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MIDDLE CAMBRIAN TRILOBITES FROM KARIHUL, LIDDAR VALLEY, ANANTNAG DISTRICT, KASHMIR AND ITS SIGNIFICANCE

GOPENDRA KUMAR AND GOPAL SINGH*
Himalayan Geology Division, Geological Survey of India, B-II/H-Road, Mahanagar Extension, Lucknow 226 006.
*Palaeontology Division, Geological Survey of India, Lucknow 226 007

THE authors, while imparting training to the Officer Trainees, Geological Survey of India, recovered five genera of Middle Cambrian trilobites from a limonitised zone of shale exposed at Karihul ($75^{\circ}22'33''$ $33^{\circ}50'30''$) in the Liddar Valley in the southeastern part of the Kashmir Basin (figure 1). The assemblage is in the form of head-shields, thoracic fragments, pygidia and some ill-preserved unidentifiable complete articulated forms.

The earlier record of the Cambrian trilobites from the Kashmir Basin were confined to the northwestern part¹⁻⁸.

The classification of palaeozoic sequence of the southeastern part of the Kashmir basin has earlier been attempted⁹⁻¹¹. Detailed lithological classification of the Lower Palaeozoic sequence (pre-Margan Shale Formation) of this area¹² is given below:

Karihul Formation:

Greenish grey sandy shale with lenticular limestone bands.

