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A SHORT NOTE ON GEOLOGY OF PHULCHAUKI

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ABSTRACT

This paper briefly deals about the Geology and structure of Phulchauki hill, one of the two fossilferous localities of lesser Himalaya. Geological observation of the author is corellated with previous work and the structure of the area is evaluated.

INTRODUCTION

The Phulchauki hill south of Kathmandu and the Chandragiri range west of Kathmandu are two of the very few fossil localities known in the Lesser Himalaya. The fossiliferous beds, of Lower to Middle Paleozoic age, occur in the axial part of the large, WNW–ESE trending Phulchauki-Chandragiri syncline, and the two localities are in obvious structural continuity with each other. It is important, however, to distinguish clearly the two sections, which are 24 km apart and apparently represent different portions of the Paleozic succession as revealed now by the respective faunal assemblages.

The Trilobites and other fossils discovered in 1952 by T. Hagen and P. B. Malla (Hagen 1969) and later studied by Bordet (1959) were found in Pulchauki hill. The Phuchauki fossils were generally assigned a Sillurian age and more recently Gupta (1975) reported Devonian Conodonts from the higher part of the Phulchauki section.

The fossilliferous beds of the Chandragiri section was studied by Stocklin and Bhattarai (1977), and yielded the oldest determinable forms of echinoderm and crinoids. They include the cystids of late ordovician age (Tremier et al 1977).

GEOLOGY

The Phulchauki hill lies geologically in the Phulchauki group of Kathmandu complex (Stocklin and Bhattarai 1977) which consists of Tistung formation,

Sopyang formation, Chandragiri limestone, Chitlang formation and top, Godavari limestone. However the Phulchauki section as described in the present paper (fig. 1) consists of only top three formations. The other two formations Tistung and Sopyang are not present in the Kathmandu Phulchauki traverse.

The lowermost formation of the Phulchauki hill is the Chandragiri Limestone which is well exposed right from the Godavari village, where the quarrying of the stone is going on. This limestone/marble is not to be confused with the Godavari Limestone of the top of Phulchauki, as locally they are named as Godavari Limestone/marble after the village name Godavari, from where the uphill trail to the Phulchauki top begins.

The Chandragiri Limestone is the most prominent Formation of the Phulchauki Group. The main rock type is yellow or brown weathered limestone, of massive appearance from a distance but always well bedded, often platy on close view. In fresh surface the limestone is from white and yellow to pale green and pinkish very finely crystalline, in part siliceous, also dolomitic containing pyrite in fine disseminations or as fissure-fillings. Argillaceous material occurs as fine sericite-chlorite films on bedding planes or as thin intercalations. In the lower part the limistone is more thinly bedded and more argillaceous and shows ripple marks on many of the phyllitic bedding planes and in places has strong green and pink colours. Many of these ripple beds contain crinoid and other echinoderm fragments. The limestone passes upwards into the slates of the Chitlang Formation.

The Chitlang Formation consists for the greater part of dark, violettish soft weathered slates. A distinct white quartzite member is interbeded in the lower part and a few thin limestone intercalations occur higher up-section (fig. 1).

Contrary to Hagen (1969) Stocklin and Bhattarai (1977) found the Chitlang Formation not to underly but to overly the ordovician Chandragiri Limestone to form the true core of the Chandragiri-Phulchauki syncline. In Phulchauki the beds consist of violettish slates, with intercalation of quartzite in the lower part and limestone in the upper part. The slate contains two or three purple ferruginous beds one of which contains iron deposits with 10–15 m. thick heamatite bed occurring partly in concretionary and partly in discrete compact layers.

The Silurian Trilobites according to Bordet (1960) occur in great abundance in the ferruginous concretions, in the eastern part. The slates could be traced into the south flank of the Phulchauki syncline but are poorly exposed there. They are however clearly underlain in both flanks by typical thick Chandragiri Limestone. Upwards they become calcareous and pass into crinoidal limestone that forms the base of the Godavari Limestone.

