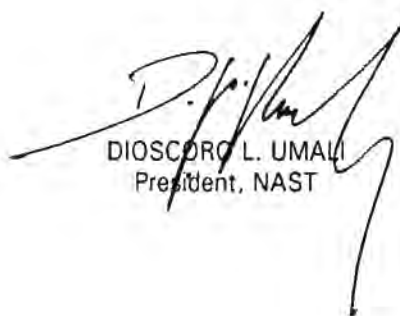


## Foreword

This volume XII of the *Transactions of the National Academy of Science and Technology* is a compilation of plenary and scientific papers presented during the 12th Annual Scientific Meeting (ASM) of the Academy which was held on July 11, 1990 at the Philippine International Convention Center in Manila.

The introductory part of this book presents two addresses and one plenary paper. The succeeding parts contain the five sets of scientific papers representing the five divisions or disciplines of the Academy: mathematical, physical and engineering sciences; biological sciences; social sciences; agricultural sciences; and health sciences.

It is hoped that this publication will be useful in enriching the minds of our colleagues in the science community as well as our promising scientists, academicians, researchers, development planners and policy-decision makers. May this volume serve as a useful reference material to every science conscious individuals or institutions.



DIOSCORO L. UMALI  
President, NAST

