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HALYSITES IN NEW SOUTH WALES.

By R. ETHERIDGE, Junr., Curator.

(Plate xvii.)

THE history of this genus, not only in N. S. Wales, but in Australia generally, is a very brief one. *Halysites* was first recorded by the late Prof. L. G. de Koninck,* who recognised *H. escharoides*, Lamk., in the collection of N. S. Wales fossils sent him by the late Rev. W. B. Clarke for determination. In the description given, however, there are no characters that would readily differentiate between this species, and the typical *H. catenulatus*, Linn. De Koninck gives Wellington as the locality, but I have never seen a *Halysites* from the limestone of that district.

Although the presence of this old Palæontological landmark has been in a generic sense, recorded as occurring in N. S. Wales, the microscopic structure has not been investigated, so far as I know.

The largest fasciculo-reticulate corallum that has come under my notice is a specimen measuring six and a half inches by four and a half, forming, in every case, a lax and spreading mass rather than a high erect growth. The intersecting reticulations, or "fenestrules," are very variable in size and shape, but always polygonal, the smaller having an average size of three by three mm., the largest observed fifteen by five mm., fourteen by twelve, and so on, with intermediate gradations, the angles of junction of the vertical laminæ or plates being equally variable. The reticulations are usually longer in one direction than another, but not by any means invariably so. The walls are strong, but in consequence of the alteration that has taken place, the epitheca on the free sides of the laminæ is rarely discernible, but when so, is well developed. The number of corallites on any one side of a reticulation varies from two to twelve, but the average number is from four to six.

Examination in thin sections renders the great amount of alteration the corallum has undergone apparent, an unfortunate circumstance common to a large number of our Lower Palæozoic

* Foss. Pal. Nouv.-Galles du Sud, pt. 1, 1876, p. 16; Clarke, Sed. Formations N. S. Wales, 4th Edit., 1878, p. 129.

corals, still sufficient details can be made out to elucidate the finer characters of our *Halysites*.

The mineral condition is very remarkable. The corals are preserved in a dark blue limestone, the tissues where unaltered being composed of the usual dark grey or brown sclerenchyma, the general infilling of all the intertabular spaces or old visceral chambers, being crystalline or granular calcite, the former in places with cleavage. Every here and there, however, the walls of the corallites are converted into a radiating siliceous mineral, or blebs of the same look as if forced into the walls; there is every reason to believe that the latter is chalcidony, in the form of Beekite rosettes, a by no means uncommon mineral in our Lower Palæozoic Invertebrata. In some cases these blebs occupy spaces within the corallites, breaking up the uniformity of the tabulate structure in a very marked manner.

Notwithstanding this excessive alteration the external walls are quite discernible, and here and there the continuous epitheca on both the free sides of the laminae is visible also. As described* by Nicholson, the epitheca does not take any part in the "formation of the partition which actually divides any tube from its neighbour on either side," but the partitions are formed solely by the coalescent walls of the two contiguous corallites." Furthermore, the corallites are of two orders, as in the well known *Halysites catenulatus*, Linn., thus at once distinguishing it from *H. escharoides*, Lamk. The larger, or normal corallites are oval, from three-quarters to one mm. in longest diameter, and the latter in the direction of the chain. In a macroscopic examination these may be at once distinguished by an outward bulging of the epithecatated walls. The smaller corallites, or those of the second order, are ranged alternately with the larger, and are either round or quadrate, and each is enclosed by a thick wall of its own, distinct from the common or enclosing wall of the laminae. The position of these "interstitial tubes," as they are termed by Nicholson, is equally discernible externally by a biconcavity of the wall opposite to each secondary corallite. The angles of junction of any two laminae that assist in forming a reticulation, or fenestrule, are always occupied by an interstitial corallite, which, in well weathered specimens, is visible with an ordinary pocket lens. Septa are absolutely wanting.

