

Some Permian conodonts from the Zewan Formation, Kashmir Himalaya

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Abstract

The present paper describes two species of Permian conodont fauna *Neogondolella orientalis* Barskov and Koroleva and *Neogondolella carinata subcarinata* Sweet from the Zewan Formation in Kashmir valley. An attempt has made done to assign the correct age of the beds containing the conodont fauna.

Introduction

Marine Permian deposits in Kashmir valley are called Zewan Formation. These deposits occur above the Lower Gondwana plant beds. They attain their maximum thickness up to 250 meters and are exposed at number of places. The best exposures can be seen at Zewan village, the type locality 10 km. SE of Srinagar, Guryul ravine, Mandakpal and Pastun spur. These rocks also occur in the Liddar valley near Pahalgam 100 km. E of Srinagar. The lithology of the beds comprises shales, sandy shales, limestones and sandstones. The outcrops of the Zewan Formation contain well defined fossiliferous horizons e.g. bryozoans, crinoids, bivalves, brachiopods and foraminifers. Extensive work on the geology and palaeontology of this formation has been carried out from time to time: Middlemiss (1910), Fuchs and Gupta (1971), Gupta (1974), Fuchs (1975), Nakazawa *et al* (1975), Ahmed *et al* (1978) and recently by Nakazawa and Kapoor (1981). Late Permian age (Kiungur-ian to Dzhulfian age) has been assigned to these beds. In this paper we describe the conodont fauna from 3 localities at Zewan, Guryul ravine and Mandakpal.

Systematic Description

Genus: *Neogondolella* Bender and Stoppel 1965

Neogondolella orientalis Barskov and Koroleva 1970

Plate I, figs. 6-9

1970 *Gondolella orientalis* Barskov and Koroleva; pp. 933-934, pl. 1-4, fig. 1.

1973 *Neogondolella orientalis* (Barskov and Koroleva); Sweet in Teichert Kummel and Sweet p. 438, pl. 13, figs. 4-11, text figs. 16 A-D.

1975 *Gondolella orientalis* (Barskov and Koroleva); Kozur pp. 18-19, pl. 2, figs. 5-8 and 11-15.

Description

Almost bilaterally symmetrical conodonts, lanceolate to lachrymiform in outline. Arched posteriorly, unit 1/3 of the whole length of the element. Platform leaf-shaped, subrounded posteriorly, widest at the mid length, tapers anteriorly. Platform is 3/4 of the whole conodont element. Aboral surface bears distinct medium furrow which ends posteriorly into an elongated basal pit. The basal pit and the furrow are surrounded by a long and very wide basal field. The basal field has clearly spaced long striations, which represent the lamellar growth. It is very wide in the middle part and is rounded posteriorly.

Occurrence

Neogondolella orientalis (Barskov and Koroleva) occurs at 2 localities: Zewan and Mandakpal. At Zewan it occurs from the crinoidal limestone 20 metres above the base of grey limestone bed and at Mandakpal from the *Marginifera himalayensis* beds 10 metres below the beds of Khunumuh Formation (Lower Triassic) with *Anchignathodus*.

Neogondolella carinata subcarinata Sweet.

Plate 1, figs. 1-5

1959 *Gondolella carinata* n. sp. Clark, p. 309, pl. 44, figs. 15-19.

1973 *Neogondolella carinata subcarinata* n. sub. sp.: Sweet in Teichert Kummel and Sweet pp. 436-437, pl. 13, figs. 12-17, text figs. 16 E-H.

? 1981 *Gondolella carinata* (Clark); Bhat, Joshi and Arora, pl. 1, figs. 1-2, ? 3 and 7.

Description

Subsymmetrical conodonts, three times long as wide, sublanceolate in outline, carina slightly compressed laterally, bowed and composed of 7-8 denticles. Denticles fused but free at the tips. Platform broad and subrounded anteriorly. Aboral surface bears narrow median furrow. Basal field wide but short. Basal pit located posteriorly.

Occurrence

1. At Zewan from the crinoidal limestone 20 metres above the base of grey limestone bed. 2. At Guryul ravine from the calcareous sandstone 3 metres below the Khunumuh Formation (Lower Triassic).

Remarks

Neogondolella carinata subcarinata (Sweet) has subrounded and very short basal field and can be differentiated from *Neogondolella orientalis* (Barskov and Koroleva) which has got very wide and rounded basal field.

