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ROUTE 6: GEZHONGWU, GUIZHOU PROVINCE

SINIAN-CAMBRIAN BOUNDARY STRATIGRAPHY AT GEZHONGWU, ZHIJIN COUNTY, GUIZHOU PROVINCE, CHINA: PHOSPHORITE AND SMALL SHELLY FOSSILS

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INTRODUCTION

The Gezhongwu section is located near Gezhongwu Village, and is about 14 km southeast of the town of Zhijin. The section has been an important source of phosphorite since the 1970s. It was first reported by Yin *et al.* (1982), and later described in detail by Wang *et al.* (1984). The Gezhongwu section is the most productive section in Guizhou Province for small shelly fossils (SSFs), particularly zhijinitids (Qian and Yin, 1984a, 1984b) which was considered to be related with tardipolypods (Qian *et al.*, 2000).

The Sinian (Neoproterozoic)-Cambrian boundary succession in the Gezhongwu section consists of the Maolongjing Member of the upper part of the Tongying (Dengying) Formation, the Gezhongwu Formation, and the lower part of the Niutitang Formation (Fig. 1). The Maolongjing Member, which is not well exposed in the Gezhongwu section, is composed of thin- to medium-bedded dolomicrite with intercalations of lenticular or nodular phosphorite and chert. The thickness of the member is less than 20 m. A low-diversity assemblage of small shelly fossils first appears in the upper part of the Maolongjing Member. The assemblage includes *Zhijinites, Anabarites, Conotheca*, and *Hyolithellus*. The Gezhongwu section is the stratotype of the Gezhongwu Formation.

Stop 1

Stratotype of the Gezhongwu Formation and small shelly fossils

A 40-cm-thick, conglomeratic, siliceous dolostone marks the boundary between the Tongying Formation and the Gezhongwu Formation. The thickness of the conglomeratic bed is variable laterally; this may result from storm-related deposition of lags. The conglomerate contains abundant small shelly fossils including *Anabarites*, *Conotheca, Protohertzina,* and *Hyolithellus*.

The Gezhongwu Formation, as exposed in the eponymous Gezhongwu section, is about 18

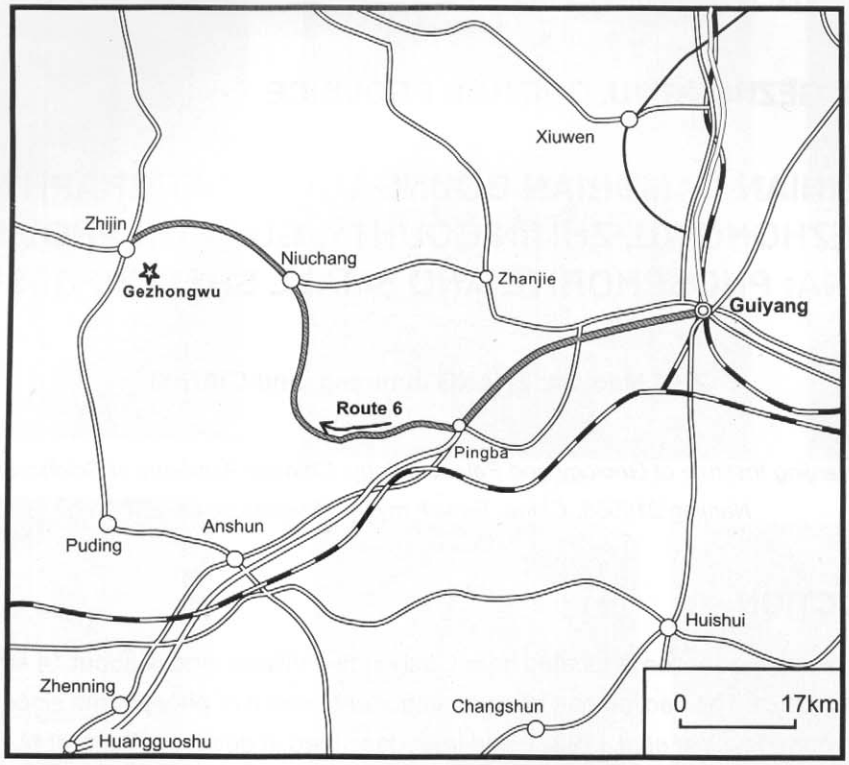

Fig. 1. Road map showing the route (shadowed) from Guiyang to Zhijin.