The two sets of corallites become even more apparent in a vertical section. The normal tubes are *closely* tabulate, the tabulae horizontal, very regular, and equidistant, five in the space of one mm., enclosing between them more or less transversely elongated or quadrangular intertabular spaces. The interstitial tubes, on the other hand, are very narrow and pipe-like, *sparsely*

* Nicholson—Tab. Corals Pal. Period, 1879. p. 227.

tabulate, the tabulæ far apart (they are nearly half a mm. apart), although complete, the intertabular spaces vertically elongate, and both the walls and tabulæ greatly thickened, (Pl. xvii., fig. 7) as compared with the similar parts of the normal corallites. There is not the slightest trace whatever of the small projections in the interstitial tubes, "apparently of a septal nature," discovered and described by Nicholson.*

The presence of the interstitial corallites, and the absence of septa clearly places the present coral within the group of *H. catenulatus*, the "Chain-coral" of the Wenlock, but as compared with the latter there is this remarkable difference. In *H. catenulatus* the tabulæ of the normal corallites are "comparatively remotely disposed," whilst in the interstitial tubes they are "much more numerous and more closely set."† In our coral, which I propose to call *Halysites australis*, the exact opposite is the case.

It is customary with Monographists to include in *H. catenulatus* a large number of other forms, in former days regarded as separate species, purely from external characters, but I think before this indiscriminate lumping is done, the whole of such forms should be submitted to microscopic examination, when possibly differences of an equally important nature to that shown above, may be found to exist.

Halysites australis differs from *H. agglomerata*, Hall,‡ by the same characters that it does from *H. catenulatus*, Linn. In the form of the reticulations and mode of growth it is more akin to *H. labyrinthica*, Goldf.§ and *H. catenulatus*, var *Harti*, Eth.,|| but in both cases the fenestrules are larger than in our species.

The specimens were collected by the Rev. J. Milne Curran, at Molong, N. S. Wales, and by him presented to the Trustees.

* *Loc. cit.*, p. 229, t. 11, f. 1.

† *Ibid.*, p. 228.

‡ Hall—Pal. N. York, ii., 1852, t. 35 bis.

