METHODS

Using flexible preserved specimens, one part of the body was moved against another. Initially observations were made in air, and the sounds noted, but were repeated upon specimens placed in water and sounds were recorded by hydrophone on a tape recorder (speed $7\frac{1}{2}$ in./sec.). The hydrophone employed ("Fish Fone" by Engineering Research Corp., Shreveport, Louisiana) did not permit high fidelity recordings, particularly in the high frequencies, but proved adequate for present purposes.

Recording conditions were kept as constant as possible throughout, including distance of source from hydrophone (*c.* 2cm), and both tone and volume controls of the tape recorder. Recordings were converted into Sonagraph records by a standard procedure (half speed tape, Sonagraph frequency setting 85r to 6K, shaping switch HS, narrow band selector) at standard levels of record reproduction (10) and mark level ($7\frac{1}{2}$). Recordings were calibrated with an oscillator.

In spite of the attempts at constancy, it was impossible to eliminate variations in (a) the speed of the plectra moving over the rasps, and (b) the pressure between the engaging surfaces. Retrials on the same specimen showed these particularly affected the clarity of the pulses as analysed by the Sonagraph. Hence too detailed comparisons of the Sonagraph records were not made and only a selection is given below (see Pl. 1). False echoes from the walls of the container could have caused additional obscuring of the pulses, but were probably of minor importance because of the close proximity of the hydrophone to the sound source.

In one case (*O. georgei*) only type material with mostly inflexible joints is available, and some of the conclusions are drawn directly from structural features, following the method of Guinot-Dumortier and Dumortier (1960).

Throughout the investigations "natural" or "unnatural" movements were noted.

The general approach below is to list the individual engagements producing sound in a given species; in most cases an imposing list results. Simultaneous or sequential engagements which give a more realistic concept of the true range of stridulating possibilities, are then listed.

THE *O. punctatus* SUBGROUP

A. Large males of *O. australiensis*

Several cheliped structures which bear either striae or granules can act as moveable rasps, and produce sounds when engaged by several plectra on the walking legs. In addition several carapace structures produce sounds when different parts of the chelipeds move across them, with the cheliped areas sometimes acting as moving rasps and sometimes as moving plectra. In some cases because both cheliped and carapace structures are granular, they appear to act simultaneously as rasps. In describing cheliped/walking leg engagements it is convenient to list rasps and plectra, but for cheliped/carapace engagements it is simpler to list stationary and moving structures.

I. Cheliped/walking leg engagements

(a) *Rasps on cheliped* (Fig. 1A)

(i) The conspicuous striae on the under surface of the palm (Fig. 1A–a) merge distally into a granular area (Fig. 1A–b), and the two areas are best considered as a unit.

(ii) The above merge into rows of granules on the immovable finger (Fig. 1A–c) but these are conveniently considered as separate.