m thick, and can be subdivided into two parts. The lower part is about 12 m thick, and composed of interbeds of laminated, bioclastic, phosphatic dolostone and bioclastic, siliceous, dolomitic phosphorite. The upper part is about 6 m thick, and composed predominantly of phosphatic dolostone. Small shelly fossils are rich in the lower part of the Gezhongwu Formation. The fossils in the lower Gezhongwu Formation are easily separated in the lab using acetic acid, but phosphatization in the upper part of the Gezhongwu Formation hinders separation of the fossils. Fossils known from the Gezhongwu Formation include *Emeithella, Sagittitheca, Lapworthella, Lopochites, Mobergella*?, *Siphognuchites, Halkieria, Zeugites, Zhijinites,* and *Parazhijinites* (Figs. 2-4).

The contact between the Gezhongwu Formation and the Niutitang Formation is sharp. The base of the Niutitang Formation is chosen as the base of the black shale with nodular phosphorite. The trilobite *Hepeidiscus* first appears 10 m above the base of the Niutitang Formation (Wang *et al.*, 1984).

Small shelly fossils in the Gezhongwu section have been divided into two assemblages: 1, the *Anabarites-Protohertzina* Assemblage-Zone; and 2, the *Siphogonuchites-Halkieria* Assemblage-Zone (Wang *et al.*, 1984; Qian *et al.*, 1999). The *Anabarites-Protohertzina* Assemblage-Zone includes the upper part of the Maolongjing Member through the basal conglomerate at the Gezhongwu Formation. Except for the basal conglomerate, the entire sequence of the

