

A new record of trace fossil polychaete (annelid) from the Cambrian of the Salt Range, Punjab, Pakistan

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ABSTRACT: *Field investigations on the paleo-biology of a hard dolomitic limestone to sandy, clayey dolomite locally known as Jutana Dolomite of Cambrian age, exposed in Khewra Gorge, Khewra, District Jhelum, eastern Salt Range, have produced fossil brachiopods, trilobites and trace fossils consisting of trails and burrows of annelids and trilobites. The formation is highly bioturbated in its upper part. A comparatively complete polychaete trace fossil from the dolomite is U-shaped, 70 cm. Long, with 28 segments of average length of 2.5 cm. Minerals (chlorite, mica, etc.) around the polychaetes are noticeably radioactive; it is likely that the radioactive material was preferentially collected by the organisms.*

INTRODUCTION

The Jutana Formation previously known as "magnesian sandstone" (Fleming, 1853) and Jutana Group (Noetling, 1894) is exposed in the eastern Salt Range out cropping in Khewra Gorge at 35° 33' 39"N, 73° 00' 25"E (topographic sheet 43H/2) where it consists of dolomite, dolomitic limestones, shales, calcareous sandstone and sandstone. Its base displays oolitic/pisolitic/oncolitic band. The Jutana Formation in Khewra Gorge may be divided into two parts; the lower part (11.6m) of cream to white coloured, hard, partly sandy and argillaceous dolomite; the upper part (36.1m) of massive hard silty and sandy dolomite. The two sequences are separated by a greenish gray bed of shale with intercalated thin sandstone and sandy dolomite. The Jutana Dolomite displays brachiopods, trilobites and burrows and casts of the worms. It was assigned a late Early Cambrian to early Middle Cambrian age on the basis of the redlichfid trilobites by

Schindewolf and Seilacher (1955).

The upper part generally displays distinct annelid casts and burrows at its base, just above the greenish gray shale bed. The polychaete fossil here reported was collected from the base of the upper unit. Figure 1 gives the location of the area; Figure 2 is a lithologic log of the formation.

TAXONOMY

The fossil is almost well preserved (Fig.3) and divided into many segments. The is typically metameric i.e. the body is divided into similar segments in a linear series along the anteroposterior, axis is long, slender, bilaterally symmetrical, somewhat broader at one end, 70 cm long with segments of 2.50 cm in length. Segments near the anterior end are 1.48 cm, and 1.15 cm at the posterior end. The polychaete fossil displays 28 segments and appears to be a complete specimen.

