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A note on the holotype of *Globorotalia fohsi* Cushman and Ellisor

ABSTRACT

The holotype of the foraminiferal species *Globorotalia fohsi* Cushman and Ellisor is keeled throughout its periphery, although the keel is weakly developed on the early chambers of the final whorl.

Recently, Blow and Banner (1966) examined the primary types of the subspecies of the foraminifer *Globorotalia fohsi* and revised that group, largely on the basis of keel development. In their revision, the holotype of *Globorotalia fohsi* Cushman and Ellisor was described as being keeled throughout its periphery. Accompanying the description were new figures of the holotype (pl. 1, fig. 5a-c) drawn by Mr. Lawrence B. Isham of the United States National Museum.

In a discussion of the Blow and Banner revision Bolli (1967) questioned the new drawings of the *Globorotalia fohsi* holotype. According to Bolli (p. 505), the figures are contradictory because no keel is shown on the early chambers in the spiral and umbilical views but is clearly shown in the edge view. Since these figures were drawn at the U. S. National Museum, where the holotype is deposited, some clarification seems appropriate.

The drawings of the *Globorotalia fohsi* holotype are accurate representations of the specimen. In fact, it is because of the accuracy of the drawings that there may be the illusion of greater keel development in the edge view than in the spiral and umbilical views. The keel of *G. fohsi* is thin, particularly around the early chambers and is not nearly as well developed as in the holotype of *G. fohsi robusta*. Nevertheless, the keel in the *G. fohsi* holotype does extend entirely around the periphery. It shows up best in edge view, where, naturally, it appears in its maximum breadth because of the projection. In spiral and umbilical views the keel appears to fade around the early chambers, as indicated by Mr. Isham's drawings. The keel is rather faint around the early chambers, and to see it in its entirety requires constant reorientation and wetting of the specimen. What Mr. Isham's drawings emphasize is the fact that, while the holotype of *G. fohsi* has a complete peripheral keel, it is a weakly developed one, particularly in the early chambers.

Since the Blow and Banner revision, a paratype of *Globorotalia fohsi* from the same locality as the holotype has been discovered in the U. S. N. M. collections. The paratype shows a somewhat better keel development around the early chambers than does the holotype, but this development is still relatively weak as compared with that of the *G. fohsi robusta* primary types, for example. In view of the subtlety of the *G. fohsi* keel, it is doubtful that carrying out the suggestion of Bolli (p. 505) to photograph and restudy the holotype would shed much additional light on the *G. fohsi* question.

A more promising suggestion by Bolli (pp. 508-509) is that a detailed biometric investigation be undertaken of a continuous sequence through

the *G. fohsi* subspecies zones. In the past there has been a considerable emphasis on the types of the *G. fohsi* subspecies, but the ranges of variation of these subspecies are still little known and are largely matters of subjective interpretation. In fact, these subspecies, as defined, represent morphotypes rather than populations or any kinds of groups with describable limits. Perhaps there has been an overemphasis on the importance of these morphotypes as reference points of the various stages in the development of the *G. fohsi* lineage, and it is time now to consider biometrically the total morphologic expression of the *G. fohsi* group at various stratigraphic levels. In this way it should be possible to determine more objectively and precisely the phyletic trends and to assess more realistically the stratigraphic value of keel development *versus* other morphologic developments. The potential value of the group concept with the use of biometric methods as a means of increasing

stratigraphic information provided by planktonic foraminifera has already been ably demonstrated by Scott (1966, 1967).

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