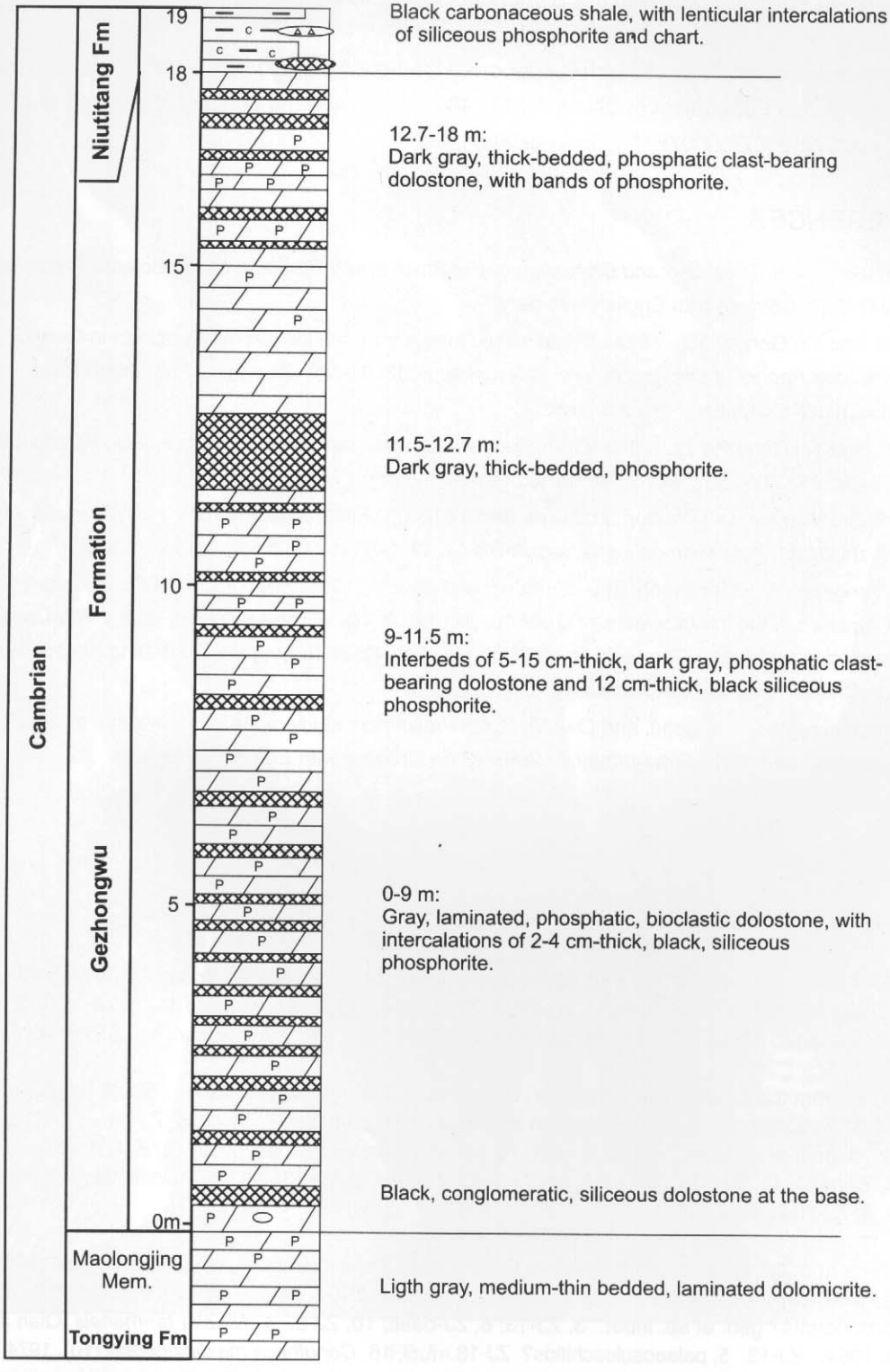

Fig. 2. Lithologic log of the Gezhongwu Formation at Gezhongwu, Zhijin County, Guizhou Province.

Gezhongwu Formation is within the *Siphogonuchites-Halkieria* Assemblage-Zone.

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Fig. 3. All from the Gezhongwu Formation, Gezhongwu, Zhijin County, Guizhou. Scale bar=100μm. 1-9, *Zhijinites minutus* Qian, 1978. 1, ZJ-12; 2, ZJ-13; 3, ZJ-13; 4, ZJ-12; 5, ZJ-12; 6, ZJ-13; 7, ZJ-12; 8, ZJ-7.5; 9, ZJ-13. 10-12, *Zhijinites panduriformis* Qian et Yin, 1984. 10, ZJ-base; 11, ZJ-13; 12, ZJ-13.

Fig. 4. All from the Gezhongwu Formation, Gezhongwu, Zhijin County, Guizhou. Scale bar=100μm. 1, 2, 5-7, *Parazhijinites guizhouensis* Qian et Yin, 1984. 1, ZJ-base; 2, ZJ-12; 5, ZJ-base; 6, ZJ-base; 7, ZJ-12. 3, gen. et sp. indet., ZJ-10.2. 4, 9, 10, 12-16, *Zhijinites minutus* Qian, 1978. 4, ZJ-base; 9, ZJ-7.5; 10, ZJ-base; 12, ZJ-10.2; 13, ZJ-9; 14, ZJ-9; 15, ZJ-7.5; 16, ZJ-13. 8, 11, *Zhijinites longistriatus* Qian, 1978. 8, ZJ-10.2; 11, ZJ-12.

Fig. 5. All from the Gezhongwu Formation, Gezhongwu, Zhijin County, Guizhou. Scale bar=100μm. 1, 13, *Halkieria mira* (Qian J. X. et Xiao), 1984. 1, ZJ-12; 13, ZJ-11. 2, gen. *et* sp. indet. ZJ-12.0. 3, 6, 10, protoconodonts? gen. et sp. indet. 3, ZJ-13; 6, ZJ-base; 10, ZJ-9. 4, *Ninella tarimensis* (Qian J. X. et Xiao), 1984. ZJ-13. 5, palaeosulcachitids? ZJ-13. 7, 9, 16, *Conotheca maidipingensis* (Yu), 1974. 7, ZJ-base; 9, ZJ-base; 16, ZJ-base. 8, *Lopochites lubricus* Qian et Yin, 1984. ZJ-13. 11, maikhanellids. ZJ-9. 12, *Lopochites* sp. ZJ-base. 14, *Solenotia lata* Qian et Yin, 1984. ZJ-9. 15, "*Aegites*" sp. ZJ-base.