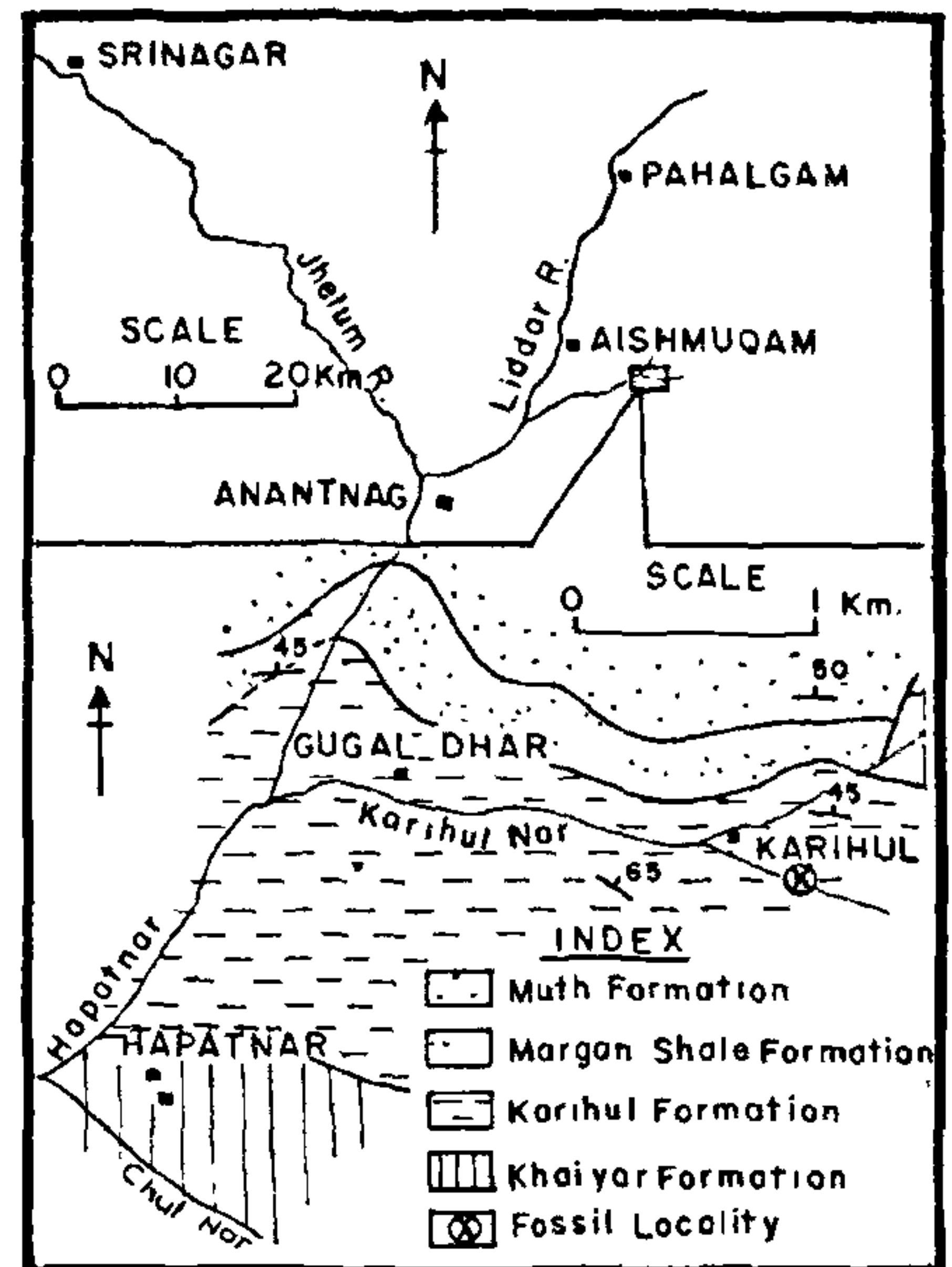


Figure 1. Fossil locality and geological map.

Greenish grey micaceous sandstone, siltstone, shale with lenticular grey to white crystalline limestone/dolomite, occasionally oolitic or pisolitic. Trilobite fauna in upper part.

Khaiyar Formation:

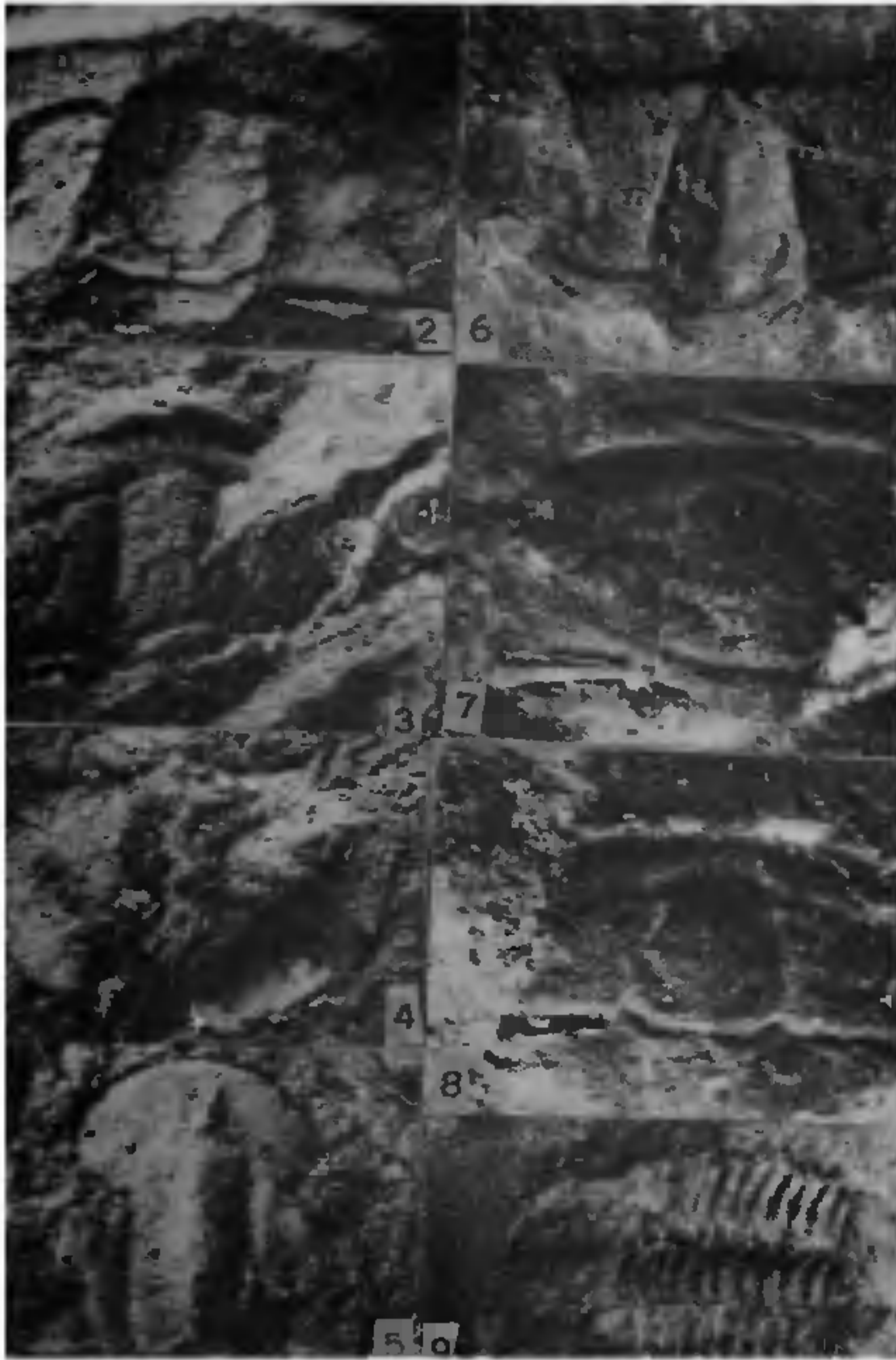
Vel Member—Alternate sequence of grey to black laminated shale and greenish grey micaceous siltstone, shale with large worm-tubes and trail markings.

