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Scanning electron microscopic studies on *Cyclotella obliquata* Qi et Yang[1)]

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Scanning electron microscopic studies were carried out on *Cyclotella obliquata* Qi et Yang. The species occurs in early Pleistocene deposits of Miyi, Sichuan Province, southwest of China. It is similar to the *Cyclotella bodanical comta* complex, but best distinguished from this by having only strutted processes scattered in the central part and the marginal zone of the valve. The striae of the marginal zone are divided into 5–7 fascicles by the broader hyaline areas.

Key Index Words: Cyclotella obliquata; *fine structure; morphology; taxonomy.*

In a previous paper (Qi and Yang 1985) the authors reported a new species, *Cyclotella obliquata* Qi et Yang, and gave just a short diagnosis on its characteristics. In the present paper we will focus on the scanning electron microscopic structure of this species in detail.

Materials and Methods

The fossil materials were collected from fluviolacustrious facies diatomaceous earth of the Xigida Group, Miyi, Sichuan province of China and the period is considered as in early pleistocene.

For scanning electron microscopy, specimens were either cleaned of organic matter by oxidation or simply washed free of preservative and then mounted on stubs. The preparation was coated with gold to suppress charging, and observed in different ways and magnitudes.

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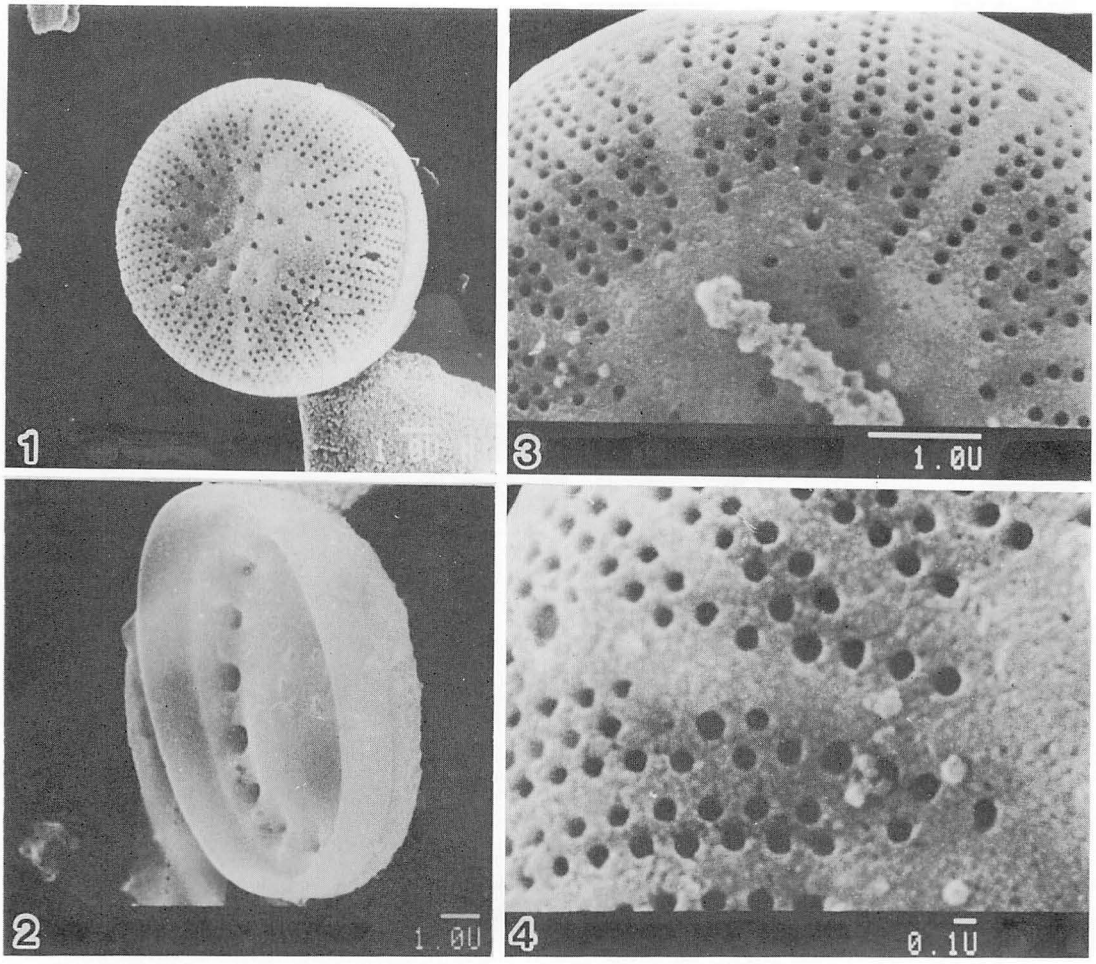
Results