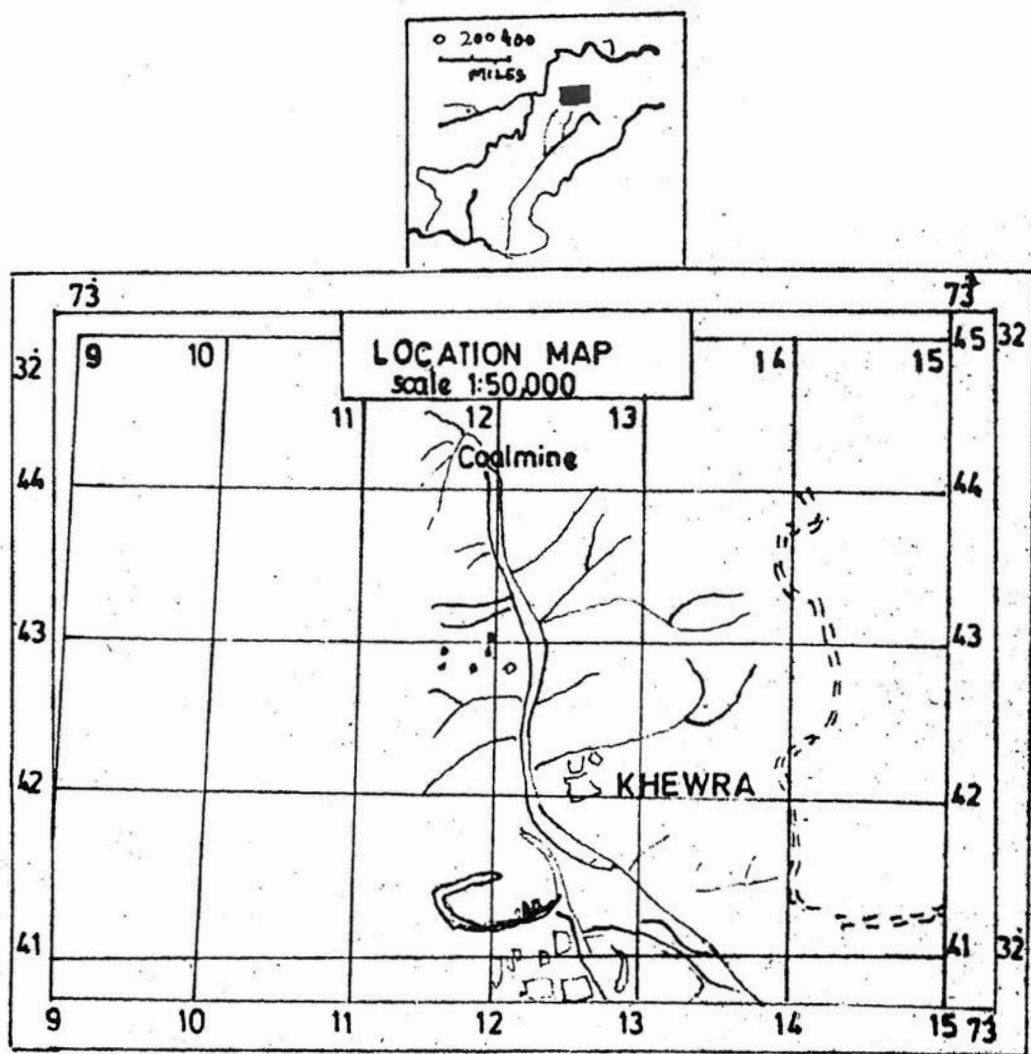


Fig. 1. The location map of Khewra Gorge, Eastern Salt Range.

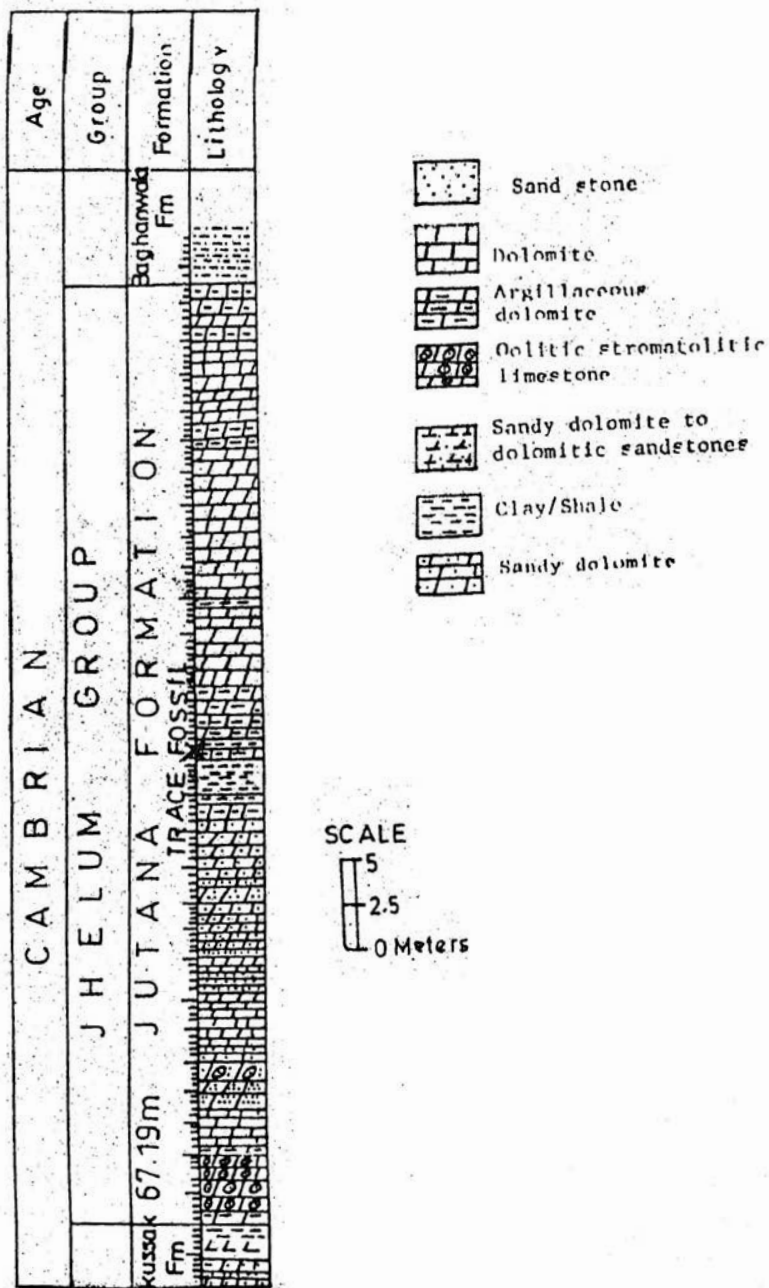


Fig. 2. Lithostratigraphic section of Jutana Dolomite exposed at Khewra Gorge, Salt Range.