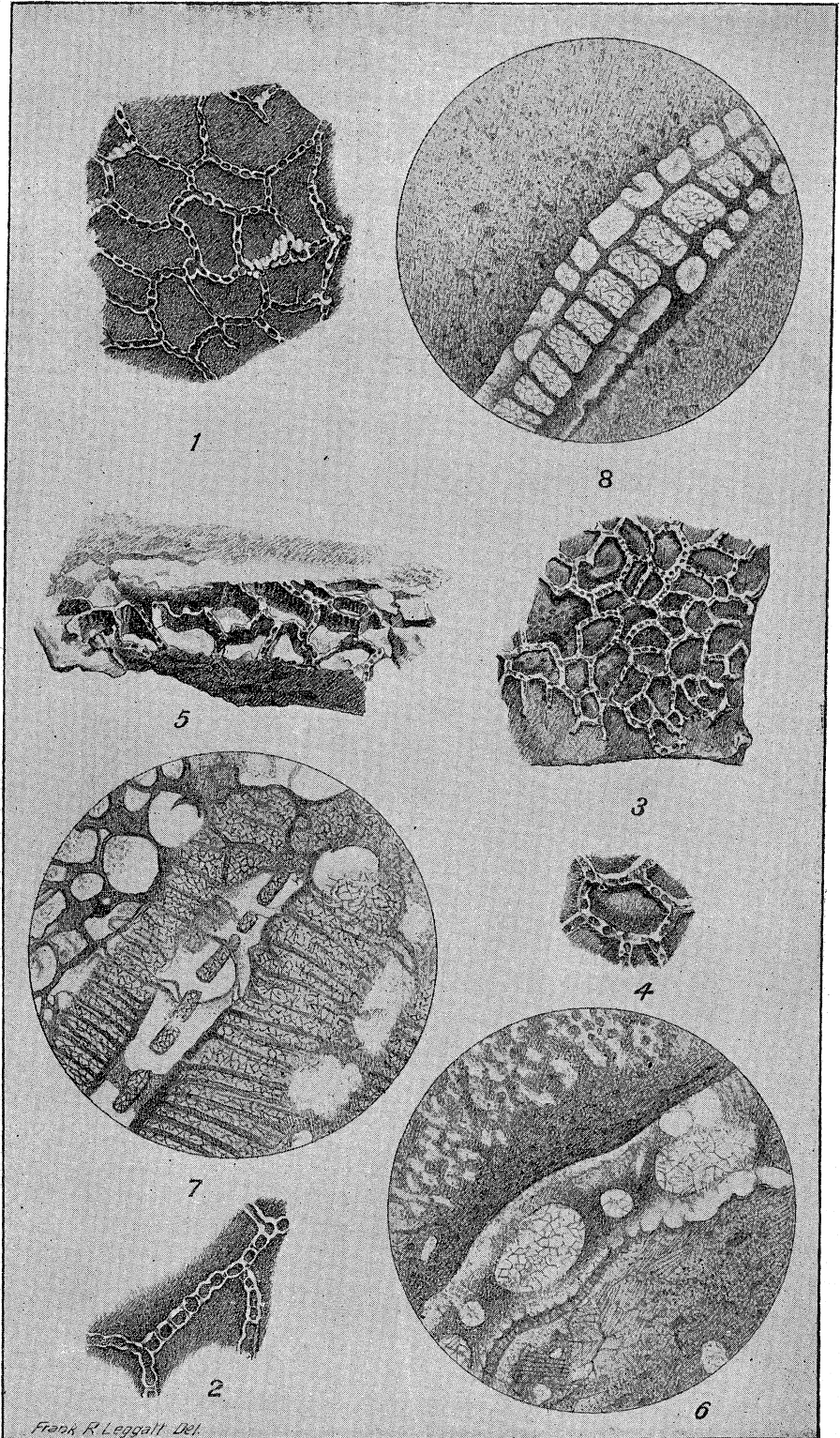
§ *Petrefacta Germaniæ*, t. 25, f. 5a.

|| *Quart. Journ. Geol. Soc.*, xxxiv., 1878, p. 583, t. 28, f. 2.

EXPLANATION OF PLATE XVII.

Halysites australis, Eth. fil.

- Fig. 1. Portion of a corallum, seen from above, showing the form of the reticulating laminæ, and the normal corallites.
- „ 2. Small portion of the same with the normal corallites and the interstitial tubes. Enlarged.
 - „ 3. Portion of another corallum differing from that seen in fig. 1 only in the size of the reticulating laminæ.
 - „ 4. The same. Enlarged.
 - „ 5. Portion of another corallum seen obliquely from the side, showing the lateral faces of the laminæ, and outline of the normal corallites.
 - „ 6. Horizontal section of part of a lamina, with two normal corallites and two interstitial tubes filled with crystalline calcite. Parts of the lamina walls are converted into chalcedony, particularly on the upper right hand; two blebs are also visible on the opposite side. $\times 18$ (about).
 - „ 7. Vertical section showing two normal corallites with close horizontal tabulæ, between them an interstitial tube with distant tabulæ. The intertabular, or visceral cavities of the normal corallites are filled with crystalline calcite; the interstitial tube on the extreme right has been converted into a mass of chalcedony, the walls and tabulæ of that in the centre are in the same condition, whilst scattered on the left hand are blebs of chalcedony. $\times 20$ (about).
 - „ 8. Vertical section of a normal corallite, highly altered. The tabulæ and portions of the walls remain as sclerenchyma, the other parts of the latter being converted into blebs of chalcedony. The intertabular, or visceral spaces, are filled with crystalline calcite. $\times 20$ (about).



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