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1.1 With the increasing use of metals and the fast depletion of some of the common metals like copper, zinc, tin etc., corrosion has become a problem of international importance.

1.2 The systematic work on corrosion in India has been started comparatively recently under the auspices of Council of Scientific and Industrial Research, New Delhi. At present, studies on corrosion are carried out at Defence Research Laboratory, Kanpur, Central Electrochemical Research Institute, Karaikudi (Madras), National Metallurgical Laboratory, Jamshedpur, Department of Chemistry, Gujarat University, Ahmedabad, etc.

1.3 The present work is carried out as a part of an all India programme. It is concerned with (A) Inhibition of incrustation in pipes carrying potable water (B) Corrosion of aluminium in supply water and its inhibition and (C) Atmospheric corrosion at selected sites in Gujarat.

A.1 The potable water supply of Gujarat University campus contains sodium chloride, sodium bicarbonate, a fair proportion of calcium bicarbonate and other salts. Use of the above water supply leads to formation of hard crust which has been a perennial problem in the campus. The crust mainly
consists of calcium carbonate, magnesium hydroxide and small amount of iron oxide, silica, etc.

A.2 Attempts to devise a laboratory test to get hard crust was not successful. Several chemicals were tried to keep the crust forming substances in solution. Of more than thirty substances tried, ammonium citrate, calgon and EDTA were found to be fairly successful in keeping calcium ions in solution. On the other hand, one may employ substances like sodium silicate to precipitate calcium ions before they enter the potable water system. The present experiments are confined to laboratory tests and physiological as well as economical aspects will have to be considered before remedial measurements are suggested in actual practice.

B.1 Aluminium metal is being increasingly employed in India. Inspite of its high position in the electrochemical series, it is fairly resistant to natural environments because of the existence of a thin, adherent film of aluminium oxide. It may be attacked both at low and high pH but in neutral pH range it is fairly stable.

B.2 Corrosion of aluminium was studied both in partial and in totally immersed states. Studies were carried out in stagnant and in slowly moving conditions of water. These studies were carried out up to a period of ten months.
B.3 The effect of various inhibitors on corrosion of aluminium in supply water was studied in totally immersed state, both in stagnant and in slowly moving conditions. Amongst twenty one substances studied as inhibitors, potassium chromate, potassium dichromate, ammonium vanadate, benzylamine and gelatin were found to be efficient inhibitors in the stagnant condition. In slowly moving condition, potassium chromate was found to be an efficient inhibitor.

B.4 Attempts to predict susceptibility to corrosion by galvanostatic studies were not successful as the system is not in a reversible equilibrium and hence Tafel's equation is not applicable.

B.5 Corrosion of aluminium was studied in systems containing NaCl + Na₂CO₃, NaCl + NaHCO₃ and Na₂CO₃ + NaHCO₃. The effect of copper ions on the corrosion of aluminium in the above systems was also studied. It was found that severe corrosion leading to pit formation is obtained only when both bicarbonate and chloride ions are present. Presence of copper ions may not be essential; however addition of even a few ppm. of copper ions may occasionally lead to more severe corrosion. In some cases, however, copper ions may actually decrease corrosion.

C.1 Atmospheric corrosion was studied for a period of three years at Ahmedabad and at Bulsar. Ahmedabad is an