A NOTE ON THE PALYNOLOGY OF THE GONDWANAS OF SIANG DISTRICT, ARUNACHAL PRADESH

This note records the first discovery of palynological evidence of the Lower Gondwana sediments of the Siang District, Arunachal Pradesh. Earlier, the Gondwana sediments of the Siang District were referred to as Gondwanas by BROWN (1912) on the basis of their lithological similarities with those of the Peninsula. Recently, KUMAR AND SINGH (1974) have studied the lithostratigraphic succession of the area and proposed a new unit "Garu Formation" comprising the members Rilu, Bomte and Siki Abu. On the basis of some palaeontological evidence the authors concluded that at least a part of the succession represents the Middle Carboniferous. On the other hand, ACHARYYA, GHOSH, GHOSH AND SHAH (1975) regarded the sediments essentially as Lower Permian in age because of their closer faunistic resemblances with those of the marine ingressions within the Talchir Formation of Peninsular Gondwanas. In view of the above controversy, a palynological investigation of the sediments exposed along the Garu-Gensi road, a distance of about 18 km, have been undertaken.

Structurally, the Eastern Himalayas swing to the south and south-west in an orographic knee-bend which partly lies in the district of Siang. The Sub-Himalayan ranges south of river Siyom show northeasterly trend whereas north of Along Valley and the upper part of Siang Valley the configuration of the ridges is complex though the main north-south and north-south-east trends maintain their identity vividly. The Lower Gondwana sediments in the Sub-Himalayan ranges of the N. E. Region thrust over the younger Tertiaries to the south. JAIN *et al.* (1974) have described this contact as the "Garu Thrust". The contact between the Gondwana and the younger Tertiaries (Siwaliks) is elsewhere described as the Main Boundary Fault. The beds are highly dipping at angles varying between 40°-60° towards northwest, while near the contact with the younger Tertiaries they show almost vertical dip.

The Gondwana Group of sediments form a long narrow strip comprising of khaki green shale, black shale, carbonaceous phyllite with lenses of semi-anthracite, calcareous and greenish-grey micaceous sandstone, mudstone and siltstone.

The mioflora consists of pteridophytic spores, gymnospermous pollen grains and alete miospores assignable to "Acritarcha". Twenty-three important spore pollen genera which have been encountered in the mioflora are :

Callumispora, *Lycopodiumsporites*, *Brevitriletes*, *Lacinitriletes*, *Microbaculispora*, *Indotriradites*, *Jayantisporites*, *Parasaccites*, *Virkkipollenites*, *Plicatipollenites*, *Stellapollenites*, *Rugasaccites*, *Crucisaccites*, *Divarisaccus*, *Caheniasaccites*, *Potonieisporites*, *Illinites*, *Platysaccus*, *Striatites*, *Faunipollenites*, *Striatopodocarpites*, *Vesicaspora* and *Scheuringipollenites*.

Among 'acritarchs' the following genera have been identified : *Pilasporites*, *Schizosporis*, *Hemisphaerium*, *Balmeella*, *Maculatasporites*, *Quadrisporites*, *Leiosphaeridia*, *Spongocystia ?*, *Botryococcus*, *Foveofusa*, sponge spicule like structures and spinose acritarchs.

The overall association of various palynotaxa indicates the occurrence of two distinct miofloral zones, viz. Miofloral Zone I and Zone II.

Miofloral Zone I is characterised by the general dominance of radial monosaccate pollen grains. Amongst these, *Parasaccites* occurs in abundance. *Plicatipollenites*, *Rugasaccites*, *Virkkipollenites*, *Stellapollenites* occur consistently. *Potonieisporites* and *Illinites* occur next to *Parasaccites*. The trilete miospore, striate and nonstriate disaccates are rather incon-

sistent in their occurrence. Spinose and non-spinose acritarchs, although rare, occur consistently.

Miofloral Zone II is marked by the dominance of the genus *Callumispora*. *Parasaccites*, as compared to Miofloral Zone I, declines to occupy only second place in abundance. *Microbaculispora* and *Indotriradites* form a significant percentage among the trilete miospore. In general the trilete miospores and monosaccate pollen grains together characterise the association. *Crucisaccites* is confined to this zone alone. Striate and nonstriate disaccates occur more frequently as compared to Miofloral Zone I. Spinose acritarchs are absent while non-spinose acritarchs occur but inconsistently.

The Miofloral Zone I is associated with the khaki-green, splintery shale, mudstone and black shale with pebbles and boulders of limestone, calcareous sandstone and cherty nodules comprising the basal part of the succession in this area. This mioflora is closely comparable with the mioflora of the Talchir Stage of the Lower Gondwana in Peninsular India (Bharadwaj & Srivastava, 1973 ; Srivastava, 1974). The characteristic lithology of the Talchir Boulder Bed (Tillite) and associated varve, khaki-green needle shale and mudstone of the Talchir Formation, bearing radial monosaccate dominant mioflora, represent the glacial/glacio-fluviatile phase during their deposition. The consistent occurrence of acritarchs in the Siang District Assemblage is closely comparable with the marine intercalations of Umaria and Manendragarh. The presence of spinose acritarchs is specially significant as it is reported for the first time from the Lower Gondwana marine sediments of India.

The Miofloral Zone II is associated with the grey and carbonaceous facies present in the younger part of the succession in Siang District and as such closely compare with the Lower Karharbari (Bharadwaj & Srivastava, 1973 ; Srivastava, 1974) miofloras of the Peninsula.

Thus, the occurrence of the above two miofloral zones in the sedimentary sequence of Siang District represents two distinct phases during their deposition. The present study confirms that the sediments are entirely of Permian age as no Carboniferous miospores have been encountered in them. The mioflora, chiefly the spinose acritarchs, during the deposition of khaki-green shale etc. indicates that the Glossopteris flora thrived successfully in and around the marine transgressive regions of the Siang District. Later on, the climate ameliorated significantly so as to permit ample diversification of the mioflora and ultimate development of coal and carbonaceous matter in the younger part of the succession.

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