

# Sixty-second Annual Meeting Papers

*Symposium on*

## EDUCATION IN MATERIALS

Sponsored Jointly by the AMERICAN SOCIETY FOR TESTING MATERIALS  
and the AMERICAN SOCIETY FOR ENGINEERING EDUCATION



Published by the  
AMERICAN SOCIETY FOR TESTING MATERIALS  
1916 Race St., Philadelphia 3, Pa.

*ASTM Special Technical Publication No. 263*

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Presented at the  
SIXTY-SECOND ANNUAL MEETING  
AMERICAN SOCIETY FOR TESTING MATERIALS  
Atlantic City, N. J., June 22, 1959



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# FRONT COVER

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## FOREWORD

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The teaching of materials in colleges of engineering has become an exceedingly critical and complicated problem and one for which there is no easy or obvious solution. For several years the administrative officers of ASEE and ASTM hoped an appropriate time would come when the subject could be discussed at a jointly sponsored meeting. For the 1959 Annual Meeting of ASTM, following on the heels of the ASEE Annual Meeting in Pittsburgh, the time, the desire to do something, and the intensely interested people came along simultaneously. ASTM and ASEE are grateful to all who generously gave help and advice in developing, presenting, and publishing this Symposium on Education in Materials; to them most sincere appreciation is extended, for it is through people, and not through organizations, that we ultimately accomplish our goals.

At the outset, it was decided that those attending the symposium should be addressed by competent spokesmen from three main groups: engineering educators, educators concerned with science curricula, and administrators or engineers from industry. The large attendance—well over 300 at each session—the many advance requests for the published papers, and the several editorials and articles in the technical press indicate the intense interest in this subject. The joint ASTM-ASEE committee responsible for the symposium was:

Glenn Murphy, Chairman of the Committee; Vice-President, General Divisions, ASEE; and Head, Theoretical and Applied Mechanics Department, Iowa State University, Ames, Iowa

R. M. King, Professor of Ceramic Engineering, The Ohio State University, College of Engineering, Columbus, Ohio

L. P. Mains, Head, Department of Civil Engineering, Drexel Institute of Technology, Philadelphia, Pa.

K. B. Woods, Head, School of Civil Engineering, Purdue University, Lafayette, Indiana

Joseph Marin, Head, Department of Engineering Mechanics, The Pennsylvania State University, University Park, Pa.

It was an inspiration to the committee to have strong support from the presidents of the two societies, each of whom presented a paper and also presided at one of the two sessions. In reading the remarks by Dean W. T. Alexander and Prof. K. B. Woods, one should remember that these men have traveled widely, met with hundreds of their fellow educators and representatives of industry, and here give the essence and the benefit of these widespread associations.

The reader also should remember that education, especially in engineering, is not static. It must change, and we are now going through a

period of more drastic and dramatic change than we have ever before experienced. It is comforting to recognize that these changes are being subjected to the searching analysis of competent men representing industry, government, and our technical and engineering schools, all of whom recognize the need for collaboration and discussion in this vital area of engineering education.

Each of the speakers brings to his subject a knowledge not only gained from high-level responsibilities within his own organization, but also distilled from the experience and research of others. Throughout the country engineering educators have been discussing and will continue to discuss the kind of curricula needed to provide future engineers and scientists with the mental capacity and skills to fit them best for the responsibilities they must face. The trend, at present, is toward more science, more mathematics, more chemistry, and more physics in engineering curricula. The development of the best solutions will require continuing review and discussion of many of the points so well presented in this symposium. To this end, the two societies, in their respective spheres of activity and influence, can be expected to continue to give all possible assistance to their members and to those concerned with engineering education.

FOR THE AMERICAN SOCIETY FOR TESTING MATERIALS

Robert J. Painter, *Executive Secretary*

FOR THE AMERICAN SOCIETY FOR ENGINEERING EDUCATION

W. Leighton Collins, *Secretary*

The papers in this Symposium on Education in Materials were presented at the First and Second Sessions and a Luncheon, June 22, 1959, at the Sixty-second Annual Meeting of the Society, in Atlantic City, N. J. This symposium was developed jointly by ASTM and the American Society for Engineering Education.

The Chairman of the morning session of the symposium was K. B. Woods, President of ASTM. W. T. Alexander, President of ASEE, presided over the afternoon session. The paper by Eric A. Walker was delivered at the Education in Materials Luncheon. Toastmaster at the luncheon was Richard T. Kropf, Vice-President and Director of Research, Belding-Heminway Co., Inc., New York, N. Y., and Past-President of ASTM.

Two papers presented at the symposium are not included in this publication: "Solid State Sciences in Relation to Materials Science, Education, and Industry," presented by Jacob E. Goldman, Manager, Physics and Chemistry Depts., Ford Motor Co.; and "Summary of Survey on Projected Degree in Materials Engineering and Related Topics," by Maurice E. Shank, Associate Professor of Mechanical Engineering, Massachusetts Institute of Technology.

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**NOTE.**—The society is not responsible, as a body, for the statements  
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THIS PUBLICATION is one of many issued by the American Society for Testing Materials in connection with its work of promoting knowledge of the properties of materials and developing standard specifications and tests for materials. Much of the data result from the voluntary contributions of many of the country's leading technical authorities from industry, scientific agencies, and government.

Over the years the Society has published many technical symposiums, reports, and special books. These may consist of a series of technical papers, reports by the ASTM technical committees, or compilations of data developed in special Society groups with many organizations cooperating. A list of ASTM publications and information on the work of the Society will be furnished on request.



