

ON THE OCCURRENCE OF PLANT REMAINS FROM LOWER PERMIAN ROCKS OF CHAMBA-BHADERWAH AREA, HIMACHAL PRADESH, INDIA

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ABSTRACT

Some fossil plant impressions are being described for the first time from the Lower Permian rocks underlying the Panjal Volcanics exposed near Swanthith, district Chamba, HP. These fossiliferous rocks are correlatable with the Nishatbagh Formation of Kashmir basin. The presence of Lower Permian plant fossils, in a geological set up identical to that of the Kashmir basin tend to suggest that the sequence in Chamba area is the southeastern extension of the Lower Permian basin of the Kashmir.

INTRODUCTION

In Chamba-Bhaderwah area, Himachal and Jammu Himalaya, rocks of Lower Permian to Lower Triassic age are well exposed as an outlier, unconformably overlying the Precambrian metasediments constituting the Chamba, Sunbian, Manzir and Salooni (redefined) formations in ascending order.

During the course of systematic section measurement studies, two plant fossil-bearing horizons, one underlying the Panjal Volcanic Formation and the other overlying it, have been mapped in the area (Kumar *et al.*, 1985-86). These are respectively correlative with the Nishatbagh and Mamal formations of Kashmir. The former horizon exposed near Swanthith (Fig. 1a) has yielded poorly preserved leaf and stem impressions reported earlier as *Gangamopteris* (Ali *et al.*, 1987). These are being revised and described here. Some fragmentary, unidentifiable plant fossils have also been recorded from the Mamal Formation exposed near Meru (Fig. 1b). Mention has also been made of the occurrence of a few unidentifiable plant fossils described by Sharma *et al.* (1975) from the Gamgul Formation (=Mamal and Zewan formations of the present authors) exposed near Tramawala and Talai, Jammu Himalaya. The marine Permian fossils recorded by Dutta and Bhattacharya (1975) occur below the Panjal Volcanics in the area, and actually belong to Zewan Formation and not to Salooni Formation.

GENERAL GEOLOGY

The generalised lithostratigraphy observed in the area is given in Table - I. The sequence has been folded into an overturned, doubly plunging syncline with axial plane dipping towards northeast.

Table 1: Generalised lithostratigraphy of the area

Age	Formation	Lithology	Thickness (in m)
Late Permian	Zewan	—	100+
	Mamal	Laminated siliceous shale with fragmentary plant fossils (basic sill in the middle part)	125
Early Permian	Panjal Volcanic	Greenish, massive amygdaloidal vesicular basic rock with calcareous lenticles and quartz veins in upper part.	15-265
	Nishatbagh	Grey siliceous shale with plant fossils.	2-5
-----Unconformity-----			
Precambrian	Salooni	—	900+

PLANT FOSSIL-BEARING HORIZONS

Nishatbagh Formation

It unconformably overlies the Salooni Formation and is overlain by rocks of Panjal Volcanic Formation. The formation is characterised by grey siliceous shale which varies in thickness from about 2-3 m (SW of Swanthith) to about 30 m (north of Kalhel-Tisa road section; Fig. 1a). However, in Meru-Salooni-Dhargala section, the formation is absent and the Panjal Volcanics rest unconformably over either Salooni or Manzir Formations. Plant fossils have been noted in the sections southwest of Swanthith.

