL.D., C.M.Z.S., Professor of Biology, Canterbury College, New Zealand.

IN May 1916 * I described a new species of Amphipod from New Zealand, naming it *Hyale grenfelli*. The type-specimen, which was the only specimen at that time known, was a male, and was characterized by the peculiar shape of the second gnathopod and by the great dilatation and setose character of the terminal joints of the maxillipeds. I pointed out that it was quite likely that this peculiar development of

* Ann. & Mag. Nat. Hist. ser. 8, vol. xvii. p. 362.

the maxillipeds would be found in the male only, and was probably to be looked upon as a secondary sexual character.

On December 12th, 1916, I received from Mr. C. R. Gow, of the Moko Hinou Lighthouse, a small collection of Crustacea which had been taken between tide-marks on Moko Hinou, a group of islands off the east coast of Auckland, situated about 50 miles from Cuvier Island, where the type-specimen was obtained. Among these Crustacea there are fortunately a few specimens of *Hyale grenfelli*. Most of these are males, showing the peculiar characters in the maxillipeds and the second gnathopod as described. One

Fig. 1.

Hyale grenfelli, ♀. Maxillipeds.

specimen is a female, 5 mm. long, bearing five large eggs in the brood-pouch, and I am therefore now able to describe the characters of the female. In it the maxillipeds (fig. 1), though, perhaps, a little larger than in the majority of the species of *Hyale*, have the terminal joints only slightly enlarged, and not showing the special form nor the numerous long setæ characteristic of the male; the carpus bears one long seta at its outer distal angle and a few on the inner margin near the distal angle, but there are none on the surface of the joint itself; in the propod the inner margin

bears a regular row of long setæ and there are two rows on the surface near the outer distal end, lying more or less parallel to the distal border, and proximal to these there is one short row of four or five setæ and a single seta situated still more proximally; the dactyl is small, very much narrower than the propod, and bears at the end a long, stout, curved seta which is proportionately much more prominent than the corresponding seta on the dactyl of the male. It will be seen that the maxilliped in the female presents the ordinary characters common to allied species of *Hyale*, and that its terminal joints show none of the numerous transverse

Fig. 2.

Hyale grenfelli, ♀. First gnathopod.

rows of long fine setæ on the surface that are so characteristic of the male.

In the gnathopoda the first pair (fig. 2) are, on the whole, similar to those of the male, but more slender; the side-plate is large, produced a little anteriorly, so that it is widest below; the carpus bears a fringe of setæ on its posterior margin, as in the male, the propod is much more slender than the corresponding joint in the male, only widening very slightly distally, and its posterior border bears only a small tuft or short row of setæ near the centre instead of having nearly the whole of the margin fringed with a row of setæ as

in the male. The second gnathopod (fig. 3) is almost exactly the same as the first, but is very slightly larger, and the side-plate differs in being regularly rectangular and not widening below; the other joints of the appendage show no differences from the first worthy of notice.

In other characters the female closely resembles the male.

Nearly all the males are apparently fairly well developed, and show the characters of the second gnathopod and the maxillipeds nearly as originally described. In one which is

Fig. 3.

Hyale grenfelli, ♀. Second gnathopod.

about 5 mm. in length the terminal joints of the maxilliped are rather less expanded and not quite so setose, and in the second gnathopod the propod is not so wide, the palm is more oblique and much less concave, being nearly straight or only slightly concave, and its outer and inner borders are less widely separated; the dactyl, however, is short and fairly stout, almost as in the typical male. Doubtless in still younger specimens of the male these appendages would show the characters of the male to a still less extent and be more like those of the female.