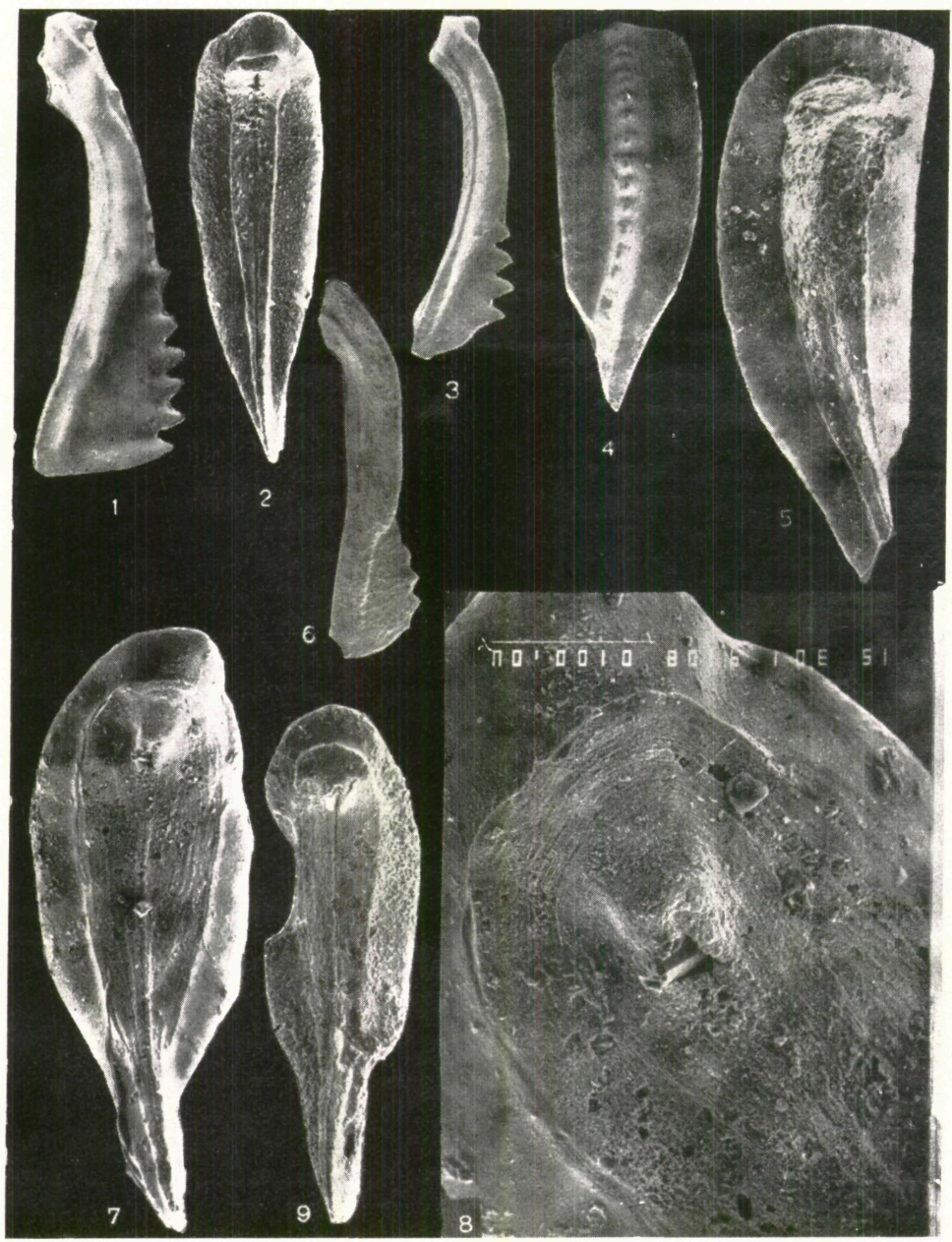
EXPLANATION OF PLATE I.

Figs. 1-5 *Neogondolella carinata subcarinata*, Sweet

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|------|-----------------------|---------|
| 1, 2 | Guryul ravine section | Bu 5007 |
| | 1 - 100 × side view | |
| | 2 - 100 × aboral view | |
| 3-5 | Zewan locality | Bu 5001 |
| | 3 - 72 × side view | |
| | 4 - 72 × oral view | |
| | 5 - 100 × aboral view | |

Figs. 6-9 *Neogondolella orientalis*, Barskov and Koroleva

- | | | |
|-----|-----------------------------------|---------|
| 6-8 | Zewan locality | Bu 5001 |
| | 6 - 72 × side view | |
| | 7 - 94 × aboral view | |
| | 8 - 300 × detail from aboral view | |
| 9 | Mandakpal locality | Bu 5015 |
| | 9 - 100 × aboral view | |



Age and Discussion

Neogondolella orientalis (Barskov and Koroleva) has been reported from the upper part of the Dorsham beds in the Dzulfa region of upper Permian age in Russia. This may represent the *Neogondolella orientalis* zone of Kozur (1975). *Neogondolella orientalis* (Barskov and Koroleva) has also been reported by Sweet (1973) from Kuh. E. Ali Bashi Formation in northern Iran of Permian age along with *Neogondolella carinata subcarinata* Sweet which characterizes the upper most part of the Dorsham beds. The occurrence of *Neogondolella carinata subcarinata* Sweet and *Neogondolella orientalis* together may demonstrate the boundary between *Neogondolella orientalis* zone and *Neogondolella carinata subcarinata* zone of Kozur (1975). The *Neogondolella carinata subcarinata* bearing beds occupy the highest position of Dorsham beds of uppermost Permian age.

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