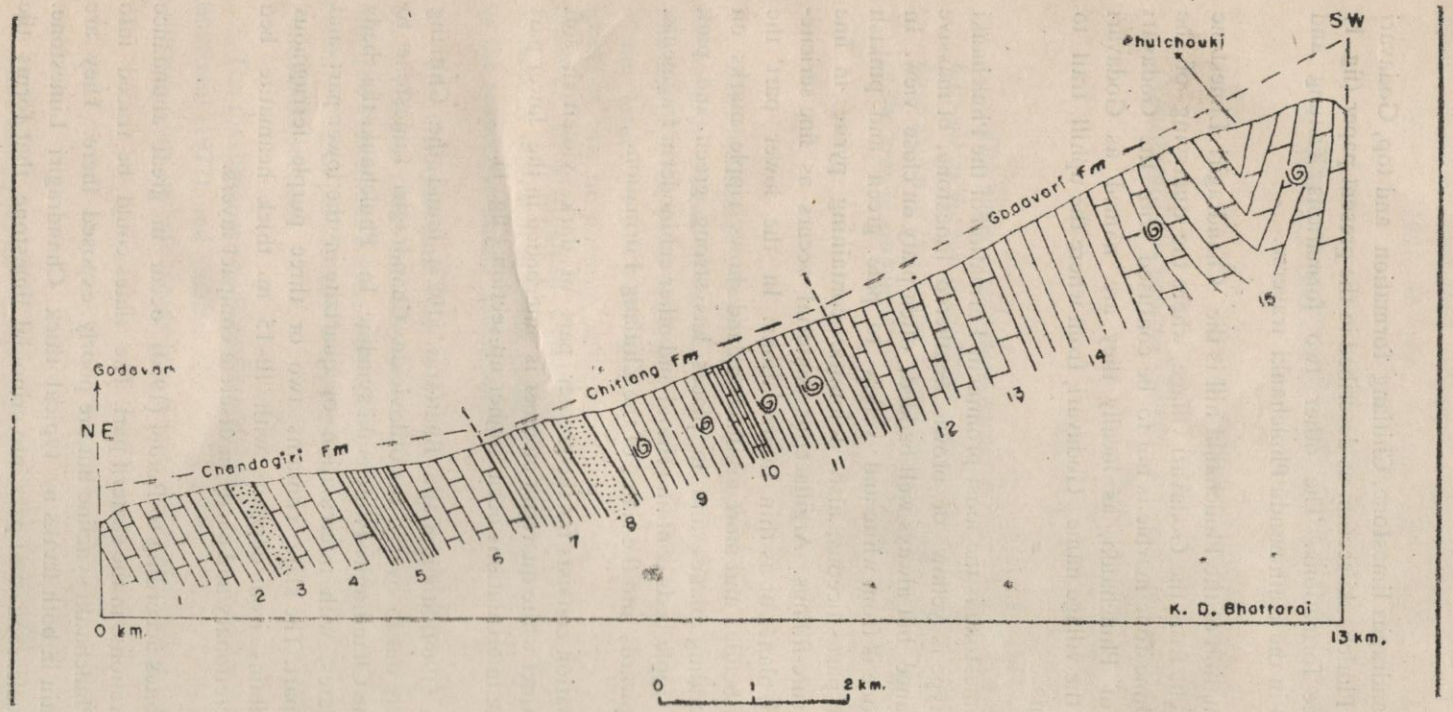

Figure 1: Sketch Profile along Godavari–Phulchauki

1. Platy dolomitic limestone 2. Argillaceous intercalation 3. Quartzite intercalation 4. Main massive yellow brown colour limestone 5. Wavy mark phyllite intercalation 6. Weathered limestone lithologically similar to the fossil containing beds of Chandragiri. 7. Soft weathered slates 8. Quartzite intercalation 9. Shale ferruginous containing trilobites fossil 10. Thin intercalation of limestone 11. Similar to No. 9 12. Argillaceous limestone. 13. Dolomitic limestone with crinoids 14. Argillaceous intercalation with (conodonts ?) 15. Massive dolomite with crinoids

The Godavari Limestone is the youngest rock of the Kathmandu Complex and forms the summit of the Phulchauki hill, dated as Devonian on the basis of conodonts by Gupta (1975). It occupies the core of the Phulchauki syncline and in fact the very core of the entire Mahabharat synclinorium. The lower part consists of well-bedded green and purple argillaceous limestone, many layers crowded with crinoidal fragements. This part of the formation resembles some what the upper crinoid-bearing part of the Chandragiri Limestone though it is evidently much younger. However Bordet correlates the Godavari Limestone of Phulchauki with Chandragiri Limestone (fig. 101 of A. Gansser; Geology of Himalaya). The main type of Godaaari formation above these crinoidal limestone is a massive coarsely crystalline dolomite of few hundred meters thickness.

CORELATION OF PHULCHAUKI GROUP

The Phulchauki Group shows certain lithological similarities with the Lower Paleozoic sequence of the Tibetan sedimentary zone of the High Himalaya. In Particular the thick Chandragiri Limestone can be closely compared in Lithology, thickness, stratigraphic position and age with Larjung Nilgiri Limestone of Thakkhola (Bordet et al., 1968) and also with the Chiatsun Limestone of the Nyalam-Sagarmatha (Everest) region (Mu Antze et al., 1972).

CONCLUSION

The detail section of the Phulchauki as observed by the author, stress its importance to interpret the general structure, as well as the stratigraphic set of the whole Kathmandu region.

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REFERENCES

Bordet, P., Cavet, J. et Pillet, J., 1959. Sur l'existence d'une faune silurien dans la region de Kathmandu (Himalaya du Nepal) C. R. Acad. Sci., Paris 248, 1547–49

Gansser, A., 1964. Geology of Himalayas. Interscience Pub., London, 289 p.

Gupta, V. J., 1975. Upper Devonian conodonts from Phulchauki. Nepal Himalaya. Him. Geol., 5, 153–157.

Hagen, T., 1969. Report on the Geological survey on Nepal vol. 1 (Preliminary reconnaissance) Denkschr. Schweiz., naturf. Ges. Bd. 6, Zurich.

Stocklin, J., 1980. Geology of Nepal and its regional frame. Geol. Soc. Lond., 137, 1–34.

Stocklin, J. and Bhattarai, K., 1977. Geology of Kathmandu area and Central Mahabharat range. H. M. G./UNDP Mineral Exploration project report (unpublished).

Termier, G., Stocklin, J. and Bhattarai, K., 1977. The fossiliferous rocks of Chandragiri (Mahabarat) range of Nepal. Bull. Geol. Soc. France, 7 (2), 367–373.