PART IV : RESUME'

CHAPTER 9

R E S U M E

The results of the present investigations have thrown considerable light on the various unexplained problems of the Kumaon Himalayas.

Though a number of geologists visited the Someshwar area in the past, none have explained its structure in detail. Heim and Gansser (1939) called the Someshwar structure as a 'false anticline'. An attempt to explain the structural complexity of the Someshwar area was made by Merh (1968) who for the first time suggested the possibility of an ESE-WNW reverse fault to explain the lithological dissimilarity of the two limbs.

The author's investigations have fully substantiated the existence of such a fault. The present study has not only explained the nature of the Someshwar anticline, but has also enabled the author to work out the correct stratigraphy and structural history of the area.

The North Almora thrust and the Kausani thrust comprise two limbs of the antiformally folded Almora thrust, such that the metasedimentary sequence of the Krol nappe forms an asymmetric anticline between the two thrusts. The author, following the correlation of Auden (1937), Heim and Gansser (1939), Gansser (1964) and Merh (1968), has assigned a Chandpur age to the rocks of Almora and Baijnath nappes, while the Krol nappe sequence has been considered as of a Deoban-Nagthat age.

The portion of the Almora nappe of the study area comprises a part of the south dipping limb of the great Almora nappe synform, similarly the rocks above the Kausani thrust, form a small portion of the north dipping limb of the Baijnath nappe synform. The rock types consist of (i) migmatitic gneisses with lenses of quartzites, (ii) sills of epidiorites and (iii) phyllonites. The gneissic rocks show considerable mylonitisation along several imbricate shear zones related to the North Almora

thrust. The unmylonitised gneiss is an augen bearing and porphyroblastic rock which the author has considered to be of migmatitic origin, having derived from the original mica schist by a progressive metasomatic addition of alkalis. The phyllonites, occurring all along in the immediate vicinity of the North Almora thrust, are separated from the gneisses by a thick quartzite band. The phyllonites are a retrograde product after the original mica schists. These phyllonites and quartzites are absent from the Baijnath nappe where the gneisses come in a direct contact with the thrust.

A critical study of the orientation of the various planar and linear structures has revealed that the crystalline rocks have undergone several deformations. The main gneissic foliation, derived from the original schistosity characterises the axial-plane of an early isoclinal fold (F_1). This folding culminated into the North Almora thrust with extensive shearing and with retrogression of schists into phyllonites as well as mylonitisation of gneisses. The folding of the Almora thrust sheet (F_2) into an antiform gave rise to the main structural pattern. During this episode, the rocks sporadically developed crinkles and minor folds. Effects of a late NNE-SSW

flexuring is seen in the gentle fluctuations of the strike trend of the foliation.

The folded and faulted metasedimentary sequence of the Krol nappe shows the following stratigraphic succession:

Lod series	Quartzites	Nagthats
	----------Unconformity----------	
Someshwar series	Chlorite schists	Deobans
	Upper slates	
	Dolomitic limestones	
	Lower slates and quartzites	

The author has differed with Valdiya (1962) and has established that the abovementioned Krol nappe succession is not inverted. As regards the age of these formations, he has followed mostly Auden (1937) and Merh (1968).

The above sequence is so folded that the Lod series quartzites form an open almost upright anticline and beneath which the rocks of the Someshwar series show an overfolded complex anticline. The crest of the Someshwar anticline is so faulted that its southern limb has been down thrown.

The structural details of the Krol nappe are equally interesting. The most prevalent structures are those connected with the development of the Someshwar anticline (F_2). The response of the different rocks of the Someshwar series to this folding is quite varied. The slates and quartzites underlying the limestone, and forming the core of the anticline show a large number of mesoscopic folds, the mechanism of folding being flexural-slip type such that there is a parallelism between slaty cleavage and bedding. The limestones, on account of less competence and plastic nature, show much contortions but little regularity in fold patterns. The slates and chlorite schists above the limestones, show extensive development of an axial-plane cleavage. The superimposition of a NNE-SSW synform (Bhatina synform)(F_3) with related flexures has distorted the anticlinal structure. Further complexity was added by the Lod-Niral reverse fault, which truncated a part of the anticlinal crest.

This faulting comprised the last major tectonic event of the region. It not only complicated the Someshwar structure, but also affected the North Almora thrust. So that in the western part of the study area,

migmatitic gneisses are seen in a direct contact with the Lod quartzites.

The study has led the author to the following main conclusions, which have considerable regional significance:

(1) The Krol nappe sequence at Someshwar, which is definitely a western extension of the calc-zone of Pithoragarh, does not show any inversion as postulated by Valdiya (1962). The inversion shown by the stromatolitic occurrences has always been found to be a local phenomenon observed on the inverted limbs of the anticlinal structure.

(2) The Someshwar anticline could be correlated with similar structures at Dudatoli-Chaukhatia in the west and the Pithoragarh region in the east. In fact, the entire Krol nappe succession forms a regional anticlinal structure.

(3) The peculiar outcrop pattern and the lack of correspondence between the two limbs is on account of (i) existence of an unconformity between the quartzites of the Lod series and the underlying Someshwar series (ii) difference in the geometry of the anticlinal folds formed in the above two

series both showing different degrees of asymmetry (iii) superimposition of a late NNE-SSW folding (iv) existence of an ESE-WNW reverse fault running along the crest of the anticline in the east and cutting the North Almora thrust in the west (v) widespread development of north dipping axial-plane cleavage in slaty rocks above the limestones.