Preface

THIS VOLUME comprises the proceedings of the Second Annual Symposium on the Physics of Failure in Electronics. The symposium was sponsored again by the Rome Air Development Center and the IIT Research Institute (formerly Armour Research Foundation of Illinois Institute of Technology), and convened in Chicago on 25 and 26 September 1963. Approximately 500 persons attended.

The purpose of the meeting was to provide a forum wherein reliability and component engineers on the one hand, and applied researchers on the other hand could exchange views and be made aware of each other's problems and approaches to their solution. In particular, the symposium addressed itself to the improved reliability of electronic devices: the identification and isolation of mechanisms by which device performance changes with time and environment, the elimination or minimization of these effects, and the prediction of long time device performance based upon the application of this type of knowledge. Thus, it was intended that the symposium would be specifically oriented to neither the practitioner nor the fundamentalist. Rather, it was planned that the subject matter of this symposium would be generally of interest to the workers in all of these diverse disciplines, who are collectively charged with the responsibility of developing highly reliable electronic devices and demonstrating their reliability.

The two-day meeting consisted of four sessions, covering broadly the following subject areas: prediction techniques, device substructures, experimental techniques, and devices. Papers are grouped in this order within the proceedings.

Making known to each discipline the problems and approaches to their solution of the workers in other disciplines is not a simple task. It cannot be said that this communication difficulty has yet been fully resolved—even now the views of each may seem in part nonrealistic to the other. On the other hand, the shift in emphasis in the papers that were presented at the two symposia is noteworthy. Last year's presentations were more concerned with a general expression of the over-all problem and a groping for their solution. This year, there are a larger number of papers which report the results of activities that have actually come to grips with specific problems. It appears, then, that progress has been made in effecting mutual understanding and in implementing the physics-of-failure approach.

While the increased attendance over last year's meeting is worth noting, the

effectiveness of the symposium cannot be judged on numbers alone. Indeed, only the reaction of the entire professional community is meaningful. For this reason, the editors invite comments and criticisms of the meeting itself and of the published proceedings.

The symposium co-chairmen were:

MORTON E. GOLDBERG
IIT Research Institute

JOSEPH VACCARO
Rome Air Development Center

Session moderators were:

DAVID F. BARBER
Rome Air Development Center

FLOYD E. WENGER
Air Force Systems Command

STANLEY POLLOCK
U.S. Naval Ordnance Laboratory

JOHN GRUOL
U.S. Army Research and Development Laboratory

A welcoming address was presented by Mr. V. H. Disney, Vice-President, IIT Research Institute, and introductory remarks were given by Major General Daniel C. Doubleday, Commander, Rome Air Development Center, at the opening session. A luncheon address was delivered by Mr. Ernest C. Wood, Deputy Director, Office of Communications and Electronics, Department of Defense Research and Engineering.

MORTON E. GOLDBERG

JOSEPH VACCARO

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SECTION I

PREDICTION TECHNIQUES