

REVIEW OF THE RISSOIDAE OF NEW SOUTH WALES.

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(Figures 1-94.)

INTRODUCTION.

This paper, the second of a series reviewing some of the families of New South Wales mollusca, is based primarily on the collections made by my son John and myself during the last twenty years. When Hedley published his check list in 1917 it was thought that the work of the systematist was nearly completed and that comparatively few species awaited discovery and naming. Since that time, nevertheless, the list has been appreciably enlarged, partially by checking known material, but particularly from new material brought in by trawlers operating on the continental shelf. Even from easily accessible locations on the shore systematic collecting has revealed that a far greater molluscan fauna exists than was ever suspected. This applies particularly to the smaller species which, though often of quite striking character, have in many cases been overlooked. Size is, after all, relative, and actually the species of small shells, say under 5 mm. in length, greatly outnumber those of larger size, while the number of individuals must be very much greater. Thus when the broader problems of marine zoology are considered, the relative importance of minute molluscs must at least be as great as, if not greater than, those of more conspicuous size.

Minute size makes study perhaps a little more difficult, but the student of small shells is fortunate in one way. In the early days of collecting very few found their way abroad, and they have thus escaped the involved synonymy which so obscures the identity of many of the larger species. Most of the known species have been described locally, and the literature and types are accessible to the local student. The contributions of such men as May, Tate, Charles Hedley and others to Australian scientific journals have been most carefully compiled and are of great accuracy. The work of the late Charles Hedley particularly is so clear, careful and accurate that it is a magnificent foundation on which to build.

The chief limitation in the past has been that most of the small material dealt with has been collected from shell sand from the beaches. This, though not without value, is at times worn and faded, and specimens are found in ones and twos instead of in colonies as when procured alive. One can go farther and say that with some groups beach material is practically unidentifiable, yet the same when found alive present very little difficulty at all.

In this paper live material has been dealt with wherever possible. A fruitful collecting ground has been the various algae abundant in rock pools right along the coast. These, if washed in fresh water, yield myriads of small shells which can be sorted out with a lens from the debris. The bottoms of rocks when scrubbed into a basin yield a further harvest, as do also masses of mussels, broken galiolaria tubes, the surface of sponges, and so on. Deeper water material has been obtained by dredging, also by the examination of mud and sand brought up by trawlers from the continental shelf. For the latter I am particularly indebted to Mr. T. Nielsen, of Crookhaven, who has for some time regularly sent me parcels of material so obtained. Though only a small proportion of dredged material is obtained alive, on the whole it is in much better condition than that found on the beach. Even for shore species

it has been found more profitable to dredge in very shallow water adjacent to the beaches and rocks than to rely on what is washed up by the tide.

The limitation of this paper to New South Wales is deliberate, as has been the determination to keep the limits of collecting within this area. The coast of New South Wales has long been considered a distinct zoogeographical province, separable on the one hand from the tropical waters of the Queensland coast, and on the other from the southern shores of Australia by the isthmus which until recently connected Tasmania with the mainland. With the east coast of Tasmania there is much closer relationship, and many zoologists have considered that these two areas should be merged into one province. A check of the species dealt with here rather strengthens this viewpoint. Hedley allowed 49 species under Rissoidae in his check list. This list is now raised to 95. Of these, 33 are described as new, but it is possible that the range of some of these will be later extended to Tasmania. Of the remainder, 36 species are so far found to be common to both areas, and these include many of the commonest and most typical forms.

Though a large number of new species and records is now added to the list, it is doubtful if this is yet nearly complete. The day of the systematist is not ended, for only when the lists are practically completed, and all the species identified and named, can the more important research be properly undertaken. Such questions, therefore, as comparative anatomy, life history, evolution and ecology are still largely problems for future study and solution.

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TYPES.

All specimens illustrated, in addition to the types of new species, have been presented to the Australian Museum.

FAMILIES AND GENERA.

Under Rissoidae is here included a rather heterogeneous assemblage of forms, between many of which there will probably ultimately be found but little relationship. For the purpose of a review of species, Hedley's New South Wales check list has been used as a basis, and all genera there included under Rissoidae have been dealt with. In a recent paper on the Australian Rissoidae, B. C. Cotton (1944, p. 286) has pointed out that *Rissoina*, *Rissolina* and *Stiva* are now recognized as belonging to a separate family, the Rissoinidae, while *Diala* goes to the Litiopidae and *Cithna* to the Cyclostremidae. Probably as knowledge grows a further regrouping of genera will be necessary.

Owing to the generally simple form of the shell, shell characters alone are sufficient for little more than specific determination, and questions of true genetic relationship are largely undecided. Even the selection of generic names for Australian rissoids is still a major problem. Certain groupings seem fairly natural, and as long as this is regarded as tentative and a matter of convenience no great harm is done. Throughout the world a multiplicity of genera have been introduced, but attempts to correlate