

SHORT COMMUNICATIONS

UNUSUAL PATTERN PRESERVATION IN A LIASSIC AMMONITE FROM DORSET

by E. C. MANLEY

ABSTRACT. Regular colour markings on a specimen of *Asteroceras stellare* (J. Sowerby) are compared with the tuberculation known within this species.

A FRAGMENT of an ammonite collected from fallen material on the beach below Black Ven, Dorset, by C. J. Burnell was found, on examination, to show unusual colour markings. It has been deposited with the British Museum (Natural History), Registered Number C 79624. The specimen is an internal cast of the body chamber of an *Asteroceras stellare* (J. Sowerby). It must have come from within the Stellare sub-zone (Obtusum Zone) of the Sinemurian, and can probably be ascribed to the Stellare Nodule Band, or close to it (i.e. bed 88f of Lang 1926, p. 158). The infilling is a dark-grey limestone. The specimen has become flattened considerably on one side, with fracturing along the keel. The flattened side is covered with fibrous calcite, and removal of this showed that the surface of the shell has become destroyed by the crystal growth. Traces of the inner whorls, preserved in brown sparry calcite, are grossly distorted. A little pyrite is present along the keel. The ratio between the adoral width and height of the whorl suggests that some flattening of the relatively undistorted side has also occurred, although there is no visible damage.

The specimen is slightly worn, but most of the surface is still covered by a thin, dark brown, calcareous coating which retains a weak nacreous lustre towards the ventral shoulder, and elsewhere displays a brown, finely granular gloss. This brown layer bears a reticulate pattern of dark spots, which are almost black. These are slightly elongated parallel to the periphery, and a few of the best preserved (near the venter) show a central zone which is slightly lighter than the border. In these areas of best preservation there is pigmentation between the spots, forming darker peripheral lines against the brown background. At their maximum development, these spots are 1.5 mm wide (radially to the whorl), and 2.0 mm long, whilst the greatest spacing between the sets of spots is 6.0 mm radially, and 5.0 mm in the growth direction.

Reference to the collections of the British Museum (Natural History) showed specimens of *Asteroceras stellare* which bore an analogous patterning, and Specimen C 56978 was selected for comparison. The specimen is crushed, and slightly distorted. Judging from the adherent matrix, it came from a calcareous nodule. Three whorls are visible in the damaged umbilical area. The specimen is incomplete, since it terminates at a septum, but from the septal spacing it seems probable that most, if not all, of the phragmacone is present. At the apertural septum the diameter is about 230 mm, the whorl height about 85 mm, and the whorl breadth is estimated to be about 70 mm. Much of the specimen is preserved as an internal cast in brown sparry calcite. The ribbing and sutures are occasionally well displayed. The external details

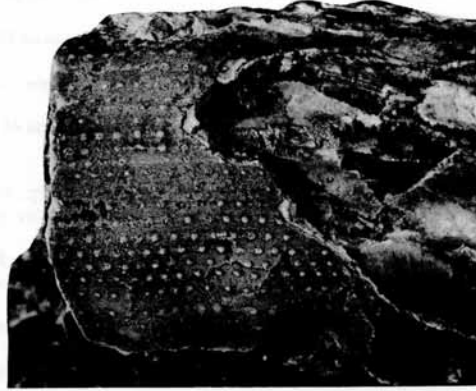


TEXT-FIG. 1. *Asteroceras stellare* (J. Sowerby), internal cast of body chamber, demonstrating the regularity and extent of the colour markings. Specimen C 79624, $\times 1$.

of the shell have been preserved in a few places, and ornament can be seen to cover at least the outer third of the outer whorl. This ornament is of small uniform tubercles, up to 1 mm in diameter, arranged in lines parallel to the periphery. The spacing of the tubercles within the lines is extremely regular, and average figures vary steadily from a maximum of 3.0 mm at the outer end of the exposed whorl (where the line-spacing is about 2.5 mm) to a minimum of 2.4 mm at the inner end. The tubercles are rounded, and slightly elongated along the line of tuberculation. At one point on the venter, one whorl before the apertural septum, these tubercles are plainly seen to be linked within each line by a threadlet of raised calcite. On the penultimate half whorl, growth lines can be seen on the venter, especially on the keel, and these show that each period of growth started with the formation of a line of tubercles and was followed by deposition of smooth shell up to the next growth line. The tubercles are most strongly developed along the keel; their diminution in strength appears due solely to preservational variations.