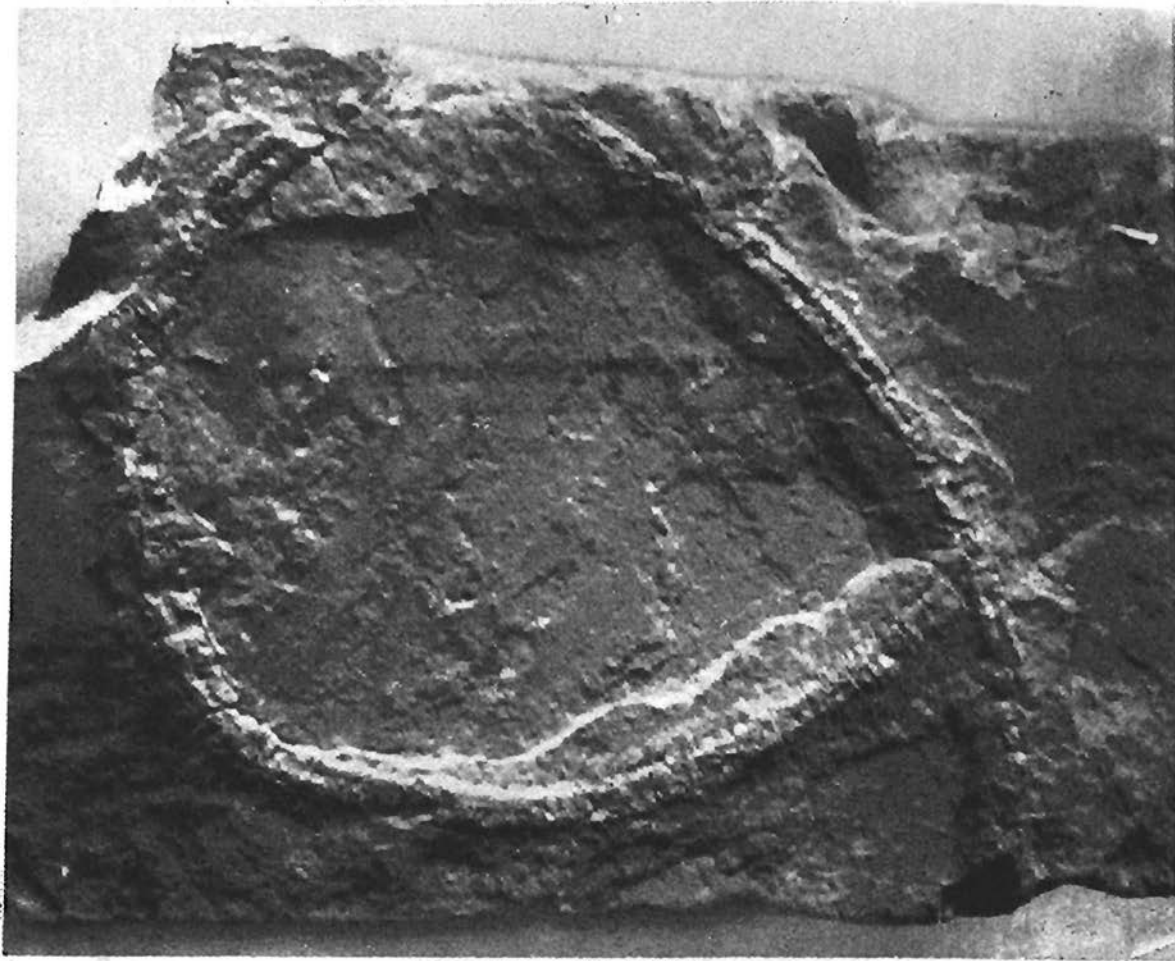


Fig. 3. Illustration of the trace fossil (polychaete-annelid).

DISCUSSION

The formation contains burrow and tracks of trilobites and annelid types of worms from base to its top. Schindewolf and Seilacher (1955) carried out a detailed work on the fossils from the Jutana Formation. They described fossil *Lingulella fuchsi*, *Botsfordia granulata*, *Redlichia noetlingi* and *Rusophycus didymus*. Fatmi (1973) stated that the upper part of formation contains the gastropoda *Pseudotheca cf. subrugosa* and undescribed species of the trilobites *Ptychoparia* and *Chitlidilla*.

The Polychaete fossil collected from the Jutana Formation displays micaceous/glaucanitic and chloritic concentration within and surrounding it. This is in contrast to the general mineral composition of the formation consisting mainly of calcite, dolomite and quartz. Mica, glauconite and chlorite may be occasionally observed scattered in the formation and also in thin beds, but their concentration along the tracks and fossil remains is striking. It is most likely that the polychaete during deposition of the Jutana Formation concentrated micaceous, glauconitic and other radioactive minerals around them. The

gamma ray logs in the well logs also display high gamma ray activity from the Jutana Formation.

Clifton (1984) has demonstrated that *Nephtys* from the sandy tidal flats of Willapa Bay can concentrate heavy minerals similar to those obtained in box cores from the southern California Shelf (Howard & Reineck, 1981).

SUMMARY AND CONCLUSIONS

1. The Jutana Formation was deposited in shallow marine waters.
2. The annelids belonging to class polychaeta were abundant and common during the deposition of the Jutana Formation.
3. It is most likely that the polychaete during deposition of the Jutana Formation concentrated micaceous, glauconitic and other radioactive minerals around them. The formation

may be a good prospect for the search of radioactive minerals.

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