SUMMARY AND CONCLUSIONS

Geology, geochemistry, magma generation, petrogenesis and the tectonic environment of the Jalor rocks have been described in the preceding chapters. On the basis of petrography, major, trace elements, including REE data, a close association of peralkaline with peraluminous component in the Jalor area, has been reported for the first time, and the granites of the Jalor area have been identified as high heat production types.

Jalor area has almost remained unexplored geologically, a brief survey of the previous work and the geological setting of the area is given in Chapter 1 and 2. Detailed geological investigations reveal bimodal suites of granites, rhyolites, gabbros and basalts with an interrelationship between volcanism and plutonism. Granites intrude their own ejecta, thereby indicating the subvolcanic nature of the former and also the fracturing of the earth's crust at the time of emplacement. The Jalor area forms two linked ring
structures almost circular in out plan, which overlap in a east-west direction. The eastern structure is marked by peripheral arcuate rhyolite dyke. Gabbroic intrusions are coeval with granite emplacement as is evident by the enclaves of the former in the granite. Both the ring structures are marked by number of granitic intrusions viz. biotite granite and alkali granite emplaced in an arcuate fashion. The alkali granite is restricted to the peripheral zones only. Numerous olivine dolerite dykes trending N15°E-S15°W cut the granite and the rhyolite as well. These dykes mark the final magmatic event in the area as is evident from the field relationship.

In Chapter 3, the petrography of granites, rhyolites, olivine gabbro, olivine dolerite and basalts have been described. It has been found that the Jalor granites are both subsolvus (two feldspar) as well as hypersolvus (one feldspar) (Tuttle and Bowen, 1953). The subsolvus granites are biotite and hornblende bearing whereas the hypersolvus granites are arfvedsonite, aegirine and kataphorite bearing. It has also been found, on the basis of the ferromagnesian modal contents, that the granites in which biotite exceeds
hornblende are subsolvus whereas the ones which have arfvedsonite, aegirine and kataphorite more than biotite are hypersolvus. Besides the rhyolites have also been identified as peraluminous and peralkaline on the basis of normative ac and c. All the basic rocks viz., olivine gabbro, olivine dolerite and basalts show same mineralogy but textural variations.

The detailed chemistry (major, trace elements including rare earth elements) of the Jalor rocks have been presented in Chapter 4 and 5. The granites and rhyolites are high in SiO₂, Na₂O + K₂O, Fe/Mg, Zr, Ga, Y, U, Th, REE (except Eu) and relatively higher in Li, Zn, and B, low in CaO, MgO and very low in Co and Sc. These granites are characterised by high total REE, with enriched LREE and somewhat HREE depleted chondrite normalised pattern with significant Eu anomaly. The abundances of the rare earth element of rhyolites are almost similar to those of granites but have a less marked europium anomaly. The chemistry of these rocks is strongly indicative of comagmatic and anorogenic origin of the Jalor rocks. It is also inferred that the magma generation depth of the Jalor granites corresponded to
about 33 Kms between pressure 4 to 10 Kb. Jalor magmatism is not exclusively peraluminous in nature as was previously believed, but has also a peralkaline component closely associated in space and time.

In Chapter 6, the radioelement concentrations and heat production of the Jalor rocks have been discussed. The HPU and Ur values of the alkali granite (hypersolvus) are higher than the biotite hornblende granite, biotite granite (subsolvus). The Ur values for the Jalor granites are much higher than the average granite value of 20 Ur. In heat production these granites are quite similar to the Nigerian Younger Granites. Nb, Sn, W and Zn deposits are associated with the latter (Kinnaird et al., 1985). It has been proposed that the Jalor granites should also be explored for Nb, Sn, W, U, Th and related mineralisation.

Magma generation and petrogenesis of these rocks have been discussed in Chapter 7. In view of the close association of the basalt and gabbro with coeval granites of the Jalor area and the emplacement of the arcuate rhyolite dyke, it is suggested that emplacement of the basaltic magma in the form of sills into the
continental crust caused partial melting of the crust which through various stages as discussed in Chapter 7, gave rise to major ignimbrite eruption, caldera collapse and large plutonic units of more silicic or felsic differentiation products (Huppert et al., 1983). Based on the major and trace element chemistry, high temperature partial melting of an inhomogeneous protolith depleted in water by extraction of a "minimum melt" I-type magma is suggested for the genesis of Jalor magma.

In the end, tectonic environment of the Jalor area has also been discussed. It is suggested that the anorogenic igneous activity of the Malani suite represents emplacement of magma into a tensional environment as indicated by the presence of ring structures and bimodal basalt—gabbro and hypersolvus—subolvus granite association.