sented by epidote–actinolite schists (Piccarreta and Zirpoli, 1969). No ferrocarpholite was found in this region, and evidently chloritoid is formed under metamorphic conditions of slightly higher grade (cf. de Roever, 1956).

Whereas the ferrocarpholite of Scalèa and surroundings appears to have been formed under glaucophane-schist facies conditions, the occurrence near Sangineto is considered to indicate that ferrocarpholite can be formed under conditions of the lawsonite-albite facies as well. A slightly higher grade of metamorphism, however, favours the production of chloritoid.

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The occurrence of vaterite in gastropod egg-shells

VATERITE is very much less common in nature than the other two forms of calcium carbonate, calcite and aragonite. It has been recorded from calcareous sediments (Bentor *et al.*, 1963), metamorphic rocks (McConnell, 1960), and meteorites (Du Fresne and Anders, 1962), but most known occurrences are in abnormally calcified tissues, including regenerated damaged mollusc shells (Wilbur, 1964), otoliths of some fishes (Carlström, 1963), and pathological concretions in man (Lagergren, 1962); additional references are given by Hall and Kennedy (1967). This note records a new type of occurrence of vaterite in the egg-shells of the gastropod mollusc *Ampullaria*.

We have examined the shells of the eggs of a number of species of gastropods by X-ray diffraction, and all were made of calcite or aragonite except for those belonging to the genus *Ampullaria*, which were found to consist of vaterite. Specimens have been examined of four species of *Ampullaria*: *A. australis* from Uruguay, *A. baxea*

from Jamaica, *A. glauca* from Guyana, and *A. malleata* from Mexico, and the egg-shell was found to be made of vaterite in all four species.

The X-ray powder pattern of the vaterite from the egg-shell of *A. malleata* is given in table I. This pattern was obtained using a diffractometer, and with silicon as an internal standard. It is very similar to the pattern recorded by Meyer (1969) for synthetic vaterite, and the cell dimensions calculated from the two patterns are identical ($a = 7{\cdot}15$ Å, $c = 16{\cdot}94$ Å), suggesting that there is probably not much isomorphous substitution of magnesium or other ions in the structure of the natural vaterite.

TABLE I. *X-ray powder pattern of natural vaterite from the egg-shell of Ampullaria malleata*

d	*I*	*hkil*	*d* (Å)	*I*	*hkil*	*d* (Å)	*I*	*hkil*	*d* (Å)	*I*	*hkil*
4·24 Å	10	0004	2·214 Å	3	$11\bar{2}6$	1·788 Å	4	$22\bar{4}0$	1·367 Å	4	$22\bar{4}8$
3·58	53	$11\bar{2}0$	2·170	2	$21\bar{3}3$	1·746	2	$22\bar{4}2$	1·352	1	$41\bar{5}0$
3·30	100	$11\bar{2}2$	2·116	9	0008	1·643	18	$22\bar{4}4$ $31\bar{4}3$	1·336	1	$41\bar{5}2$
2·733	93	$11\bar{2}4$ $20\bar{2}3$	2·065	58	$30\bar{3}0$	1·542	3	$40\bar{4}1$	1·313	4	$1.1.\bar{2}.12$
2·324	6	$21\bar{3}1$	1·855	18	$30\bar{3}4$	1·476	4	$30\bar{3}8$	1·287	8	$41\bar{5}4$
2·285	4	$20\bar{2}5$	1·821	44	$11\bar{2}8$	1·417	1	0.0.0.12			

Vaterite has not previously been recorded in the egg-shells of any organism. Mineralogical examination of egg-shells has so far been confined mainly to vertebrate eggs, and most of these are calcitic, although aragonite occurs occasionally (Foulkes *et al.*, 1958). There appears to be no relationship between the mineralogical composition of the egg-shells and the composition of the shell of the adult animal, since the shells of adult *Ampullaria* are made of aragonite.

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