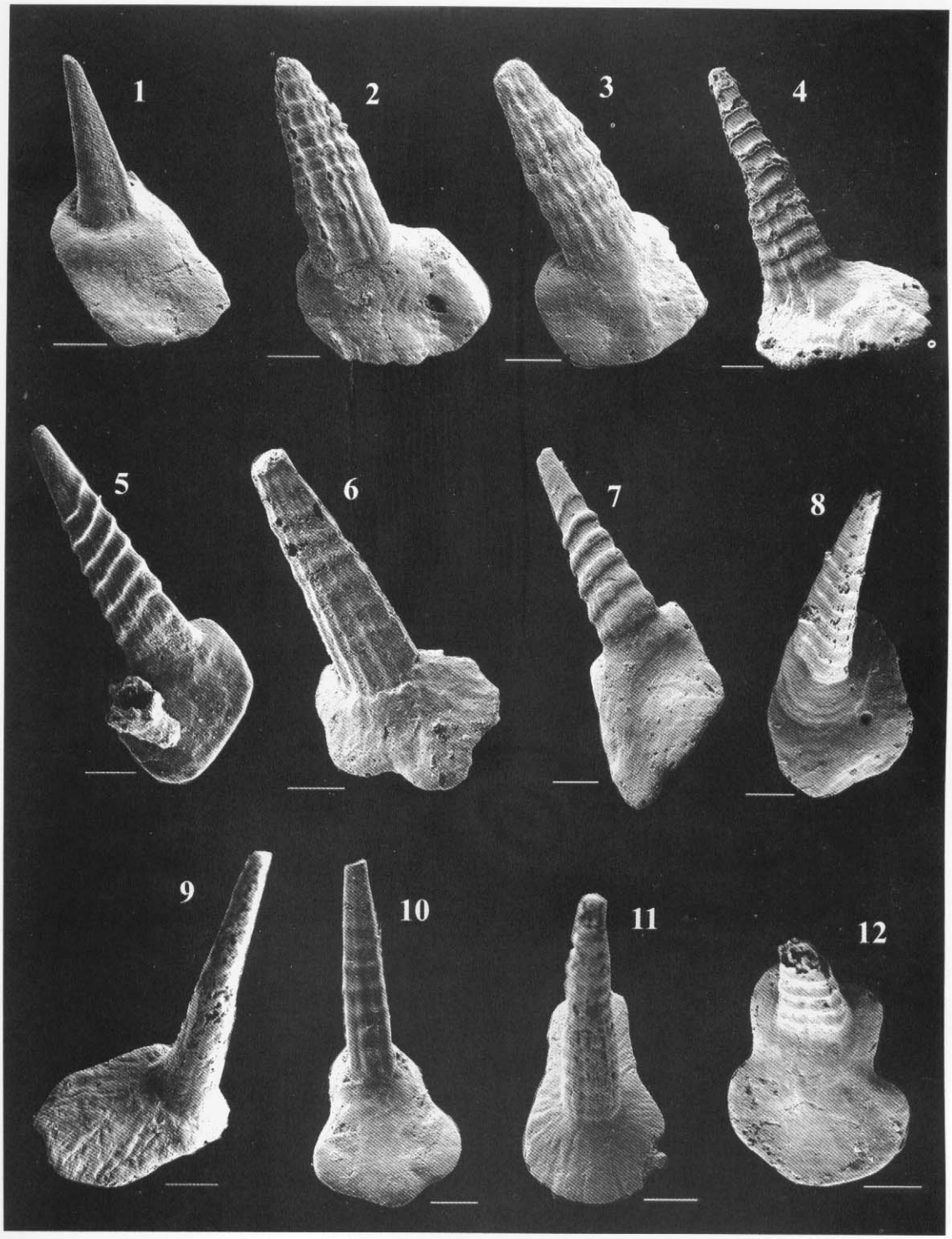

Figure 3