Mamal Formation

It conformably overlies Panjal Volcanic Forma-

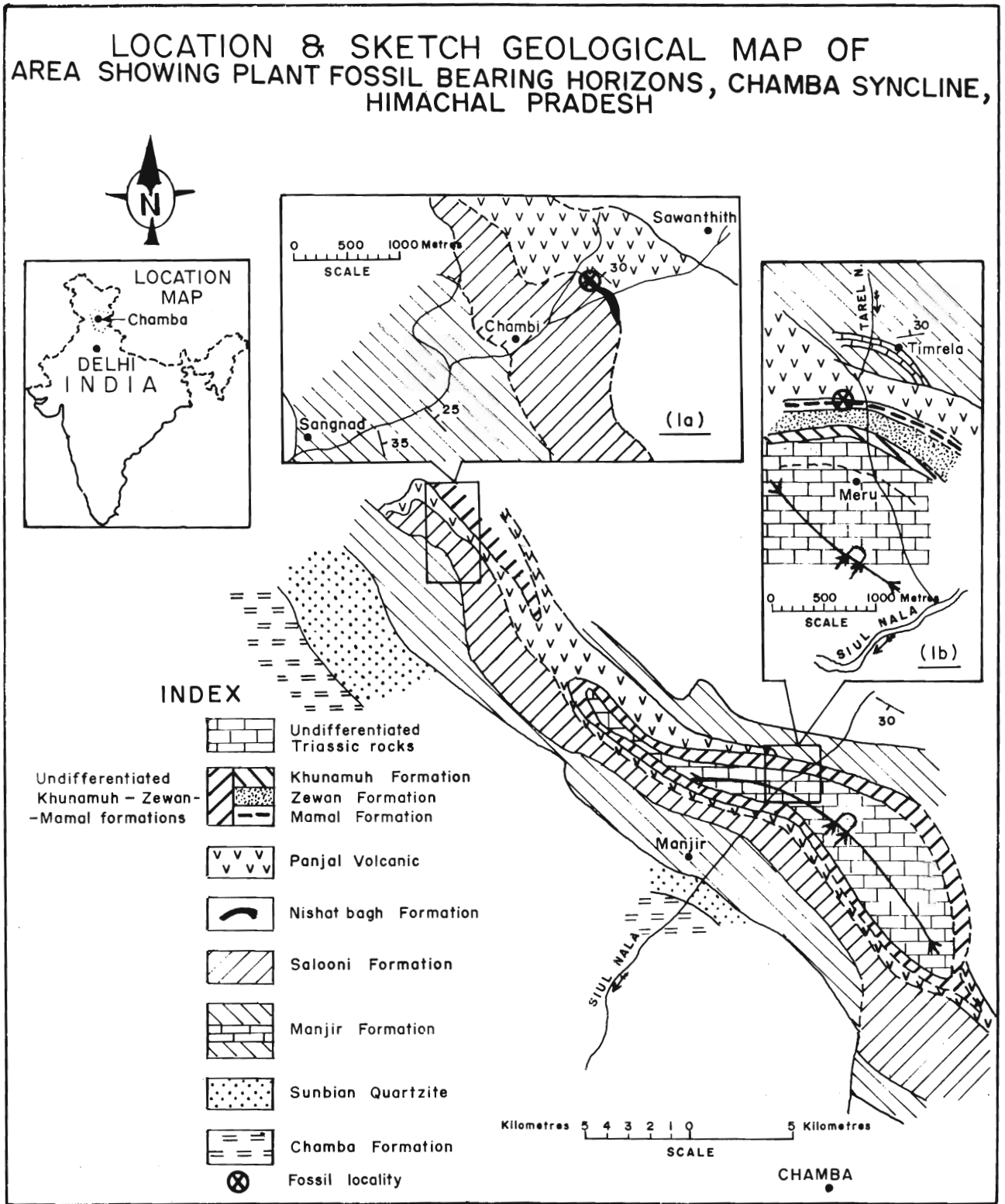


Fig. 1: Location & sketch geological map of the area showing plant fossil-bearing horizons, Chamba Syncline, Himachal Pradesh.

tion and is overlain by rocks of Zewan Formation. It is characterised by grey, siliceous shale, occasionally laminated and exposed in the northern limb of Chamba Syncline at Meru (Fig. 1b).

SYSTEMATIC DESCRIPTION

? Lycopod stem
(Pl. I, fig. 4)

Material : One poorly preserved impression.

Remarks : Ill-preserved stem impressions probably of Lycopod genus are being recorded. Proper generic identification could not be carried out for want of more and well preserved specimens.

Locality : About 1.25 km southwest of Swanthith, district Chamba, H.P. (32° 50' 30" : 75° 56' 15").

Horizon : Nishatbagh Formation, Lower Permian.

Repository : GSI Type No. NRP/1/879.

Glossopterid leaf Type-1
(Pl. I, fig. 3)

Material : One incomplete leaf impression, poorly preserved.

