

EARLY CAMBRIAN (TSANGLANGPUIAN STAGE) TRILOBITES FROM VEL NAGABAL, ANANTNAG DISTRICT, JAMMU AND KASHMIR, INDIA.

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ABSTRACT

The note records and describes redlichiid trilobite *Paokannia magna* Qian et Yas. P. of *P. angulata* Chang and *P. sp.* and hyolithids from the vel member of lolab Formation exposed in the Vel Nagabal section, Hapatnar vally, Anantnag district, Jammu and Kashmir, India. The fossiliferous horizon is referable to the *Drepanurodies* Zone of the Tsanglangpuian stage of Early Cambrian in southwest China.

INTRODUCTION

Redlichiid trilobites - *Redlichia noetlingi* (Redlich), R. cf. *konjazei-rapina* and *Tungusella obesa* Repina, were

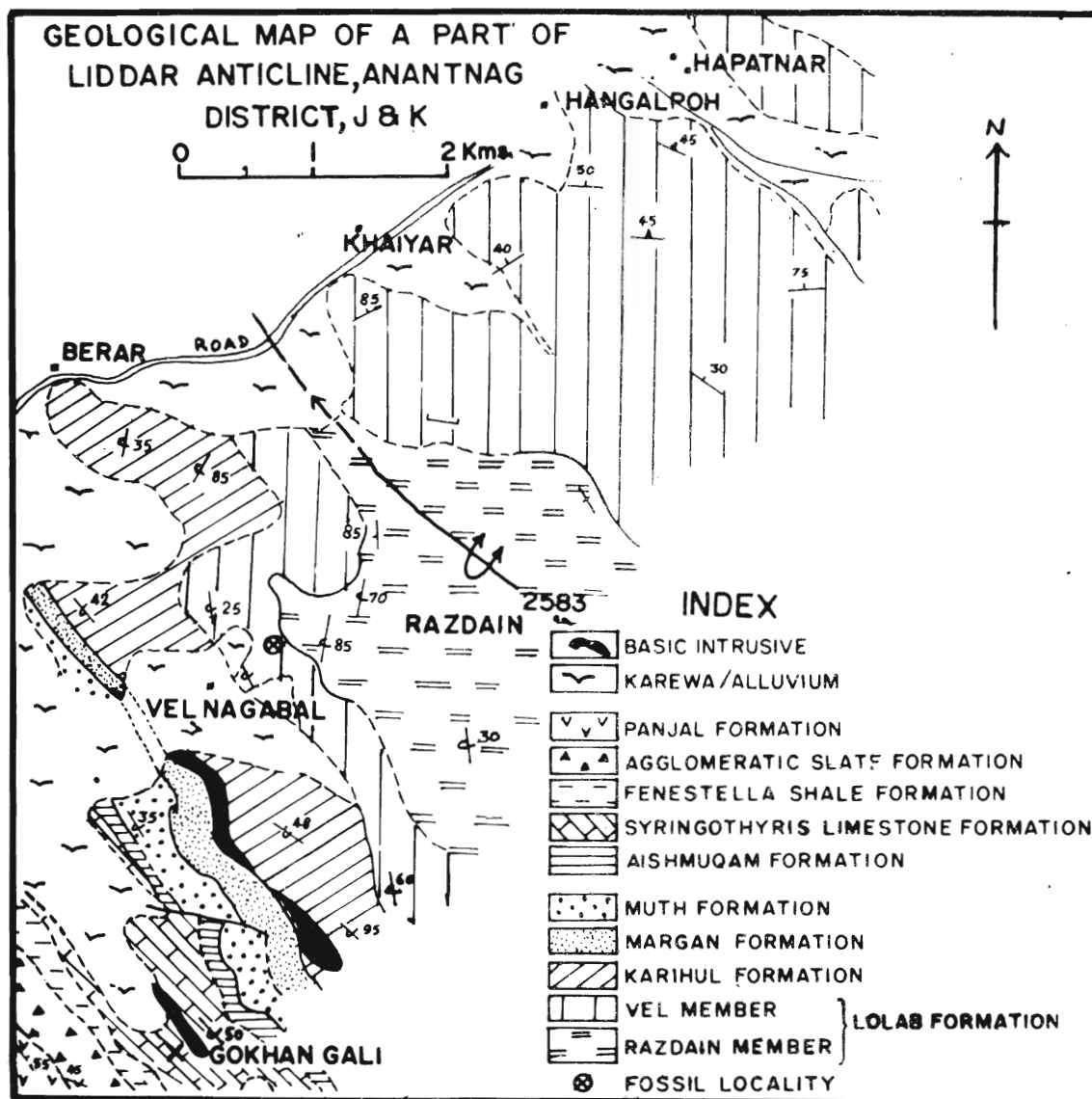


Fig 1.

