

NEW GENERA OF TERTIARY ECHINOIDS FROM VICTORIA, AUSTRALIA.

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INTRODUCTION.

Through the courtesy of the National Museum of Victoria the following material was made available for study and for comparison with Tertiary echinoids from New Zealand. It proved to represent an undescribed genus of Temnopleuridae from the Batesfordian stage, and an undescribed genus of Brissidae from the lower Aldinga beds. The type specimens are in the National Museum of Victoria. I am grateful to Mr. M. D. King for the photographs in Plates 1 and 2, to Dr. J. Marwick for information on age correlation, and to Mr. Edmund D. Gill for his many kindnesses in connection with these and related studies.

Order TEMNOPLEUROIDA.

Family TEMNOPLEURIDAE.

IRENECHINUS gen. nov.

Small forms of hemispherical shape. Pore-pairs in a vertical series. Primary tubercles, and many of the larger secondary tubercles, crenulate; all tubercles imperforate. Radiating series of secondary tubercles surround the primaries, tending to form zig-zag series on the interambulacral mid-zone. Apical system regularly dicyclic. Gill-slits small, indistinct. Spines unknown.

Type species: *I. hentyi*.

Irenechinus hentyi sp. nov.

Plate 1.

Height, 8.5 mm.; horizontal diameter, 15.0 mm.; peristome diameter, 5.0 mm. Apical system lost, but its regularly 10-lobed outline is preserved by the adjoining plates, indicating that it is dicyclic with all the oculars exsert.

Ambulacral plates 13 in each series, each carrying one primary and numerous secondary tubercles. Interambulacral plates 11 in each series, each carrying one primary and numerous secondary tubercles.

Ambulacral sculpture.—The pore-pairs are oblique, not on distinct depressed oval areas, but separated by transverse ridges of epistroma, one such ridge curving round the upper margin of each successive pore-pair. The ambulacral mid-zone is traversed by a double zig-zag series of secondary tubercles, about six tubercles in each oblique row, all more or less fused into a continuous ridge. The primary tubercles, which are imperforate and almost spherical, form vertical series on either side of the amb, immediately adjacent to the poriferous zone. They form a well-marked vertical row in conjunction with secondary tubercles, of which two or more lie between each successive primary; they do not form a distinct vertical ridge. Very little test is visible between the crowded secondaries, but what can be seen is smooth.

Interambulacral sculpture.—Each primary tubercle is surrounded by a radiating system of about 10 ridges, usually arranged so that there are two vertical ridges above (communicating with the next primary), two similar ones below (communicating with the adjacent primary), and three on either side (each communicating with a ridge which lies between the adjacent pore-pairs of the ambulacra). The arrangement described is that on the ambital plates, but it persists with little alteration almost to the apex. The ridges are made up of secondary tubercles, more or less fused together. The ridges which lie on either side of the primaries tend to form a double zig-zag row, and this is especially apparent in the interambulacral mid-zone, and is accentuated if there happen to be four transverse ridges to a primary instead of three. The general effect is that of short strings of pearls, sewn onto plain material, to form the pattern described.

Holotype: Specimen P16409 in the collection of the National Museum of Victoria.

Locality: Batesfordian *Lepidocyclina* limestone, below A. Henty's house "The Caves", on Grange Burn, west of Hamilton, Victoria, collected and presented by E. Henty Jr., April 1955. The formation is the Bochara Limestone.

Horizon: Lower Miocene, about equivalent to the New Zealand Lower Southland stage (J. Marwick).

Remarks: *Irenechinus* is related to *Brochopleurus*, with which it shares the radiating arrangement of ridges formed by numerous secondary tubercles around the primary tubercles, and the vertical series of pore-pairs. It differs from *Brochopleurus* in having distinctly crenulate tubercles, and a tendency to zig-zag

series of tubercles in the interamb. *Irenechinus* resembles *Paradoxechinus* in having such zig-zag series, though they are more distinct in *Paradoxechinus*, but differs from that genus in having scattered secondary tubercles, and in the crenulation of the tubercles. *Irenechinus* resembles both *Brochopleurus* and *Paradoxechinus* in having a regularly dicylic apical system. indistinct gill-cuts and imperforate tubercles.

