Introduction

Galvanic and pitting corrosion are widely different forms of degradation; however, both lead to the same result, premature failure. Galvanic corrosion is the accelerated corrosion of a metal due to an electrical contact with a more noble metal or nonmetallic conductor in a corrosive electrolyte. Pitting corrosion is attack of a metal surface at a point or small area resulting in the formation of cavities (or pits).

The problems associated with galvanic and pitting corrosion have been extensively investigated but are far from being solved. Therefore, ASTM Committee G-1 on Corrosion of Metals sponsored a symposium from which the papers form the basis of this STP. These papers, which cover practical aspects, mechanisms, and testing techniques, will be useful to those who need to prevent, understand, or test for galvanic and pitting corrosion.

The galvanic corrosion papers include laboratory investigations and field testing results. In addition to a review of electrochemical techniques for predicting galvanic corrosion, laboratory studies include the behavior of aluminum alloys coupled to iron, nickel, and titanium, welded materials exposed to seawater, and cathodic protection of dissimilar metal assemblies. Reports on field tests include such subjects as galvanic corrosion of underground power cables, galvanic corrosion of stressed stainless steels exposed in various soils, and the coupled behavior of structural materials ranging from magnesium to titanium in atmospheric, seawater, and soil environments.

The pitting corrosion papers include descriptions of new test techniques such as rapid scan potentiodynamic measurements and a multiple crevice test assembly for statistical analysis. A review of the measurement and evaluation of pitting corrosion provides a standardized approach to the examination of this type of corrosion. Practical applications information on pitting corrosion of copper tubing in cold water service and evaluation of galvanized steel in corrosive atmospheres are included.

The information in the book should be useful to those involved with materials research and development, material selection, materials processing,

and corrosion evaluation and test techniques. In addition to the wide range of materials investigated, the broad range of conditions covered include atmospheric, oil, and aqueous environments. In addition to being a valuable guide for testing and evaluation of galvanic and pitting corrosion, this STP provides practical information on these two forms of corrosion and a direction for future investigation.

J. F. Rynewicz
Lockheed Missiles and Space Company, Sunnyvale, Calif. 94088; chairman of Galvanic Corrosion symposium.