

CHAPTER III

REGIONAL GEOLOGICAL SETTING

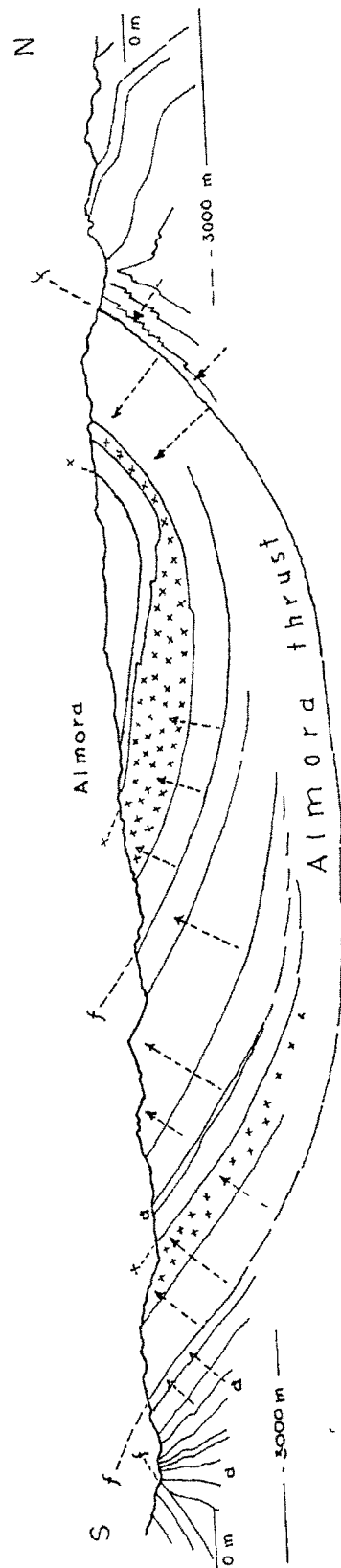
EARLIER VIEWS

The study area forms a part of the Lower Kumaon Himalaya. Its rocks have been correlated by Heim and Gansser (1939) with those of the Krol-belt of Auden (1934). According to Gansser (1964, p.91), the Krol-type outcrops of Mussorie Hills (in Garhwal) can be followed to the south-east as far as Naini Tal. The Naini Tal-Bhimtal area thus lies at the south-eastern extremity of the Simla-Krol belt. It forms a part of the Krol nappe, lying just north of, and very close to the Krol Thrust.

The rocks of the study area make a large anticlinal structure, a major portion of which extends NW-SE. This anticline is quite conspicuous in the field and is typically exhibited by the quartzites of the area. Beneath the quartzites lie the basic rocks and occupy the core of the anticline. The Bhowali-Bhimtal anticline is an important structure recognised by almost all the previous workers.

A perusal of the section (Fig. 3.1) prepared by ~~Klein and~~ Gansser (1964) ideally shows the regional setting of the Bhowali-Bhimtal anticline. To the W and NW of this anticline, occur the overlying sequence that has been correlated with Infra Krol-Krol and which at Naini Tal makes a large syncline. The absence of Infra Krol-Krol rocks on the north-eastern limb of the anticline has been explained by the occurrence of a major reverse fault or through a thrust viz. the Ramgarh Thrust. This dislocation extends all along the north-eastern flank of the anticline. Further north, beyond the Ramgarh thrust, is encountered the South Almora Thrust which separates the underlying Krol Nappe rocks from the Almora Crystalline Thrust Sheet (= Almora Nappe). This thrust sheet forms a regional synform, and the Krol nappe rocks to its north form a

Fig. 3.1 Section across Kumaon Himalaya
A Gansser - 1964



complicated anticlinal structure which has been referred to as "false anticline" by Heim and Gansser (op. cit. p.43). The rocks to the south of the South Almora Thrust (Garampani, Bhowali-Bhimtal and Naini Tal etc.) form a syncline at Naini Tal before finally resting over the Krol thrust at Ranibag.


The Ramgarh Thrust just above the quartzites of Bhowali, has intrigued most of the previous workers. Heim and Gansser (1939) thought that this dislocation was a folded continuation of the Almora Thrust. They have shown two thrusts dipping to the NE, the one near Ramgarh (Ramgarh Thrust) in their opinion, is the southern flank of the synformally folded Almora Thrust and the other one further north, is their south Almora Thrust (Fig. ^{3.1} 2.5). These two workers also postulated a recumbent syncline in the quartzites at Nathuakhan in the Ramgarh valley and accordingly considered, the rocks lying above the Ramgarh thrust as equivalent to the crystalline rocks of the Almora nappe. Thus came into vogue, the concept of Ramgarh Nappe.

VIEWS OF MERH AND HIS ASSOCIATES

According to Merh (1968) however, neither the 'Ramgarh Nappe' nor the 'recumbent syncline' exists.

He has written (Op. cit. p.2), "To the south of Upradi Thrust (South Almora Thrust), the rocks of the Krol Nappe extend uninterrupted as far as Bhowali and beyond. The uniformly NE dipping rocks hardly show any evidence to suggest the possibility of a folded thrust, open or tight, to form the so called Ramgarh Nappe. A critical examination of the current bedding in the quartzites, also rules out the existence of the recumbent syncline as postulated by Heim and Gansser (1939, p.28)". Merh (op. cit. p.5) has on the other hand, suggested that the two flanks of the synformally folded Almora thrust are represented by the North Almora Thrust and the South Almora Thrust, and the thrust at Ramgarh is of a later date and in some way connected with the synformal folding of the Almora thrust and the Krol thrust movement. The folding of the Almora thrust in the opinion of Merh (op. cit. p.6), appears to have taken place at the same time as the formation of the anticlinal structures at Bhowali and Someswar.

The stratigraphic ages of the various formations of the Bhowali-Bhimtal area, are also controversial. Almost all the previous workers have considered them equivalent to one or the other part of Jaunsars of Simla. The rocks to the N and NE of Bhowali, upto the South Almora Thrust, were taken to be a rather highly folded



sequence such that within Nagthat quartzites occurs a thrust slice of older (Chandpurs ?) rocks (Please see sections prepared by Heim and Gansser, 1939 and Gansser, 1964). Merh (1968), though discounting the existence of Ramgarh Nappe, more or less accepted these rocks to be of Jaunsar age. Almost all previous workers have agreed that the quartzites of Bhowali were of Nagthat age, and to the W and NW these quartzites were overlain by a continuous sequence of Infra Krol and Krol formations. No one suspected that these quartzites could after all be the lowermost formation of the Krol group itself (? equivalent to Blaini).

In the course of last four years, Devendra Pal (1973), Shah (1973) and the present author, have systematically reinvestigated the area around Naini Tal, Bhowali, Bhimtal and Garampani and have arrived at quite new and interesting conclusions. The present author who restricted his studies to the Bhowali-Bhimtal area, established that the Bhowali anticline (F_1) is much distorted on account of the superimposition of later (F_2) folds. Devendra Pal working to the west found that the syncline at Naini Tal belongs to this later F_2 fold episode. Shah C.P. (1973) worked on the northern extension of the Bhowali anticline and traced its hinge area (Fig. 3.2). Both the present author and Shah C.P. have concluded that the quartzites of Bhowali-Garampani are equivalent to Blainis and not to Nagthats.

In the subsequent pages of this thesis, the author has elaborated upon the various geological details of the Bhowali anticline and its two flanks, bringing out the salient points on which his investigation differs from the existing ideas about the structure and stratigraphy of this part of Kumaon.