Order SPATANGOIDA.

Family BRISSIDAE.

GILLECHINUS gen. nov.

Test of ovoid outline, convex above and below, of moderate size; apex subcentral, slightly anterior; peristome crescentic, anterior; periproct vertically ovate, placed on the vertically truncate posterior margin of the test; vertex posterior. A peripetalous fasciole, not cutting the petals, and a subanal fasciole, transversely reniform; no anal fascioles. Apical system ethmolytic, four genital pores. Frontal ambulacrum very shallow, frontal notch very faint. Paired petals somewhat depressed, extending more than midway to the ambitus. Interamb. all somewhat inflated above, the paired interamb. carrying a conspicuous group of primary tubercles on each posterior column of plates, the primary tubercles confined within the peripetalous fasciole; no primary tubercles on the posterior interamb. Plastron completely tuberculated, the tubercles arranged in a fan-like group of lines radiating from the posterior keel of the plastron.

Type species: *G. eudmorei*.

Gillechinus eudmorei sp. nov.

Plates 2 and 3.

Dimensions of holotype: Height, 30 mm.; length, 55 mm.; breadth 51 mm.

Ambulacra: the petals are well developed, only the adapical 4-6 pore-pairs rudimentary, both series equally developed in each petal, the petals scarcely closing distally. There are twenty fully-developed (plus several rudimentary adapical) pore-pairs in each series of the anterior petals, and about nineteen fully-developed (plus several rudimentary adapical) pore-pairs in each series of the posterior petals. The pores are feebly conjugate, mainly because the distal margin of each amb-plate is slightly depressed. There is no ridge between successive pore-pairs, instead a broad, flattened rectangular area on which several small

miliary tubercles occur, in an irregular transverse series five to seven, with occasionally a secondary tubercle among them. The pores of the inner and outer series of both anterior and posterior petals are sub-equal. The peripetalous fasciole passes just distal to the ends of the petals; it is narrow, and rather indistinct over parts of its course, but reaches to the anterior ambulacrum.

Interambulacra: Fine secondary tubercles are scattered rather evenly over the whole aboral surface, but the enlarged primary tubercles of the paired interamb. are so conspicuous as to make the rest of the surface appear relatively naked. There are about twenty primaries in the anterior interamb., all restricted to the posterior column of plates within the peripetalous fasciole; in the same relative position in the posterior paired interamb. occur some 22 primaries. The primaries are arranged in several series parallel to the transverse axes of the plates which bear them, and in each row the anterior members are smaller than the posterior.

Apical system and subanal plastron and fasciole: as in the generic diagnosis.

Peristome, periproct and plastron all broken in holotype (see however paratypes mentioned below). Spines unknown.

Holotype: Specimen P16022 in the collection of the National Museum of Victoria.

Locality: Lower beds, Aldinga, South Australia, coll. F. A. Cudmore.

Horizon: About upper Eocene (Glaessner).

Paratypes: Two specimens from the type locality. One of these (P16023) is a complete test, but has lost the characteristic sculpture of the upper surface. It shows however that the periproct is vertically ovate, placed in a slightly depressed area on the vertically truncate posterior margin of the test, and that no trace of anal fascioles occurs (the holotype is well-enough preserved in this region to prove the absence of anal fascioles); and that the peristome is transversely crescentic, the plastron being fully tuberculated. The paratype P16023 is illustrated in Plate 3; it measures, length 48 mm.; breadth 46 mm., and height at vertex 26 mm. A third specimen (P16021) is incomplete, but suffices to show that the species reached a larger size than the holotype, perhaps half as large again (though no precise measurements can be given).

