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SIR,—We are glad to have provided an occasion for Dr. Stewart's contribution, although we did not intend in our schematic table to depict time intervals, or even correlation. Our scale was intended to be concerned primarily with thicknesses, and in this connection, as well as with respect to the unconformity between lower and upper Torridonian, the left-hand column of our table should thus be revised substantially downwards.

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#### BROOD POUCHES IN THE BRACHIOPOD *UNCITES*: A RE-INTERPRETATION

SIR,—In 1964, in this *Magazine*, I interpreted the postero-lateral shelly pouches of the Devonian brachiopod *Uncites* as possible brood pouches. This interpretation has recently been criticized by Jux and Strauch (1966) in their comprehensive revision of this genus. In the light of this work my earlier interpretation requires modification on one important point, but does not, I believe, deserve to be abandoned altogether.

For my earlier paper I was obliged to rely on well-preserved but poorly localized specimens from early museum collections. I therefore overlooked the fact that the pouches are characteristic of all specimens of *U. paulinae* Winterfeld (cf. my Text-fig. 1 A, B) which has a distinctly higher stratigraphical range than the pouchless *U. gryphus* (Schlotheim). Jux and Strauch erect a stratigraphically intermediate species, *U. beuthi*, which has rudimentary "open" pouches (cf. my Text-fig. 1C, D). There is thus a stratigraphical (and phyletic?) series, showing a gradual development of the pouches (Jux and Strauch, Abb. 17). Therefore, as Jux and Strauch rightly point out (p. 215 footnote, p. 216), my tentative suggestion that the presence or absence of pouches might be a case of sexual dimorphism must now be abandoned.

However, Jux and Strauch assume that the interpretation of the pouches as brood pouches can also be rejected. This does not follow. The suggestion of sexual dimorphism rested on the assumption that *Uncites* was dioecious. There is the alternative possibility that it was hermaphrodite, as a few living brachiopod species are now known to be. If it was hermaphrodite, brood pouches would be expected to be present in all adult members of the population. Jux and Strauch's observation that pouches are universal in *U. paulinae* accords with this interpretation. Thus the series *U. gryphus*—*U. beuthi*—*U. paulinae* would represent the gradual development of increasingly protected brood pouches in all members of an evolving population of hermaphrodite brachiopods. This development might have been related to the ecological differences which Jux and Strauch detect between the species concerned.

This re-interpretation is supported indirectly by the molluscan analogue I quoted in my earlier paper. Barnard (1964), while noting that the pouch of *Thecalia* serves as a brood pouch, also reported that he had been unable to find any shells above a length of 10 mm. *without* pouches; he therefore

doubted whether pouches were confined to females, and remained uncertain whether the species was dioecious or not. Clearly it is possible, though not yet proven, that *Thecalia* is hermaphroditic and that it forms an analogy with *Uncites* even closer than previously described.

The open pouches ("parathyridia") of the small Pennsylvanian rhynchonellacean *Cardiarina* are also found in all specimens (Cooper, 1956): this could be an independent development, in another hermaphroditic brachiopod, of rudimentary brood pouches similar to those of *U. beuthi* and *Milneria*.

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#### PRISTIOGRAPTUS LUDENSIS (MURCHISON 1839)— ITS SYNONYMY AND ALLIED SPECIES—AND THE POSITION OF THE WENLOCK/LUDLOW BOUNDARY IN THE SILURIAN GRAPTOLITE SEQUENCE

SIR,—A reinvestigation of the Salopian graptolite faunas of North Wales and of some of the type-specimens in the Elles and Wood Collections at the Sedgwick Museum, Cambridge and Birmingham University and a study of the graptolites of the Wenlock Shales and Wenlock Limestone and comparisons with Polish graptolite material (for which we are indebted to Dr. L. Teller of Warsaw), have together yielded significantly new information on the graptolite sequence of the Upper Wenlock and Lower Ludlow Series.

A comprehensive paper is in course of preparation, but the authors believe their conclusions to be of sufficient interest to merit prior publication; in particular since they affect the preparation of future maps of the Silurian based on graptolite sequences and the worldwide correlation of the Wenlock and Ludlow Series.

The main conclusions are as follows:

(a) *Pristiograptus vulgaris* (Wood 1900) and *P. gotlandicus* (Perner 1899) are junior synonyms of *P. ludensis* (Murchison 1839)—a revised name for the form described originally by Murchison as *Graptolithus ludensis* and later by Wood (1900) as *Monograptus colonus ludensis*. *M. gerhardi* Kühne 1955 is probably also a junior synonym (cf Jaeger 1964, p. 37).

(b) Whilst the type-specimen of *P. vulgaris* (Elles and Wood 1911, Pl. xxxvii, Fig. 10a) is conspecific with *P. ludensis* (Murchison 1839, Pl. xxvi, Fig. 2, and Wood 1900, Pl. xxv, Fig. 11) the specimen figured by Wood (1900, Fig. 10a), showing a straight proximal end, is not; and for this similar forms, some stratigraphically earlier than *P. ludensis*, we intend to create at least one new species.

(c) *P. ludensis* and straight pristiograptids have been found in the uppermost Wenlock Shales and the Wenlock Limestone of the Ludlow area, and it is clear that the graptolite zone of *P. ludensis* (as the "*vulgaris*" zone must now be called) belongs, largely if not entirely, to the Wenlock, as suspected as early as 1938 (Pocock *et al.* 1938, p. 102). As those authors point out (p. 102) "the alternative course—that the Wenlock Limestone . . . should cease to be of Wenlock age—is naturally undesirable".