CONTRIBUTIONS TO A KNOWLEDGE OF THE AUSTRALIAN CRUSTACEAN FAUNA.

No. ii.—On *Sacculina*, parasitic upon *Pilumnopeus serratifrons*.

By David G. Stead.

The species treated of in this note—*Pilumnopeus serratifrons*, Kinahan—is very abundant in Port Jackson. It is purely a littoral form, and is common on rocky shores, between high- and low-tide marks, wherever there are boulders, under which it seeks concealment. When disturbed, it has the habit of drawing up its legs close to the body and remaining quite still. This enables it often to escape observation entirely, as its dull-coloured body readily assimilates with the surrounding pebbles and *debris*.

In colour, it is subject to a good deal of variation. Though usually of a uniform dark brown (with the exception of the external portion of the propodos of each cheliped, which is of a lighter hue), specimens are occasionally met with of a dirty-white colour, this latter variety being connected with the former by a series of intermediate mottled forms. The colour seems to depend in some measure upon the animal's surroundings.*

The females arrive at maturity at a comparatively early age, specimens of very small proportions being found carrying ova.

Upon an observer's examining a good number of these crabs, he will most likely come across one or two which will at once

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* This modification of colour to suit surroundings is especially conspicuous in another Port Jackson species—*Leptodius exaratus*—of which there are four varieties, viz., white, red-and-white, black-and-white, and black.

arrest his attention because of the sac-like body—of a yellowish colour—which is to be found attached by a stalk to the sternal aspect of the pleon. This sometimes attracts especial notice, as the parasite is occasionally as large as the body of its host, thereby causing very great inconvenience to the crab when it walks. This parasite is the *Sacculina*, which forms the subject of the present note.

Professor Haswell recorded some years ago, in the Proceedings of this Society,* the occurrence of *Sacculina* on one of our semi-pelagic species—*Nectocarcinus integrifrons*—but, as I shall show, the effect produced in his case is a great deal different from that which I have found in *Pilumnopeus serratifrons*. In *Nectocarcinus*, Prof. Haswell found that only specimens of the male sex were attacked; but in *Pilumnopeus* this state of affairs does not obtain; instead, I find that the parasite appears to be about equally distributed between the two sexes.

A very noticeable feature in connection with this *Sacculina* is, that out of all the specimens of its host which I examined, none were of a large size. From this one would, of course, infer that it has to a great extent (and to a greater extent as it—the parasite—becomes larger) the effect of arresting any further development of the crab which it has attacked. In one case I found the most unusual occurrence of two specimens of *Sacculina* having attacked the same individual. They were both of the same size, and were attached side by side.

Both male and female pleons consist of 7 movable segments, the only difference being that in the female this portion is considerably wider than that of the male.

Quite contrary to my expectations, neither the pleons nor the abdominal appendages of either sex are in any way affected by the parasites. This in itself stamps the present case as being considerably different from that memorable one described by Prof. A. Giard† and the before-mentioned case of *Nectocarcinus integ-*

† P.L.S.N.S.W. (2), Vol. ii., 1888.

‡ Parasitic castration and its influence upon the male sex in the Decapod Crustacea." Ann. Mag. Nat. Hist. (5), Vol. xix. pp. 325-345, 1887.

rifrons as recorded by Prof. Haswell. Prof. Giard, in speaking of a *Sacculina* parasitic upon *Stenorhynchus phalangium*, says:—"In the infested females the influence of the parasite . . . betrays itself externally by a profound modification of the 4 pairs of ovigerous feet. These are very inferior in size to the normal state."

As before stated, in the present case no such modifications as the foregoing have taken place.

In some specimens there was a slight difference in the form of the pleon. This unimportant difference, consisting as it did of a slight narrowing, could not in any way be attributed to the parasite, as the same could be found in specimens which had not been attacked by the *Sacculina*.

As would be expected, it is quite evident that the parasites prevent their hosts from reproducing their young, as no signs of ova were to be seen on attacked females, although at the time that I procured my specimens it was the breeding season, and many *ovigerous* females could be found roundabout.

As will be seen by referring to the following 12 examples taken indiscriminately, the parasites do not always attack the same part of the pleon, nor do they favour especially either sex.

Sex.	*Diam.*	*Situation of Sacculina.*
♀	11 mm.	On right side of intestinal canal under 3rd segm. (Same width as host.)
♂	11 ,,	On right side of intestinal canal under 5th segm.
♀	5 ,,	Middle of intest. canal under 3rd segm.
♀	8 ,,	,, ,, ,, ,, 4th ,,
♀	8 ,,	,, ,, ,, ,, 4th ,,
♂	— ,,	This *had been* attached to the junction of pleon and pereion, but had been dislodged—whether by its host or accident, I know not—before the crab came into my possession.
♀	1 ,,	On left side of intest. canal under 4th segm.
♀	6 ,, / 6 ,,	Both together on the middle of intest. canal under 3rd segm. These two *Sacculinæ*—as larvæ—must have gone "hand-in-hand," as they were both attached to same spot, and were also of the same size.

Sex.	*Diam.*	*Situation of Sacculina.*
♀ ...	6 mm. ..	Middle of intest. canal under 3rd segm.
♂ ...	7 ,, ...	,, ,, ,, ,, 3rd ,,
♂ ...	1 ,, ...	On left side of intest. canal under 4th segm.
♂ ...	1 ,, ...	Middle ,, ,, ,, ,, 5th ,,

Though quite able to reach it with their chelæ, the crabs never seem to interfere with the *Sacculina*, apparently regarding it as a part of themselves. Only by repeatedly wounding the parasites, have I succeeded in making their hosts interfere with them, and in one instance the crab pulled so hard that he completely dislodged the *Sacculina*, thus showing that, in some instances at least, it would be possible for the crab to remove the parasite, if driven to it either by irritation or any other cause.