This style of tuberculate ornament has been described, within the genus, on various occasions, and seems to be a variable feature. Wright, discussing *A. stellare* (1881, 295 and 296, pls. 21 and 22), mentioned only that the specimens were 'finely

punctuated', whilst Guérin-Franiatte (1966, 283–286, pls. 153–155; text-figs. 144 and 145), after referring to Sowerby's type of *A. stellare* as 'quadrillé et ponctué', remarked that 'Quelques-uns de nos exemplaires présentent un test identique, celui-ci se retrouve d'ailleurs chez d'autres espèces du genre *Asteroceras*'. Reynès (1879, pl. 36, fig. 3) illustrated very clearly the pattern of tuberculation of a specimen of *A. stellare*.



TEXT-FIG. 2. *Asteroceras stellare* (J. Sowerby), surface of venter, showing the tuberculation. Specimen C 56978, $\times 1$.

Specimen C 79624 is a body chamber, as is demonstrated by the lack of sutures, the infilling by matrix material, and the distortion during diagenesis. Well-preserved body chambers of *A. stellare* are rare (M. K. Howarth, pers. comm.). In these circumstances, any comparison between the body chamber of one ammonite and the phragmacone of another must necessarily be somewhat imperfect, and the inherent uncertainties must be increased considerably by the comparison of an internal cast of the one with the shell of the other.

To suggest, then, a relationship between colour markings of the one and tubercles of the other must seem dubious. However, it seems, that the resemblance of the two patterns is so close that the two can be considered as two representations of the same feature. This specimen must represent a very abnormal set of conditions of preservation. Colour patterns in the Cephalopoda have been noted within orthoceratids, principally by Ruedemann (1921), and, within the Ammonoidea, by such as Arkell (1957, L92 and L93, fig. 138), Greppin (1898, 22 and 23), Schindewolf (1928), Spath (1935), and Tozer (1972, pl. 126, fig. 3), but all these refer to colour manifestation in bands and stripes upon the outside of the shell. Nowhere is there any mention of pattern decipherable upon the inner surface of the body chamber, or upon the infilling matrix in contact with it, apart from Tozer's discussion of the very different wrinkle-layer (op. cit.).

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REFERENCES

- ARKELL, W. J. 1957. Mesozoic Ammonoidea. In MOORE, R. C. (ed.). *Treatise on Invertebrate Paleontology, Part L, Mollusca 4*. University of Kansas Press, Lawrence, Kansas.
- GREPPIN, E. 1898. Description des fossiles du Bajocien Supérieur des environs de Bâle. *Mém. Soc. Paléont. Suisse*, **25**, 1-52, pls. 1-5.
- GUÉRIN-FRANJATTE, S. 1966. *Ammonites du Lias Inférieur de France. Psilocerataceae: Arietitidae*. Tome 1: Texte; Tome 2: Planches. Ed. du Cent. Nat. de la Rec. Sci.
- LANG, W. D. 1926. The Black Marl of Black Ven and Stonebarrow, in the Lias of the Dorset coast. *Q. Jl Geol. Soc. Lond.* **82**, 144-165.
- REYNÈS, P. 1879. *Monographie des Ammonites. Lias*. Atlas. Pl. 36, figs. 3, 4.
- RUEDEMANN, R. 1921. On colour bands in *Orthoceras*. *Bull. N.Y. State Mus.* Pp. 79-88.
- SCHINDEWOLF, O. H. 1928. Über Farbstreifen bei *Amaltheus (Paltopleuroceras) spinatum* Brug. *Palaont. Zeit.* **10**, 136-143.
- SPATH, L. F. 1935. On colour-markings in ammonites. *Ann. Mag. Nat. Hist.* (10), **15**, 395-398, pl. 18.
- TOZER, E. T. 1972. Observations on the shell structure of Triassic ammonoids. *Palaontology*, **15**, 637-654, pls. 124-128.
- WRIGHT, T. 1881. Monograph on the Liassic ammonites of the British Islands. Vols. 32-39 of *Pub. Palaeontogr. Soc.*

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