Remarks: In Mortensen's (1951) *Monograph*, this material has no place in the key to genera, since only *Eupatagus* matches the genus; but this latter differs from *Eupatagus* in several respects, notably in the arrangement of the primary tubercles, which are like those of *Plagiobrissus*, and in the indistinct closure of the petals. The whole aspect of *Gillechinus* matches that of *Plagiobrissus*, not *Eupatagus*, yet it differs markedly from *Plagiobrissus* in the complete absence of the anal fascioles, in the conspicuous breadth of the posterior amb on the oral side, and in the bilobed reniform subanal plastron (which is shield-shaped, and not bilobed, in *Plagiobrissus*). *Gillechinus* is unknown outside Australia, though some superficially similar Tertiary species occur in New Zealand; these latter species, however, have an internal fasciole, and cannot be referred to the Brissidae.

REFERENCE.

Mortensen, Th. 1951.—A Monograph of the Echinoidea, 5 (2), Copenhagen.

CAPTIONS FOR PLATES 1 AND 2.

Plate 1.—Above, *Irenechinus hentyi* n.g., n.sp. holotype P16409, detail of amb, on left and of interamb on right, near the ambitus, X 12. Below, *Gillechinus cudmorei* n.g., n.sp., holotype P16022, in aboral aspect, X 2.
Photo M. D. King.

Plate 2.—*Gillechinus cudmorei* n.g., n.sp.: Above, paratype P16023, in aboral aspect, X 2. Below, holotype P16022, in lateral aspect, X 2.
Photo M. D. King.

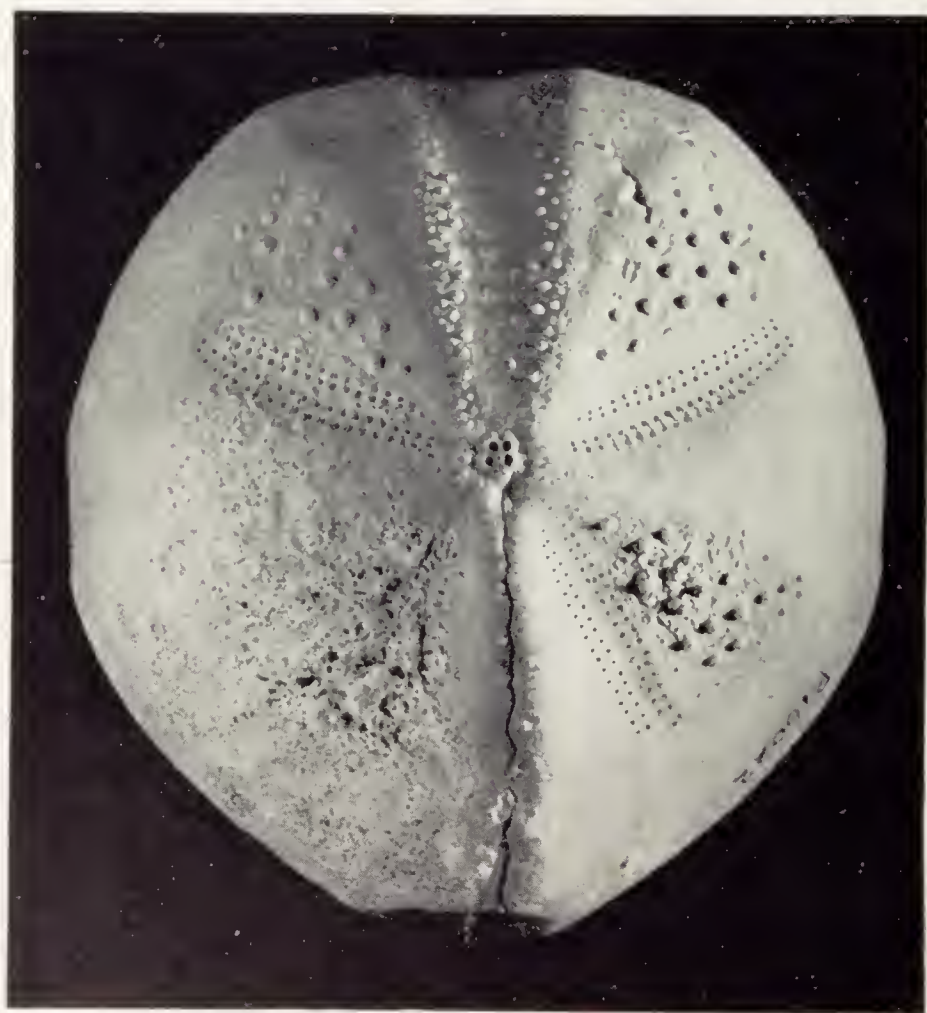


PLATE 1.

