

CONTENTS

| | Page |
|-------------------------------------|--------------|
| PREFACE | vii |
| LIST OF TABLES | xviii |
| LIST OF PLATES | xix |
| LIST OF FIGURES | xxi |
| INTRODUCTION | xxv |
| | |
| CHAPTER I | |
| CORROSION PRINCIPLES | 1 |
| ELECTROCHEMICAL NATURE OF ATTACK | 1 |
| TYPES OF GALVANIC CELL | 3 |
| INTENSITY OF ATTACK | 12 |
| WATER COMPOSITION | 14 |
| | |
| CHAPTER II | |
| TYPES OF WATER | 18 |
| DISSOLVED SALTS | 18 |
| DISSOLVED GASES | 24 |
| ORGANIC MATTER | 25 |
| BICARBONATE EQUILIBRIA | 27 |
| ALKALINITY AND HARDNESS | 28 |
| LANGELIER INDEX AND SCALE FORMATION | 29 |
| WATER ANALYSES | 34 |
| INDUSTRIAL WATERS | 34 |
| | |
| CHAPTER III | |
| FORMS OF CORROSION | 38 |
| UNIFORM ATTACK | 38 |
| GROOVING | 38 |
| PITTING | 39 |
| TUBERCULATION | 45 |
| EXFOLIATION | 48 |
| WATERLINE ATTACK | 48 |
| CREVICE ATTACK | 49 |
| DEZINCIFICATION | 51 |
| GRAPHITISATION | 53 |
| CORROSION-EROSION | 54 |
| CRACKING | 55 |
| | |
| CHAPTER IV | |
| IRON AND ITS ALLOYS | 61 |
| IRON AND ITS ALLOYS | 61 |
| IRONS | 66 |
| STEELS | 73 |
| | |
| CHAPTER V | |
| NON-FERROUS METALS | 79 |
| ALUMINIUM AND ITS ALLOYS | 79 |
| ALUMINIUM | 80 |
| ALUMINIUM ALLOYS | 82 |
| BERYLLIUM | 83 |
| CADMIUM | 83 |
| COBALT | 84 |

| | |
|---|------------|
| CHROMIUM | 84 |
| COPPER AND ITS ALLOYS | 85 |
| LEAD | 89 |
| MAGNESIUM | 90 |
| MANGANESE | 93 |
| MOLYBDENUM | 93 |
| NICKEL AND ITS ALLOYS | 93 |
| NIOBIUM | 95 |
| TIN | 95 |
| TITANIUM | 96 |
| TUNGSTEN | 97 |
| URANIUM | 97 |
| ZINC | 98 |
| ZIRCONIUM | 100 |
| NOBLE METALS | 100 |
| | |
| CHAPTER VI | |
| CORROSION AT BIMETALLIC CONTACTS | 102 |
| PRACTICAL EXPERIENCE | 108 |
| PREVENTION OF GALVANIC ATTTACK | 116 |
| | |
| CHAPTER VII | |
| MECHANICAL AND METALLURGICAL FACTORS | 118 |
| SELECTIVE ATTACK | 119 |
| STRESS CORROSION | 121 |
| CAUSTIC CRACKING | 125 |
| NITRATE CRACKING | 125 |
| CORROSION FATIGUE | 125 |
| CORROSION—EROSION AND IMPINGEMENT | 127 |
| CAVITATION | 129 |
| COATINGS : ALLOYING | 130 |
| | |
| CHAPTER VIII | |
| FLOW, TEMPERATURE AND HEAT TRANSFER | 132 |
| HYDRODYNAMIC CONSIDERATIONS | 132 |
| TEMPERATURE | 138 |
| HEAT TRANSFER AND CORROSION | 143 |
| BOLIER AND HIGH TEMPERATURE PLANT | 149 |
| CONDENSERS AND HEAT EXCHANGERS | 153 |
| | |
| CHAPTER IX | |
| INHIBITION AND WATER TREATMENT | 157 |
| CLASSIFICATION OF INHIBITORS | 158 |
| CHOICE AND USE OF INHIBITORS | 159 |
| BOILER WATER TREATMENT | 174 |
| CONDENDSTE TREATMENT | 183 |
| INDUSTRIAL COOLING SYSTEMS | 185 |
| ENGINE COOLING SYSTEMS | 188 |
| DOMESTIC WATER SYSTEMS | 191 |
| | |
| CHAPTER X | |
| PROTECTIVE COATINGS | 195 |
| PRETREATMENT OF METAL SURFACES | 195 |
| METAL COATINGS | 199 |
| INORGANIC COATINGS | 208 |
| TEMPORARY PROTECTIVES | 211 |
| PAINTS | 211 |
| OTHER COATINGS | 218 |

| | |
|---------------------------------|------------|
| CHAPTER XI | |
| CATHODIC PROTECTION | 220 |
| METHODS OF PROTECTION | 221 |
| APPLICATION | 223 |
| ANODIC PROTECTION | 231 |
| | |
| CHAPTER XII | |
| DESIGN | 232 |
| CHOICE OF METAL | 233 |
| GEOMETRY AND WORKING CONDITIONS | 236 |
| | |
| CHAPTER XIII | |
| DIAGNOSIS | 248 |
| GASES | 248 |
| SAMPLING | 248 |
| HISTORY OF FAILURE | 249 |
| PRELIMINARY EXAMINATION | 249 |
| CORROSION PRODUCTS AND DEPOSITS | 250 |
| COLOUR | 250 |
| SURFACE FILMS | 251 |
| TYPE OF ATTACK | 251 |
| FURTHER EXAMINATION | 252 |
| BIBLIOGRAPHY | 254 |
| APPENDIX | 259 |
| INDEX | 263 |