Microfossils and the age of the Subathu Formation of Dogadda, Garhwal Himalayas

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Introduction
Recently, the geology around Dogadda (78°36'40"N: 29°48'20"E) has received the attention of several geologists, prominent amongst these being Maithani (1972), Ganeshan (1972), Shankar, Dhaundial and Kapoor (1973), Shanker and Ganeshan (1973) and Kalia (1974). The chief attraction being the new finds of Upper Carboniferous Brachiopods and Bryozoans near Jogira (78°39'04"N: 29°47'56") and the reported occurrence of various groups of fossils from the Tal Formation (Middlemiss, 1865) and their bearing on the age of this key horizon in the Himalayas.

The Subathu Formation from Dogadda has received scant attention and so far no fossils have been recorded from this horizon to enable us to infer the age of these rocks. The note records profuse occurrence of Nummulites cf. "maumilla" Fichtel and Moll., Operculina patalensis Davies, a few fragments of "atacicus" Leymerie, Assilina granulosa chhumbiensis Gill, Globorotalia, shells of Molluscs and some oblique sections of Cocconeis, from the Subathu Formation which according to Hanna (1929) is a brackish water Tertiary Diatom.

Stratigraphy

<table>
<thead>
<tr>
<th>Formation</th>
<th>Lithology</th>
<th>Age</th>
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</thead>
<tbody>
<tr>
<td>Amri</td>
<td>Schistose phyllites with granite</td>
<td>Lower Palaeozoic to Precambrian?</td>
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<tr>
<td>Lower Bijni</td>
<td>Quartzites, boulder slate, gritty quartzites and sandy limestones</td>
<td>Permian to Upper Carboniferous</td>
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<tr>
<td>Subathu</td>
<td>Intercalated bands of grey, green and purple shales, grey sandstones, and lenses of grey limestones and brownish shell marls</td>
<td>Lower Eocene to Upper Paleocene</td>
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<td>Tal</td>
<td>Interbedded greenish, reddish, shales and compact sandy limestones becoming oolitic and shelly near top</td>
<td>Lower Paleocene to Cretaceous</td>
</tr>
<tr>
<td>Krol</td>
<td>Dolomitic grey limestones and grey, green and red shales</td>
<td>Cretaceous? Jurassic to Upper Paleozoic</td>
</tr>
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<td>Siwalik Group</td>
<td>Compact micaceous sandstones and interbedded greenish and reddish shales</td>
<td>Pliocene to Middle Miocene</td>
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Figure 1. Microrofossils from the Subsite of Dogadaa.

1. *Operculina patula*ensis Davies, axial and oblique sections x 8.
2. *Nammulites cf. mammilla* (Fichet and Moll) and *Anolinus granulosa* chhumbiensis Gill, axial sections x 8.
3. *Cocconus* sp. x 19.
4. *Nammulites cf. mammilla* (Fichet and Moll), fragment of equatorial section x 32.
Similar association of O. pataleensis and N. mammilla in abundance is known only from the Khararad Limestone and Patala Shales of the Ranikot Formation (Paleocene) of Salt Range, Pakistan (Davies and Pinfold, 1937). The Subathu Formation of Dogadda is therefore restricted to Upper Paleocene to Lower Eocene (= Laki). The underlying glauconitic, gritty-oolitic Tal limestones enclosing a varied assemblage of Archaeolithothamnion, Neomeris (Decaisnella), Girvanella, Globigerina Globorotalia, Textularia, Milliolid, Cyclostomatous Bryozoa resembling Leiosoea, Laterocavella, Grammatomutillacea (Tewari and Kumar, 1967) is logically to be restricted to Lower Paleocene-Cretaceous. The bed has often been confused and mixed up (Valdiya, 1975) with the tectonically overlying Upper Palaeozoic grey limestones of the Lower Bijni unit, which can also be distinguished by the absence of the above mentioned assemblage of the Tal Formation.

References