the only record of Lower Cambrian trilobites from Kashmir area (Shah, Raina and Razdan, 1980). These were known from the northwestern part of the Kashmir Valley. So far, no Lower Cambrian trilobites were known from the southeastern part of the Valley. The recent find of Middle Cambrian trilobites (Kumar and Singh, 1982) from this southeastern part of the Valley and subsequent detailed investigations in connection with the demarcation of the Precambrian-Cambrian boundary under International Geological Correlation Programme (IGCP), led only to record of an assemblage of trace fossils known Lower Cambrian successions elsewhere in the World (Kumar *et al.* 1984). During the course of further investigations, the authors were able to locate a new fossiliferous horizon in the overturned southwestern limb of the Liddar Anticline on the spur close to and northwest of Vel Nagabal village in the Harpatnar Valley, Anantnag district, Jammu and Kashmir, India (Fig.1). The fossils occur in a ferruginous zone which has yielded trilobites in association with hyolithids.

GEOLOGICAL SETTING

The precambrian-Cambrian succession of the Kashmir area has been divided into the Machhal, the Lolab and the Karihul Formations, in ascending order (Kumar *et al.* 1984). This succession is unconformably overlain by the Margan Formation (Ordovician-Lower Devonian). The present collection of fossils is from the Lolab Formation (Khaiyar Formation, Kumar and Singh, 1983) which is divisible into two members, a lower Razdain Member made up of a rhythmic alternation of thin-bedded grey shale and arenite with abundant ichnofossils, and an upper Vel Member characterised by dark grey laminated shale and arenite (Fig. 2). The basal part of the Vel Member, about 15 m above the base, has yielded the present collection of fossils (Pl. I).

The classification of trilobites belonging to superfamily Redlichiacea, as revised by Zhang Wentang (Change, W.T.) *et al.* (1980), is followed here.

SYSTEMATIC DESCRIPTION

- Order Redlichiida RICHTER, 1933
- Suborder Redlichiina HARRINGTON, 1959
- Superfamily Redlichiacea POULSEN, 1927
- Family Yinidae HUPE, 1953
- Subfamily Drepanopyginae LU 1961
- Genus *Paokannia*. HO & LEE 1959
- Paokannia magna* QIAN & YAO
(Plate I—8,10,11)

Material: Several specimens of pygidium

Description: Pygidium large, convex, triangular in outline with well defined axial and pleural regions. The axial region is strongly convex, well segmented, 7-9 axial rings and a large sharply incurved terminal piece with rounded margin. The axial furrows are subparallel. The

pleural region is also convex with well marked 6-7 segments having small but broad pleural spines.

Remarks: The present specimens compare well with the pygidium of *Paokannia angulata* Chang 1966 (in Zhang *et al.* 1980, Pl. 55, Fig. 6-9). It differs with *P. magna* Qian *et al.* in having broader and triangular outline and lesser number of segments in the pygidium.

Paokannia sp.

(Plate I-2-5,7,9)

Material: Several specimens of pygidium.

Description: Pygidium large and very convex almost semicircular with well defined axial and pleural regions. The axial region is almost semi-circular with about 7-9 rings and a very large unsegmented terminal piece. The pleural region is also very convex with equal number of segments bearing sharply pointed spines. Interpleural furrows are also present.

Remarks: The specimens bear some resemblance with the pygidium of the *P. angulata* Chang in general shape but differs in having well developed interpleural furrows and greater number of pleural spines.

DISCUSSION AND CONCLUSION

Though the present forms are part of the 'Redlichid Province', our knowledge of Lower Cambrian trilobite fauna is limited to the records of *Redlichia* from the Trans Himalayan Spiti (Reed, 1910), Kashmir (Raina and Razadan, 1975; Shah, Raina and Razdan, 1980) and Lesser Himalaya (Kumar, Mathur and Joshi, 1985; Kumar, Joshi and Mathur, in press). This horizon is correlatable to the upper part of the Tsanglangpuian stage (Wuljing substage) of Early Cambrian in southwest China (Zhang *et al.* 1980). The present find of redlichid trilobite *Paokannia*, therefore, is of special significance as it is correlatable to the *Drepanuroides* Zone in the lower part of the Tsanglangpuian Stage (Hongjiingshao substage). The genus *Paokannia*, according to Dr. W.T. Chang (Zhang Wentang), Nanjing Institute of Geology and Palaeontology, Nanjing, China, is widely distributed in southwest China and also occurs in western part of Tarim Platform, western China (personal communication). It is, therefore, of much wider distribution, and the present find is the record of the oldest identifiable trilobite, so far, known from India.