External valve structure: The cells of *Cyclotella obliquata* are solitary and drum-shaped (Figs. 1, 2). The marginal zone of the valve is divided into five to seven areas by radial broader hyaline areas (interfascicles). Striae are fasciclate, of unequal length, parallel to each other and composed of two or rarely three rows of poroid areolae (Figs. 1, 3, 4). The areolae are round, simple openings on the surface but not of the same size (Fig. 4).

The central area is smooth or verrucose and tangentially waved. In the central part of the central area, several outer openings of the strutted processes are scattered (Figs. 1, 3, 5). A ring of the openings of the marginal strutted processes is located along the margin of the valve mantle. These are quite apparently seen on the end of every radial interfascicle (Figs. 1, 3, 5, 8).

Internal valve structure: Figure 6 shows the whole outline of the internal valve



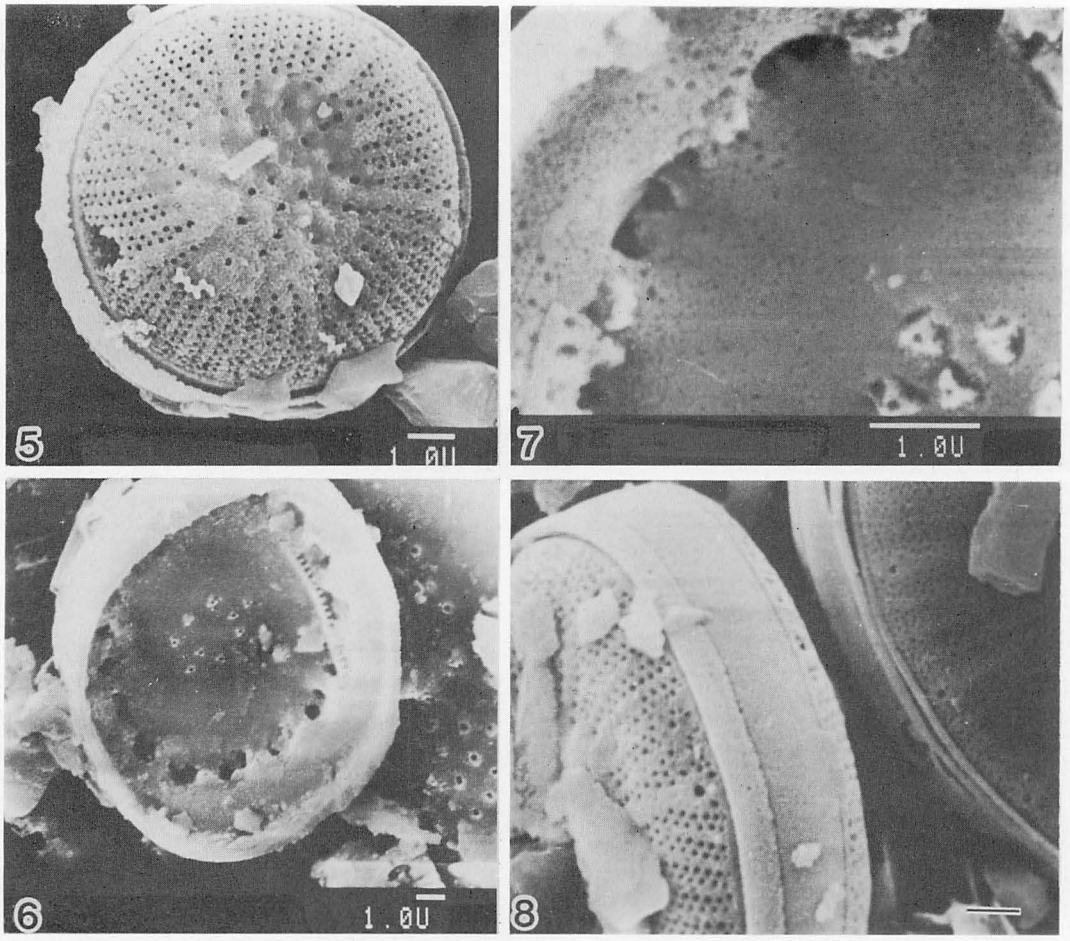
Figs. 1–4. *Cyclotella obliquata* QI et YANG
Fig. 1. External valve with tangentially waved central area. ×5500. Fig. 2. Internal valve showing the strutted process on every costa. ×5000. Fig. 3. Valve margin showing the fasciclate striae and radial interfascicles with an outer opening of the strutted process near the marginal end. ×15000. Fig. 4. Enlargement of the outer valve margin. ×30000.