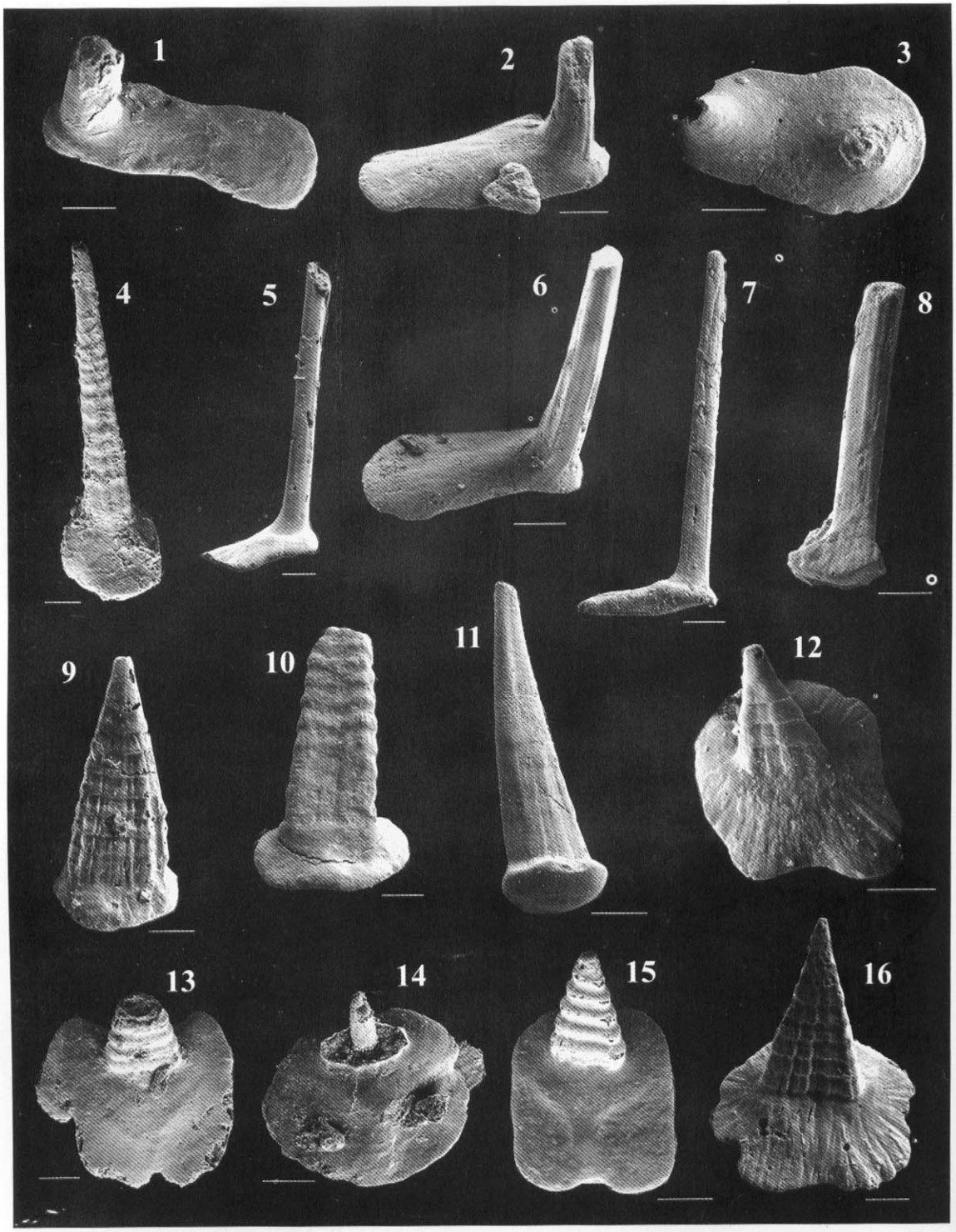

Figure 4