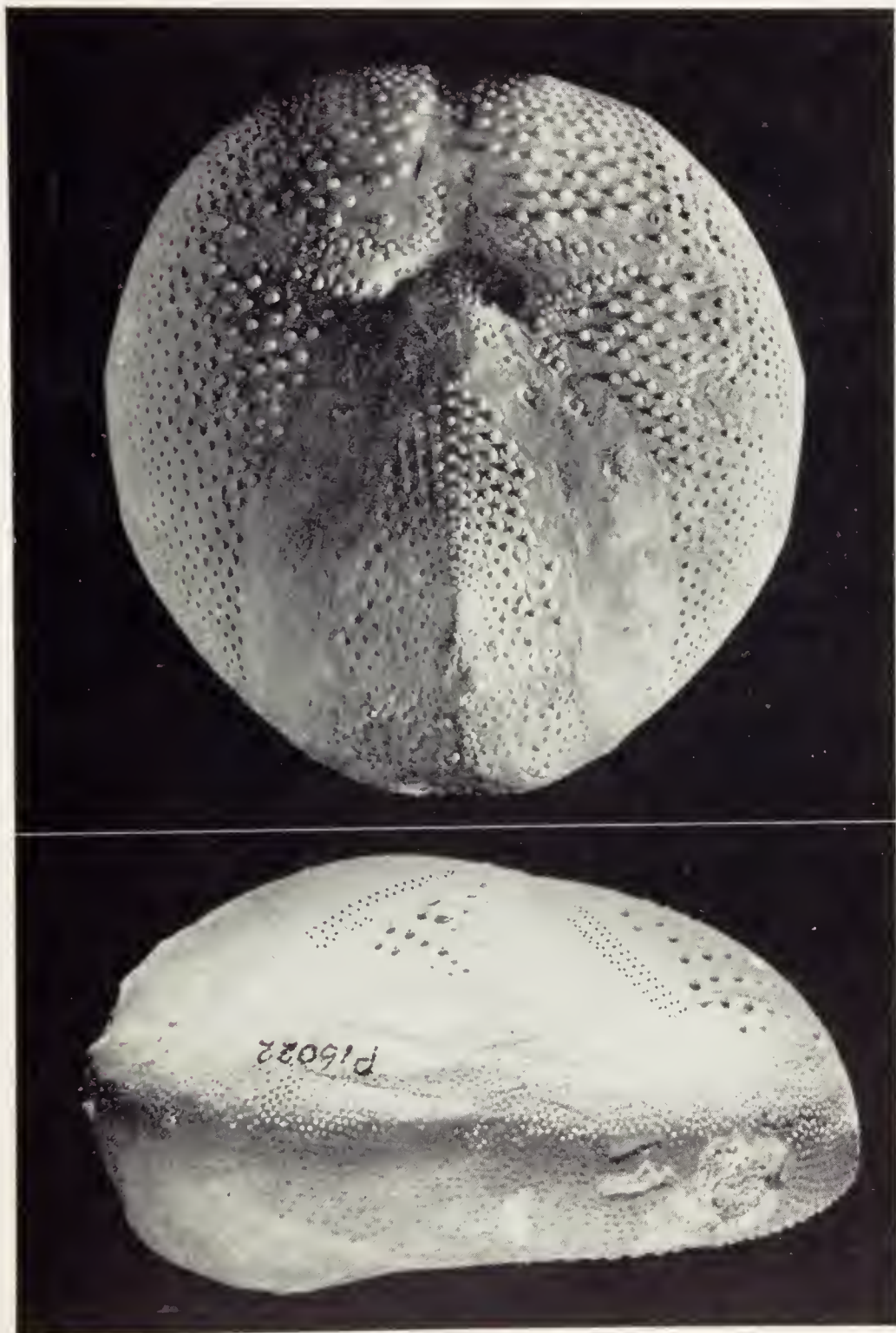


PLATE 2.