ACKNOWLEDGEMENTS

The authors are grateful to Dr. W.T. Chang (Zhang Wentang), Nanjing Institute of Geology and Palaeontology, Nanjing, People's Republic of China for confirming the identification, valuable comments and information.

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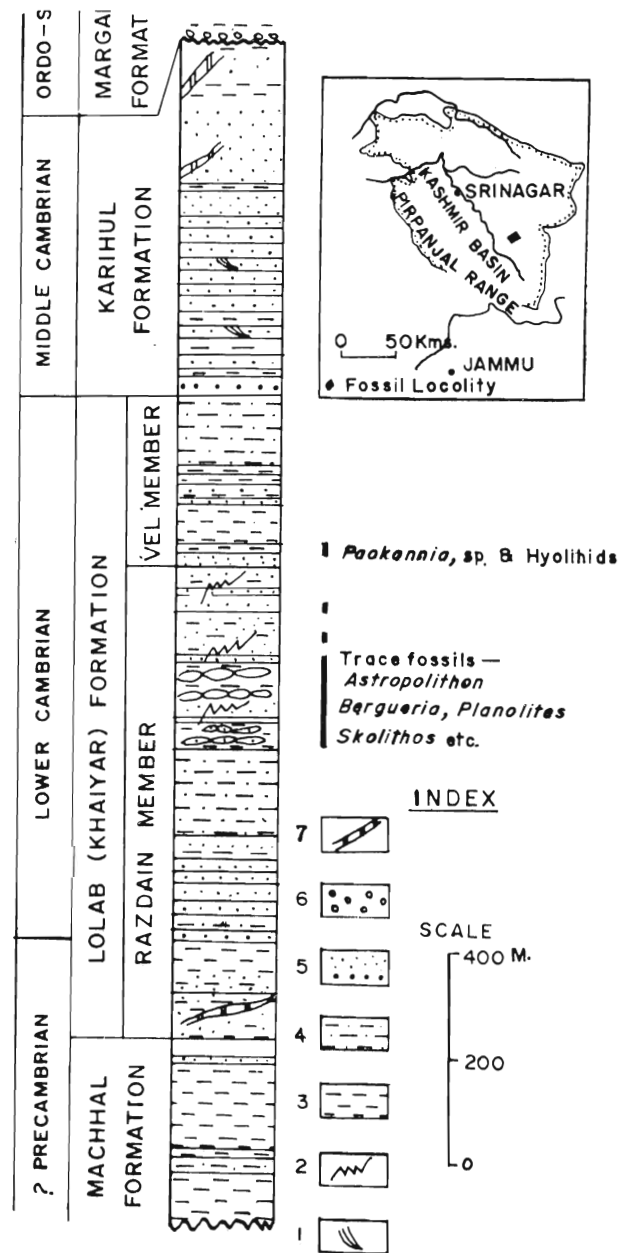


Fig 2. Lithocolumn of the Lolab and Karihul Formations showing the position of the Paokannia bearing horizon in Vel Nagabal section, Anantnag district, Jammu and Kashmir (after Kumar et al. 1984) 1. current bedding; 2 - Interference ripple marks; 3 - shale; 4 - mudstone; 5- Arenite; 6 - conglomerate; 7 - dolerite dyke.

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EXPLANATION OF PLATE

PLATE-I

1. *Hyalithids*, X 3. GSI type No. 20262
2. *Paokannia* sp., X 2.5, pygidium, GSI type No. 20263
3. *Paokannia* sp., X 1.5, pygidium. GSI type No. 20264
5. *Paokannia* sp., X 1.5, side view of pygidium showing the convexity, large terminal piece of the axial region and pleural spines. GSI type No. 20265
6. *Paokannia* sp. cf. *P. angulata* Chang, X 11.5, pygidium. GSI type No. 20266
7. *Paokannia* sp., X 3, pygidium (broken) showing deep axial and pleural furrows. Interpleural furrows are also developed. GST Type 20267
8. *Paokannia magna* Qian et Yao, X 3, pygidium. GSI type No. 20268
9. *Paokannia* sp., X 1.5, pygidium (broken) Showing well developed terminal piece of the axial region. GSI type No. 20269
10. *Paokannia magna* Qian Yao, X 3, cranidium, GSI type No. 20270
11. *Paokannia magna* Qian Yao, X 2, pygidium. GSI type No. 20271
12. *Paokannia* sp. of. *P. angulata* Chang, X 2.5, pygidium. GSI type No. 20272.

