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**THE ECONOMICS OF
INDUSTRIAL
MANAGEMENT**

WALTER RAUTENSTRAUCH

and

RAYMOND VILLERS

SECOND EDITION

Revised by

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THE ECONOMICS OF
INDUSTRIAL MANAGEMENT

BY *Walter Rautenstrauch* and *Raymond Villers*

BUDGETARY CONTROL

BY *Raymond Villers*

THE DYNAMICS OF INDUSTRIAL MANAGEMENT

PREFACE TO SECOND EDITION



NE OF THE MOST rewarding

aspects of the research undertaken in preparing this Second Edition of *The Economics of Industrial Management* has been to find that the data available for the decade following World War II strongly confirm the validity of the linear relationship of the profit and loss chart as a reliable standard of measurement for the purpose of profit control. A quantitative measurement of its validity, in the case of a few well-known industrial enterprises selected at random, will be found in Table XX. A similar measurement for all manufacturing industries is presented in Table XXX.

In this *Second Edition*, statistical data have been brought up to date on the basis of the information obtainable at the time the revised manuscript was completed. A special effort has been made to give the source of such data so as to facilitate the work of the reader who, at some later date, may pursue his own research in the light of the new developments.

The potentialities of the use of electronic computers for purposes of accounting, of production control, and of evaluation of the relative worth of alternatives have been given particular attention. The method of differential profit control is extensively discussed. This method, in part related to the increasing use of electronic computers in industry, has been the subject of specific research work by the author in recent years; it can thus be considered as an endeavor to modernize the break-even analysis method developed originally by Walter Rautenstrauch.

The assistance given in the preparation of this edition by many associates and friends is hereby cordially acknowledged. Special acknowledgment is gratefully extended to Mr. Robert C. Crawford, Manager, Business Research, Monsanto Chemical Company; Professor J. T. Elrod, Chairman, Industrial Engineering Department, University of Houston; Professor David S. Fields, Operations Research Office, Johns Hopkins University; Mr. Joseph Gilbert, Assistant General Manager, Society of Automotive Engineers; Captain M. H. Gluntz, Supervisor of Shipbuilding, United States Navy; Mr. Peter V. Norden, Staff Engineer, Engineering Laboratory, International Business Machines Corporation; and Professor Ralph O. Swalm, Department of Industrial Engineering, Syracuse University, who have all offered valuable suggestions. Mr. J. E. Connor, Head, Business Analysis and Methods Division, Bayway Refinery, Esso Standard Oil Company, made it possible for the writer to become acquainted with some of the problems faced in electronic-computer programming as they relate to the present study. Dr. Melvin E. Salvesson, Management Consultation Services, General Electric Company, was kind enough to permit the extensive use of his own research work in the application of modern mathematical methods for decision making.

Many colleagues, who have used the earlier edition of the text in the classroom, have made valued and constructive suggestions for change in the presentation of certain chapters. So also have several of the author's students and former students. A special effort has been made to check computation errors and they have helped greatly in this direction.

Miss Mary E. Poole, business librarian at Columbia University, her associates, Mrs. Walter Batts and Mr. Frank E. Gibson, and Mr. Russel Shank, engineering librarian, contributed important services on references; Mrs. Vera K. Taylor competently prepared the typescript; Mrs. Philippe Villers actively participated in the research work and the presentation of statistical data. Finally, the author wishes to express

his sincere and deep gratitude to Mr. Robert W. Voorhees of the publisher's staff for his constant encouragement during the development of this work.

Comment and criticism from the reader will be sincerely appreciated.

Westminster, Vermont

RAYMOND VILLERS

PREFACE TO FIRST EDITION

THIS BOOK EMBODIES the results of many years' experience in industry, in teaching, and in research. It is written to serve the needs of the executive in industry as well as those of the student of industrial engineering and management. Most of the examples used to illustrate the principles formulated have been chosen from the authors' practical experience in the organization of industrial enterprises, in the operation of businesses in which they have served at various times as directors, presidents, general managers, and treasurers and in government service both at home and abroad.

The authors are indebted to their many associates in industry and to the members of the staff of the Department of Industrial Engineering of Columbia University for valuable criticisms and suggestions. Special acknowledgment is gratefully given to Professor Robert Teviot Livingston, Executive Officer of the Department of Industrial Engineering. The services are gratefully acknowledged of Professor J. Brooke Willis, of the School of Business, who read and criticized part of the manuscript; Professor William Jaffe, Mr. Seymour Melman, Mr. Sydney Pollack, Mr. Paul Flatow, Mr. Julian Green, Mr. Lawrence Cohen, Mr. Robert Edward Randell, and Mr. Frederick G. Oess, who checked problem solutions, and Miss Marion Thompson, who typed the manuscript and prepared its many tables.

It is too much to hope that the book is without some errors. The authors will therefore appreciate it if any reader will write them in criticism of any part of the text.

Athens, Vermont
Westminster, Vermont

WALTER RAUTENSTRAUCH
RAYMOND VILLERS

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