

A Triassic Echinoid from New Zealand

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RECENTLY some fragmentary remains of a Cidarid were discovered in Triassic strata in Nelson. These represent an undescribed genus and also constitute by far the oldest echinoid remains so far known from New Zealand. The material comprises internal and external natural moulds in indurated argillite. It was collected by Mr H. W. Wellman, of the New Zealand Geological Survey, and submitted to me through the courtesy of Dr J. Marwick.

Order CIDAROIDEA Duncan

Family CIDARIDAE Gray

Dicyclocidaris n.g.

Cidarids of medium size, in which the larger interambulacral plates possess two concentric rings of scrobicular tubercles; the outer ring demarcating the boundary of the scrobicule, and the inner ring well within the margin, separated by a greater or lesser interval from the outer. Ambulacral border of the interambulacral plates denticulate. Tubercles perforate, strongly crenulate.

D. denticulata n.sp.

Dimensions: horizontal diameter ca. 20 mm., height ca. 12.5 mm. (estimated from cotype, a broken internal mould). Probably 7 or 8 interambulacral plates to each vertical series.

The holotype constitutes an external mould of four interambulacral plates which seem to comprise the proximal half of a natural series. The description and photographs (Figs. 1 and 2) are taken from positive casts made from the moulds, Fig. 1 being part of the holotype specimen.

Scrobicules shallow, circular on the larger plates, transversely oval on the smaller proximal ones. Scrobicules of the proximal plates confluent, reaching to both the proximal and distal borders of the plates; on the larger plates, no doubt from the ambital region, the scrobicules reach only to the proximal border of each plate, where they are slightly truncated. Tubercles large, prominent, standing well above the general level of the scrobicule, each with about 12 crenulations. Scrobicular tubercles of the outer ring numbering ca. 16 on an ambital plate, and the inner ring comprises about the same number. The inner ring may be separated from the outer ring by an interval only as wide as one scrobicular tubercle, as in the holotype (Fig. 1), or the inner ring may lie midway between the outer ring and the base of the parapet, as in a cotype (Fig. 2). Both scrobicular rings are interrupted by the truncation of the scrobicule at the proximal margin. Tuberculation outside the scrobicule not well preserved, but apparently similar to the scrobicular tubercles in form and size, but irregu-

larly arranged and less distinctly differentiated. The ambulacral border of each interambulacral plate bears on its inner surface 6 or 7 denticulations (Fig. 3, from an internal natural mould).

Ambulacra, peristome, periproct, apex and spines unknown.

Locality: Wai-iti Survey District, Nelson, east side of Castle Hill. Grid reference S20/427097. G.S.4560.

Horizon: Carnic (upper Triassic).

Type and Cotypes: In the collection of the Geological Survey Office, Wellington.

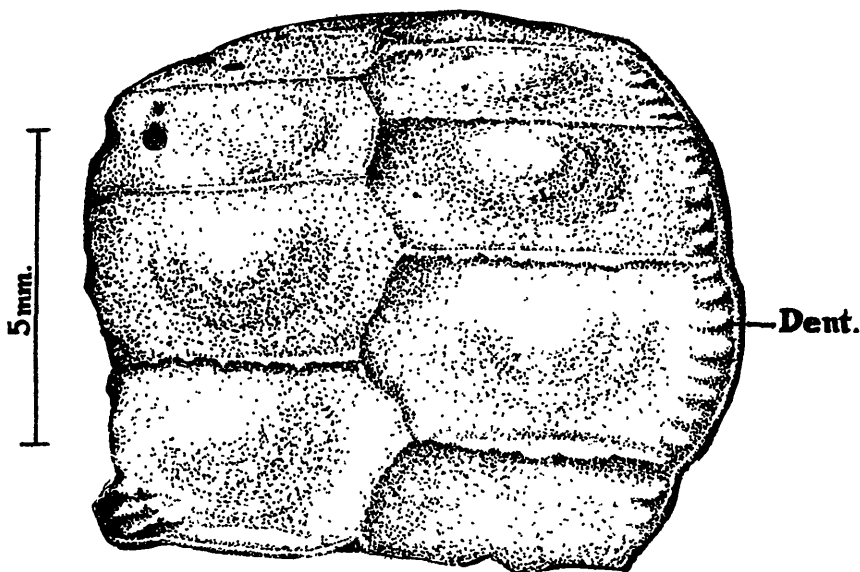


FIG 3—*D. denticulata*, another cotype, an internal natural mould of part of an interamb. showing impressions (Dent.) left by the denticulate edge of the ambulacral margins of the plates. The ambulacral margins of the left column of plates have been eroded away.

DISCUSSION

No Triassic Cidaridae are known from Australia. The oldest Cidarid from that region is "*Cidaris*" *comptoni* Glauert (1923), from the Cretaceous of Western Australia. This species, whatever its real generic position may be, is certainly unrelated to *Dicyclocladaris*, as the structure of the two forms is not at all comparable.

