CONCLUDING REMARKS

During the studies on the various aspects of solar salt in this investigation, some useful observations have been made which can be advantageously put into practice by the salt and salt based industries.

Survey of the quality of salt produced in India shows that most of the salt samples contain more impurities than laid down by I.S.S. 797:1955 for salt for chemical industries. The effort should be made to upgrade the quality by carefully controlling the density of brine at various stages during evaporation and adopting the improved methods like soil stabilisation, series feeding, washing the salt in pans by fresh brine etc at the time of manufacture. By this, quality of the salt can be raised; washing of the above salt if necessary in screw conveyor washery unit can produce the salt as per the said specifications.

Study on the association and distribution of major impurities in two typical common salt samples viz. Kharaghoda (inland well brine salt) and Bhavnagar (sea salt), indicate that contamination of impurities increases as the crystals grow bigger. It has been found that by restricting the growth of salt crystals during evaporation of sea brine in cement pan from 26° to 29° Be' to a size of 1 to 1.5 mm, very good quality of salt (99.0 - 99.5 per cent NaCl) is obtained. If the same is prepared from filtered saturated common salt solution in similar conditions, high purity salt of 99.8 per cent NaCl can be obtained. Similarly washing of freshly harvested and
crushed sea salt in disperse column washing unit, designed and used in this investigation, produces a salt of good purity (99.2 - 99.5 per cent NaCl). These are suitable for being used directly for caustic soda or soda ash manufacture with very little or without any chemical treatment. The salt produced may be costlier than average common salt but is cheaper than refined salt obtained by forced or vacuum evaporation, at the same time its purity is very close to refined salt.

In the study, moisture absorption by sodium chloride containing hygroscopic impurities like magnesium chloride and magnesium sulphate, quantitative correlations between the impurity content of salt and moisture absorption have been obtained at relative humidities in the range of 50 to 90 per cent. Based on these, empirical equations have been derived, which are useful for calculating the equilibrium moisture absorption, without doing any experiment, by salt from its impurity content at 50, 60 and 70 per cent relative humidities. For determination of moisture absorption by unknown salt sample, method adopted in this study, is reliable and gives an accuracy of ±4 per cent.

The method devised to assess the caking of salt to study the effect of various factors in this investigation can be usefully adopted for assessing the caking of finer size fertilizers, their mixtures and other chemicals which show the caking tendency. It is quicker than those used by earlier workers and though its accuracy is ±8 per cent, a good idea of the amount of caking is obtained.
Caking of stored salt is a common problem of salt or salt based industries. In the present study on caking, it has been found that sodium ferrocyanide can reduce the caking of salt considerably even when its proportion is very small (5 to 10 ppm). Use of sodium ferrocyanide for reducing the caking of salt in outdoor heaps is recent. In some foreign countries it is used with or without treatment with some organic compounds like liquid siloxanes for reducing the caking of salt in big heaps. The same can be used in India.

Caustic soda industry purchases salt from different salt works. This industry requires high purity salt. So, when salt samples of similar purity are available, the selection can be made from dissolution rates of the samples. In the present work dissolution rates of some samples have been determined in continuous dissolving column specially prepared for this purpose. This equipment can be easily prepared and used for determining and comparing the rates of dissolution of salt samples.