CHAPTER 11

SUMMARY AND CONCLUSIONS

In the preceding chapters of this thesis the author has given a detailed account of his investigations, observations and conclusions in respect of the Mesozoic rocks of the Wagad hills. He has been able to establish a detailed stratigraphic framework in relation to environments of deposition in the Wagad basin which formed a sub-basin of the regional Kutch basin that existed during the Mesozoic times.

To summarise:

(1) The author has successfully established a formal stratigraphic classification and regional correlation of the Wagad hills. He has designated the entire sequence as 'Wagad Group' which has been divided into three formations viz. the Washtawa Formation, Kanthkot Formation and the Gamdau Formation.

(2) He has found that the stratigraphic cross section of the Wagad Group shows a wedge shaped geometry with tapering end towards NE. The percentage of finer clastics gradually increases towards thicker end i.e. towards WSW and SW.

(3) The study reveals that the palaeocurrent system remained stable throughout the deposition of the Wagad rocks. The prominent cross bedding directions are seen to be SW and WSW being sub-parallel to the palaeoslope. The formational thickness show increase in the same direction.

(4) The grain size study shows that areally the mean grain size of sandstones of all the formations indicate a gradual decrease in size from E to W. This change corresponds well with the palaeocurrent directions and in turn, reflects the direction of

transport. Vertically, the Washtawa and the Lower Kanthkot Formations show 'upward coarsening' pattern of the mean grain size while the Upper Kanthkot and the Gamdau Formations, show 'fining up' pattern.

(5) The area is bounded by a high angled fault to the S with a regional E-W strike. This fault - the South Wagad fault and its banching faults, are associated with narrow linear asymmetrical flexure zones comprising domes and anticlines towards the upthrown side. These faults mark the fundamental basement fractures. The flexure zones described as 'fault folds' appear to be the results of differential uplift of basement blocks along the faults accompanied by bending or draping of the sediments over the fault scarps.

(6) The Northern Range structures which are neither associated with any major fault nor show any preferred orientation are described as idiomorphic folds.

(7) The main tectonic activity took place during post-Upper Kanthkot and pre-Gamdau time.

(8) The area is marked by two distinct cycles of marine regression followed by deltaic environments in the eastern parts. Western half experienced two cycles of marine regression followed by marine transgression and fluvial environments.

(9) Stable shelf tectonic conditions coupled with mild subsidence prevailed over the northern parts of the basin while southern and south western parts experienced mildly unstable conditions which resulted into moderate subsidence. The northern half is marked by mild uplift, while the southern parts show moderate uplift. The uplift took place during post-Upper Kanthkot and pre-Gamdau time.

(10) The author has worked out in far detail the stratigraphy of the area for the first time, and his results are summarised in the enclosed Table 11.1. The sedimentary model of the basin has been given in the Table 11.2

The author has come to conclusion that the rocks of the Wagad basin to a great extent, contain in a nutshell, the various depositional events and characteristics of the regional Kutch basin. It would be most

TABLE 10.2

WAGAD SEDIMENTARY MODEL

Unit	Basin Geometry	Directional structure	Lithic fill	Arrangement
Gamdau Formation	Semi oval shaped widening and deepening down the paleoslope towards WNW Forms only western-most part of Wagad	Cross bedding, small to medium scale, asymmetrical ripple marks both giant and medium size. Rarely flute casts.	Sandstones over 90% mainly quartz arenite to quartz wacke type Rest shales and clays	The total section expands down the paleoslope from 0' to over 600' in that direction. Longitudinal filling.
Upper Kanthkot Formation	Arcuate type basin, opening and deepening along the paleoslope towards WSW and SW. Mainly active in the western part.	Cross bedding, small to medium scale, sub-parallel to the paleoslope. Symmetrical ripple marks, rarely sole marks.	Sandstones, calcareous quartz arenite to quartz wacke type, occasionally micaceous constitute about 90% to 60%. Rest are shales, often silty.	Gradual increase in the thickness and percentage of finer clastics down the paleoslope. Longitudinal filling dominant.
Lower Kanthkot Formation	Arcuate shaped basin opens in the SW and WSW parts, in the direction of paleoslope. Basin asymmetric in cross section.	Cross bedding, small to large size. Match well with the paleoslope. Asymmetrical ripple marks, subparallel to depositional strike.	Sandstones quartz arenite to quartz wacke type, varying from 90% to 60%, Shales, grey to dark grey, brownish, khaki, constitute rest of the amount.	Mainly longitudinal filling. Section shows sharp increase in thickness towards SW and WSW in the paleoslope direction. Higher shale percentage in the W.
Washtawa Formation	Arcuate shaped basin. Paleoslope towards SW, WSW and W. Basin widens in the direction of paleoslope. Asymmetric in cross section with steeper southern arts.	Cross bedding, small to medium scale, generally subparallel to the paleoslope. Symmetrical and asymmetrical ripple marks.	Sandstones, quartz wacke to quartz arenite, occasionally micaceous, constitute about 75% to 30%. Shales grey to khaki, silty, constitute rest of the percentage.	Section expands towards WSW and SW along the paleoslope. Shale percentage increase towards W. Mainly longitudinal filling prevailed.

appropriate if similar studies are extended by future workers to the north and west, many complexities of stratigraphy and tectonics of Kutch basin will be adequately unravelled.