Description : Leaf simple, incomplete (3 cm long, 1.85 cm wide), appears to be lanceolate; lamina margins subparallel. Definite midrib is absent but a prominent central strand identifiable (0.45 cm wide); secondary veins sub-parallel and form an acute angle with central strand; connected by cross connections forming fine, narrow mesh.

Remarks : The leaf impression appears to be similar in venation pattern to *Glossopteris douglasii* Rigby and Chandra (Rigby and Chandra, 1990) and *Glossopteris emarginata* Maheshwari and Prakash (Chandra and Surange, 1979).

Locality : About 1.25 km southwest of Swanthith, distt. Chamba, H.P. (32° 50' 30" : 75° 56' 15").

Horizon : Nishatbagh Formation, Lower Permian

Repository : GSI Type No. NRP/1/880.

Glossopterid leaf Type-2
(Pl. I, figs. 1, 2, 5, 6)

Material : Two incomplete and a few fragmentary leaf impressions, fairly well preserved.

Description : Leaf simple, incomplete (average length 8.6-9.8 cm and width 1.7-2.0 cm), elongate; apex seems to be broadly rounded. Definite midrib

absent, though very wide (0.6-0.7 cm); central strand is identifiable. Secondary veins subparallel forming acute angle with central strand, connected by cross connections forming very fine, narrow mesh.

Remarks : The present leaf impressions compare to some extent with *Gangamopteris kashmirensis* Seward and Woodward, 1905; Seward, 1907) in shape but differs in other characters. It is also comparable to *Gangamopteris angustifolia* (Mc Coy) Mc Coy (Rigby and Chandra, 1990) in having almost similar venation pattern but differ from latter in other details.

The present impressions also appear similar to *Glossopteris vulgaris* Pant and Gupta (Chandra and Surange, 1979) and *Glossopteris nishatbaghensis* (Singh *et al.*, 1982) in overall shape and size but differ from them in venation details.

Locality : About 1.25 km southwest of Swanthith, district Chamba, H.P. (32° 50' 30" : 75° 56' 15").

Horizon : Nishatbagh Formation, Lower Permian.

Repository : Geological Survey of India, Lucknow. Specimen nos. GSI type Nos. NRP/1/881 and NRP/1/882.

DISCUSSION AND CONCLUSION

The Lesser Himalayan belt of Chamba has witnessed a major transgressive phase during Lower Permian time from the adjoining Kashmir basin which is clearly indicated by almost identical lithostratigraphic and biostratigraphic sequence of these two areas.

The present find of Lower Permian plant fossil-bearing horizon below the Panjal Volcanic Formation in Chamba area (equivalent to the Nishatbagh Formation of Kashmir basin) further confirms the continuation and extension of the Lower Permian-Lower Triassic basin of Kashmir to the present area. The only difference in the stratigraphic set up is the absence of underlying Agglomeratic slates in the study area which is so conspicuously present in almost all the sections in Kashmir. The physical discontinuity could be due to deep erosion by the Chenab river. In the light of these recent finds, the earlier scheme of lithostratigraphic classification of Kashmir basin (Kapoor, 1973; Singh *et al.*, 1982 and Kumar *et al.*, 1987) has been followed here to maintain the uniformity in stratigraphic classification. However, the proper generic identification of the leaf impressions could not be carried out for want of better-preserved specimens in sufficient number.

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EXPLANATION OF PLATE

Plate I

- 1 Glossopterid leaf type-2 (x1.0 approx). GSI type no. NRP/1/881.
- 2 Glossopterid leaf type 2 (x5.0 approx) A portion of Fig. 1, showing central strand and Secondary veins.
- 3 Glossopterid leaf type-1 (x2.50 approx), GSI Type No. NRP/1/880.
- 4 Lycopod stem (x2.0 approx) GSI Type No. NRP/1/879.
- 5 Glossopterid leaf type-2 (x1.25 approx) GSI Type No. NRP/1/882.
- 6 Glossopterid leaf type-2 (x3.0 approx) A portion of fig. 5 showing central strand and Secondary veins