Razdain Member—Rhythmic alternation of grey quartzite and shale with abundant worm-tubes on ripple-marked surfaces.

Lithologically, the Karihul Formation is comparable to the similar rocks of northwestern Kashmir, and also of Spiti Valley^{13,14}, Himachal Pradesh, where they also contain Cambrian trilobites.

Check list of trilobites:

- | | |
|-----------------------------|-----------------------------|
| 1. <i>Ptychoparia</i> sp. | 4. ? <i>Asaphiscus</i> sp. |
| 2. <i>Ptychoparella</i> sp. | 5. ? <i>Caborcella</i> spp. |
| 3. ? <i>Anomocare</i> sp. | 6. Gen indet. |



Figures 2-9. 2, *Ptychoparia* sp., $\times 6$, head-shield, G.S.I. Type No. 19650; 3, *Ptychoparella* sp., $\times 9$, head-shield, G.S.I. Type No. 19651; 4, ?*Asaphiscus* sp., $\times 5.5$, pygidium, G.S.I. Type No. 19652; 5, ?*Anomocare* sp., $\times 6$, head-shield G.S.I. Type No. 19653; 6-8, ?*Caborcella* sp., 6, *C.* sp., $\times 6$, head-shield, G.S.I. Type No. 19654; 7, *C.* sp., $\times 6$, head-shield, G.S.I. Type No. 19655; 8, *C.* sp., $\times 4$, head-shield, G.S.I. Type No. 19656; 9, Gen indet., $\times 5.5$, cast, G.S.I. Type No. 19657.

All the specimens are housed in the Central Palaeontological Laboratory, Geological Survey of India, Calcutta, bearing G.S.I. Type Nos. 19650 to 19657.

This fauna not only establishes the Cambrian sediments but also suggests that the major part of the underlying Khaiyar Formation may also be Cambrian (Early Cambrian) in age.

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STRUCTURE AND DEVELOPMENT OF THE CARYOPSIS IN *SPOROBOLUS COROMANDELIANUS* (RETZ.) KUNTH.

T. V. CH. SATYAMURTY

Department of Botany, Andhra University, Waltair 530 003, India.

Present address: Government Junior College, Erragondapalem 523 327, India.

A CARYOPSIS is the fruit of a member of the Poaceae in which the seed coat is adnate to the pericarp. The caryopsis wall has anatomical and agricultural importance since it may contribute to the dormancy in weed species^{1,2}. Rost and Lersten³ have made a survey of the available literature on the anatomy of the caryopsis and pointed out that thorough anatomical investigations of an adequate sample of the family are lacking.

In view of the above it was thought desirable to study the anatomy of the caryopsis in *Sporobolus coromandelianus*.

In *Sporobolus coromandelianus* the campylotropous ovule is solitary and sub-basal. It is erect in the early developmental stages but later becomes campylotropous. The ovule is tenuinucellar and has two

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