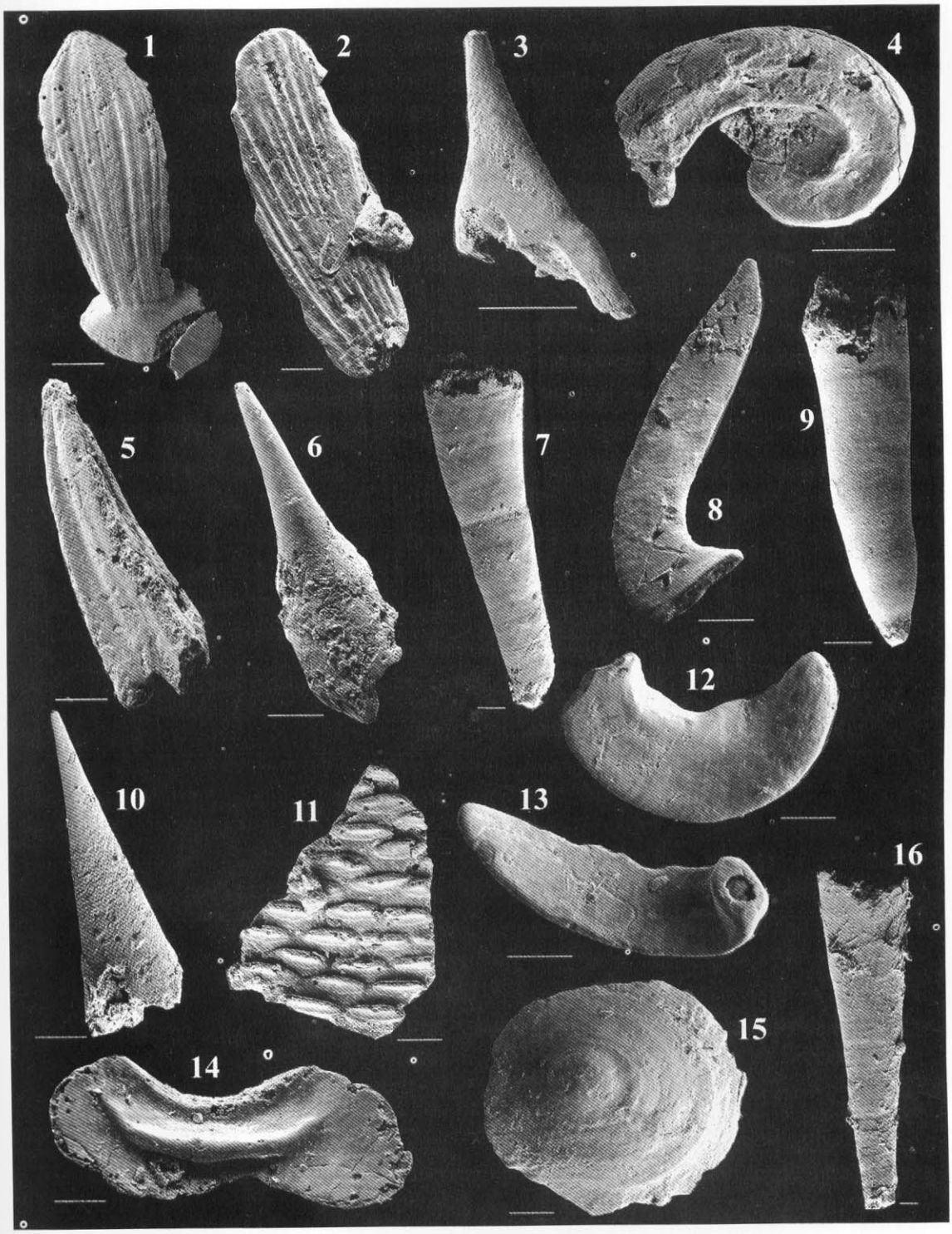

Figure 5