Of the three subfamilies of Cidaridae recognized by Mortensen (1928), two, namely the Stereocidarinae and Diplocidarinae, are unknown prior to the Jurassic. The remaining subfamily, the Streptocidarinae, ranges from Lower Carboniferous to the Lias in Europe and North America. The special feature of the Streptocidarinae is the imbrication of some of the plates. The material of *Dicyclocladaris* so far obtained is insufficiently complete to determine the presence or absence of this condition. What does appear to be highly significant, however, is the fact that the ambulacral margins of the interambulacral plates are denticulate. This is one of the diagnostic characters of

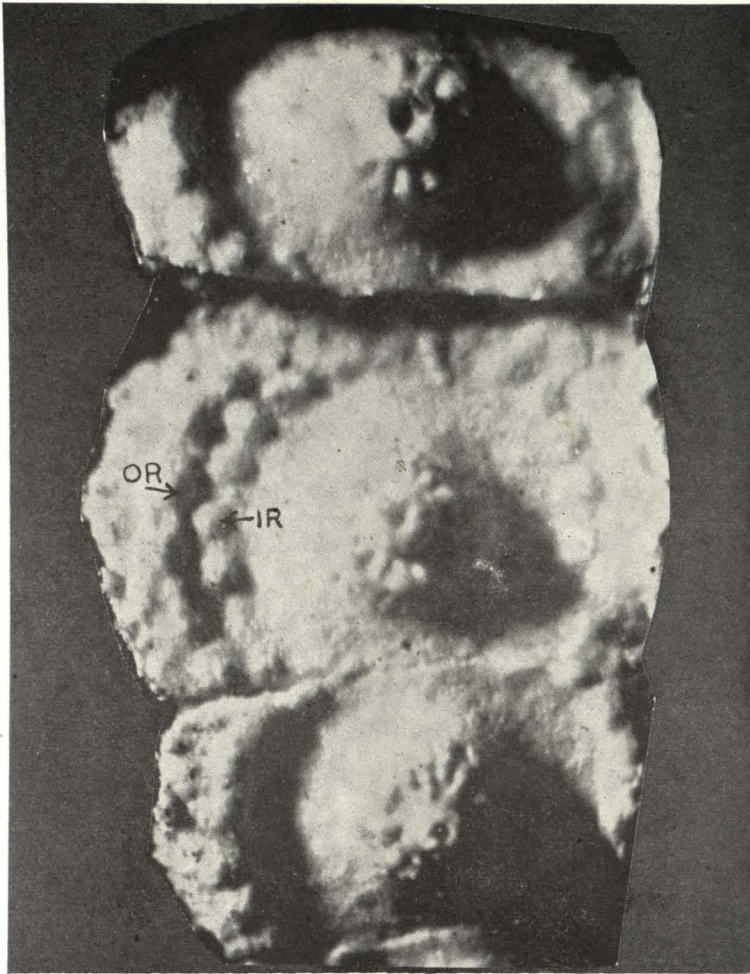


Fig. 1.

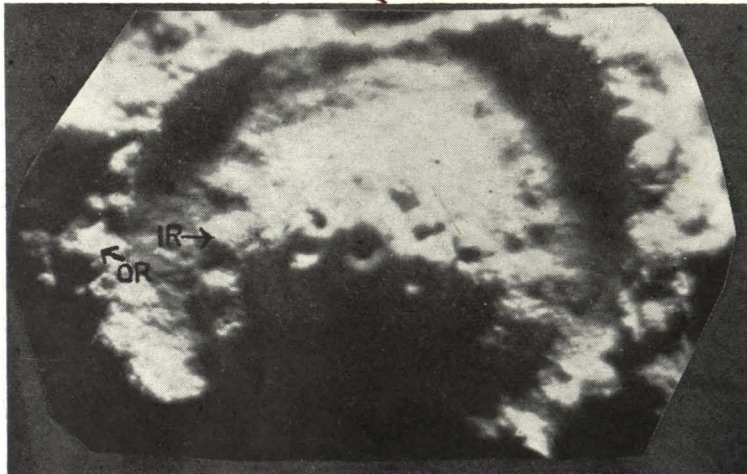


Fig. 2.

FIG. 1—*Dicycloclidaris denticulata*, holotype specimen, OR, tubercle of the outer scrobicular ring; IR, tubercle of the inner scrobicular ring. Positive impression taken from original negative external mould. Lower border proximad.

FIG. 2—*D. denticulata*, cotype specimen, showing the inner scrobicular ring relatively further within the margin; abbreviations as for Fig. 1. Positive impression taken from original negative external mould.

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Miocidaris, a genus of Streptocidarinae typical of the Triassic of Europe and North America. There is also a further important parallel between *Dicyclocidaris* and *Miocidaris*. With only one exception, the Cidarids did not develop crenulated tubercles until the Jurassic. The exception is *Miocidaris*, which already had the crenulation developed in the Triassic. To this we must now add *Dicyclocidaris*. The evidence would thus point rather strongly in favour of grouping *Dicyclocidaris* with *Miocidaris* in the Streptocidarinae.

The two genera are mutually distinguishable by the fact that the scrobicular tubercles are monocyclic in *Miocidaris*, dicyclic in *Dicyclocidaris*. Dr Th. Mortensen, of the Copenhagen University Museum, who has examined photomicrographs of the interambulacral casts, makes the following interesting comment on the possible meaning of the inner ring of tubercles, so foreign to the usual conception of Cidarids (private communication, 28/3/48): "I cannot help thinking of *Porocidaris*, with a circle of pores inside the scrobicular ring. Just as these pores in *Porocidaris* are no true pores, I think the inner series of tubercles in your Cidarid are no true tubercles, viz. not spine-bearing, as are the scrobicular tubercles, but only a peculiar structure within the areole. From my knowledge of the Cidarids I should think it impossible that there could have been a circle of spines inside the normal circle of scrobicular spines, these latter lying always directly as a cover of the muscle of the primary spine. I think you have here a new genus forming a close analogy to *Porocidaris*."

If the foregoing discussion is a correct interpretation of the fossils, then it seems that the following conclusion may legitimately be made. As early as the Triassic the echinoid fauna of the New Zealand region contained an element which, although at the equivalent evolutionary stage to that occurring contemporaneously in Europe and North America, nevertheless showed a distinctive Zealandic character of at least generic value. Whether this Zealandic character could more correctly be described as Australasian cannot be determined until something is known of the Triassic Cidaridae of Australia.

REFERENCES

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- MORTENSEN, TH., 1928. *Monograph of the Echinoidea*, 1.