view. A ring of strutted processes is located along the mantle on every costa. All valves observed were eroded, so that the exact structure of the marginal and central strutted processes was inconspiquous. However, the internal tube of a marginal strutted process is short and with three struts. The number of these processes per valve varies from 14 to 16. The internal tube of a central strutted process is very short but has clearly three struts (Figs. 2, 6, 7). Unfortunately we have unable to find a labiate process, however, finding this can strongly expected.

Girdle: As seen in Fig. 8, the cingulum appears to be composed of two bands, valvocopula and pleura both without ornamentation, though complete frustules are very scarce in the materials.

Discussion

We placed this species in the genus *Cyclotella*, because it shares the basic diag-



Figs. 5–8. *Cyclotella obliquata* QI et YANG

Fig. 5. External valve with slightly waved and verrucose central area. ×6000. Fig. 6. Internal valve showing the central area with scattered strutted processes. ×4000. Fig. 7. Enlargement of the internal valve margin showing the marginal and central strutted processes. ×15000. Fig. 8. Girdle view showing the valve copula and pleura. ×7000.

nostic characters of the genus (LOWE 1975, HÅKANSSON 1986, XIE and QI 1984). The difference between our species and those of the *Cyclotella bodanical comta* complex lies in; (1) central zone of our species has only strutted processes and no areolae with domed cribrum internally. (2) the marginal zone of the valve is divided into five to seven fascicles by the broader hyaline areas (interfascicles). However, *Cyclotella curvistriata* CHEN et ZHU (CHEN and ZHU 1985) has curved striae but arranged in different fashion. Meanwhile, *Cyclotella kuetzingiana* THWAITES has shorter and longer striae in the marginal zone of the valve but not the same structure as in *Cyclotella obliquata*. Moreover, SERIEYSSOL (1984) described *Cyclotella iris* complex with many pictures showing a lot of striae structure of unequal length and curved, but it still differs from *Cyclotella obliquata* in the number and arrangement of striae. Such a striae arrangement has never been observed before in the genus *Cyclotella*.

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斉雨藻*・楊景栄：*Cyclotella obliquata* QI et YANG の走査型電子顕微鏡による研究**

南西中国，四川省，米易の更新世初期の堆積物中から見出された *Cyclotella obliquata* QI et YANG の走査型電子顕微鏡による研究を行った。本種は *Cyclotella bodanical* comta complex に似るが，殻面中心部と縁辺部とに散在する有基突起を持つ点で後者と区別出来る。縁辺部の条線は広いハイアリン領域によって 5 — 7 個の胞紋に分画される。(*中国広州暨南大学生物学系，**中国　南京　中国科学院南京地質古生物学研究所)