

5. Note on the Number of Anal Plates in *Echinocidaris*. By F. JEFFREY BELL, B.A., Magdalen College, Oxford, Zoological Department, British Museum, F.Z.S.

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If any one anatomical fact was thought to be certain with regard to the Echini, it was the presence, as a constant mark of differentiation, of four plates and four plates only in the anal region of the species of the genus *Echinocidaris*. Thus not only does the diagnosis of Desmoulins (1835) include the words "pièces terminales anales au nombre de quatre seulement," and that of Gray (1835, *Arbacia*) "anus valvis quatuor spiniferis tectus," but the definition given by Prof. Alex. Agassiz¹ of the family Arbaciadæ states among other characters that "the anal system consists of only four large triangular plates." Prof. Troschel, in an elaborate article on the genus², exhibits not the slightest doubt as to the validity of this character, and expresses himself in the following words:—"Das Periproct ist durch vier dreieckige Platten geschlossen"³. In a later publication than his 'Revision' (in the Zoological Results of the Hassler Expedition⁴), Prof. Alex. Agassiz sounds the first inharmonious note. Troschel (so certain was he of the great value of these four anal plates) had, on account of the presence of five anal plates in some *Parasalenia*, separated them from the Echinocidaridæ, in which family, as he imagined, Agassiz had placed them. Roused, apparently, by his criticism, the American naturalist took the opportunity afforded him by the arrival of additional specimens of *E. dufresnii* to point out "that it is quite remarkable that in the few specimens existing in the British Museum and in our collection, there should be two specimens having five anal plates instead of the normal number of four in the other species of the genus"⁵. As there are two specimens in the British-Museum collection in which there are five anal plates, and as, on the other hand, the collection made by Dr. Cunningham, "of quite a number of specimens," passed, as Prof. Agassiz informs us, through his hands before the 'Revision' was published, and that without the peculiarity in question being there noticed, it would be possible to read the (not too perspicuous) sentence which I have just quoted in any one of the three following ways:—

(1) Both the specimens referred to are in the British Museum; (2) neither specimen is in the British Museum; or (3) there is, to Prof. Agassiz's knowledge, one specimen in each of the collections mentioned. I am inclined to think that this last construction is the one which the words were meant to bear; and I am supported in this belief by the difference between the two specimens from Dr. Cun-

¹ Revision of the Echini, p. 399 (1872-1874).

² Archiv für Naturgeschichte, xxxviii. p. 293, xxxix. p. 308.

³ *Op. cit.* xxxviii. p. 298.

⁴ Illustrated Catalogue, Mus. Comp. Zool. viii. p. 6 (1874).

⁵ Cat. M. C. Z. viii. i. p. 6.

ningham's collection, one of which bears evident marks of having undergone examination.

It is obvious that the question could not be left in this state. It seemed now necessary to see how far the number of anal plates varied in various species, and whether the character in question had not been definitely attained to by this species only, or whether in other species also there was at times a return to the possession of the large number of plates which are so commonly found in nearly all Echinida.

With this object in view, I have examined all the specimens of the genus *Echinocidaris* in the Museum; and the accompanying Table will, I think, show that the work was worth the doing. In addition to the nine specimens here noted, there is a specimen of *E. pustulosa* ("grandinosa") in which only three plates are present: one of these is very small; and it is also evident that two have dropped away. I have been enabled to examine some fifty-four specimens in which the anal plates are preserved; and the "number of specimens" in the following list gives the number of specimens in the set from a given locality or collection.

Name of species.	Locality.	No. of specimens.	Varieties.
<i>E. dufresnii</i>	Port Otway.	5	One with five anal plates.
"	Shell Bay.	3	One with five "
"	Sandy Point.	1	One with three "
"	Otter Islands.	1	One with three "
<i>E. stellata</i>	?	1	One with five "
<i>E. nigra</i>	Coquimbo.	1	One with five "
" (or sp. closely allied)?		10	One with six "
"	?	1	One with ten "
"	?	8	One with three "

In the three specimens of *E. dufresnii* and the one specimen of *E. pustulosa* (juv.) received from the 'Challenger' Expedition, the number of anal plates is normal.

With regard to this Table we have to note (1) the reduction of the plates below the normal number, as obtaining in three specimens not all of the same species; (2) that the specimen of *E. pustulosa* (*grandinosa*) already referred to, and that of *E. nigra* from Coquimbo prevent our limiting the possession of five plates to *E. dufresnii*; while the specimens with six and with ten plates are most remarkable, inasmuch as in both cases there are two plates which retain the proper Echinocidarid character. No normal specimen seems yet to have been observed so young as not to have attained its four anal plates. In conclusion I think it well to abstain for the present from any speculation on the matter, and shall be satisfied if I direct the attention of echinologists to the point in question.



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