CHAPTER VII

R E S U M E

The salient points of the subject matter of the preceding chapters, have been summarised here to provide an integrated picture of the geology of the Ramgarh-Mukteswar area as worked out by the author.

The entire sequence of the area, essentially a structural one, contains rock formations which have been correlated to the different horizons of the Jaunsar Series. Two dislocations, the S. Almora thrust and the Ramgarh thrust, have brought about much structural complexity. The older Chandpurs have been brought over the younger Nagthats

by the S. Almora thrust while the Ramgarh thrust is responsible for pushing the Deoban sequence over the quartzites of Nagthat age. The author has worked out the following succession:

Upper Schistose Group	Chandpurs	Almora Nappe
Mukteswar Gneissic Group		
Bhulmaria Schists and Phyllonites		
-------South Almora thrust---------		
Nathuakhan Quartzites and Phyllites	Nagthat	Krol Nappe
Sayalgad Limestone	Deobans	
Lusgaini Quartzites and Slaty Phyllites		
Ramgarh Group of mylonitised-granitic rocks etc.		
---------Ramgarh thrust----------		
Titoli Quartzites	Nagthats	
Bhowali Traps	(?)Tertiary	

The author's conclusions support the findings of Merh (1968) that the entire succession from Bhowali northward upto the South Almora thrust, constitutes an uninverted and unfolded sequence.

Structurally, the area comprises parts of two major tectonic units of Kumaon - the Almora and the Krol nappes, and both the units show distinctive structural characters. The main structural events that have affected the area are as under:

(1) Isoclinal folding (F_1) of Almora nappe rocks.

(2) Culmination of isoclinal folding into the Almora thrust.

(3) Synformal folding (F_2) of Almora nappe.

(4) Superimposition of E-W folding (F_3).

(5) Development of Ramgarh thrust cutting F_2 and F_3 structures.

(6) NE-SW to NNE-SSW open folding (F_4).

The rocks of Almora nappe show effects of F_1, Almora thrust, F_2 and F_3, while those of Krol nappe contain structures related to Almora thrust, F_2, Ramgarh thrust, F_3 and F_4.

The S. Almora thrust being the culmination of the isoclinal folding (F_1) appears to have closely followed the folding. This dislocation has caused considerable metamorphic downgrading. The Ramgarh thrust is not a folded extension of the Almora thrust but it is an independent dislocation of the nature of a big reverse fault

or a high angled thrust, that originates from Krol thrust in the SE. The author has however, established that the Ramgarh thrust is in no way related to F_2 folding. The Ramgarh thrust came into existence at a much later date, i.e. after F_3 but before F_4 folding.

The metamorphic histories of the rocks of Almora nappe and Krol nappe are equally different, and on the whole, the Almora nappe shows a higher metamorphism as compared to the Krol nappe.

The garnet-mica schists of Almora nappe, indicate a medium grade of regional metamorphism of 'Almandine-amphibolite facies', and this metamorphism synchronised with F_1 folding; as a result the metamorphic foliation (schistosity) characterises the axial plane of F_1 folds. The schists show an increasing downgrading towards the South Almora thrust. The final retrograde rocks in the immediate vicinity of the thrust are phyllonites. The gneisses that occur as bands in the schists indicate their migmatitic origin, the transformation of schists into gneisses having been brought about by a progressive addition of Na_2O and K_2O. Bulk of the migmatisation took place before the Almora thrust movement.

It is interesting to note that while the S. Almora thrust brought about retrogression in Almora nappe, it was the main contributor of progressive metamorphism in underlying Krol nappe. Though the metamorphism of the Krol nappe never exceeded that of phyllites, but a delicate change from slate to phyllite is obvious, on going west to east towards the thrust. The area thus affords a good example of 'metamorphic convergence'. Another important conclusion arrived at by the author in respect of the Krol nappe, is the true understanding of the nature of the so called 'porphyries' of Ramgarh. It has been established by the author that these are neither 'migmatites' nor 'porphyries', but are group of mylonitised granitic rocks showing a porphyroclastic structure. The shearing and mylonitization of these rocks is related to the Ramgarh thrust.

The results of the present study have not only enabled the author to work out in detail complete sequences of the structural and metamorphic evolution of the Ramgarh-Mukteswar area but have thrown much light on some of the regional problems of the Kumaon Himalaya.