

EDUCATION AND INDUSTRY

BY

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FOREWORD

The process of education is that of developing the faculties we possess to give us increased capacity for enjoyment and usefulness, and of gaining instruction to enable us to direct our efforts more effectively to the purposes we have in view. In the days of hand tools and the household industries, the processes of production were very simple and readily comprehended; moreover, there was a large degree of individual independence and self-sufficiency in industry. Differences of course existed in individual skill and ability, and the apprentice system was developed as a means of education and training. The methods of imparting instruction and of developing skill, however, were simple, consisting almost wholly of personal direction and practice. Education in the schools had little to do with the industries, but was devoted to abstract reasoning and general intellectual culture.

With the progress of invention and the development of power-driven machinery came the higher organization of industry, involving greater complexity in the system and an increase of interdependence. The processes of production and exchange have been developed and extended until they have reached beyond the view and comprehension of many engaged in them. As a natural result, misunderstandings multiply in the relationships between the various groups whose cooperation is required. There is no obvious method or rule by which the fruits of associated effort are divided. The workers who tend a blast furnace, producing pig iron, are not able to calculate the actual relationship between

their services and the value of the things which comprise their daily purchases, or even between the pay they receive and the value of the furnace product. There are so many factors in every calculation that the relationships become for the ordinary man practically incalculable.

- Here then is a fundamental need for education about industry. There must be a general understanding of the industrial system by which society supplies its wants, of the benefits that all derive from it, the responsibilities they have under it, and of the economic laws and forces which tend to accomplish a just distribution of benefits.

And then the constant growth of population makes it imperative that the productive capacity of the industries shall be constantly increased. In some respects the conditions of life tend to grow harder as population increases and natural resources are impaired. Society is always in the position of a man rowing a boat up stream: it must make constant efforts even to hold its own. Therefore there is need for widespread instruction in all that makes for the highest efficiency in industry, and which tends to develop the initiative and capacity of all those concerned in it.

A larger understanding of these needs for industrial education is rapidly developing, and there are many plans for promoting it. I have read enough of the writings of Henry C. Link to be impressed with the clearness and constructiveness of his thinking in this field, and I commend this book to all those interested in the subject as worthy of their careful attention.

GEORGE E. ROBERTS.

New York, February 2, 1923.

P R E F A C E

A subject so vital as that of education and its relation to industry lends itself only too readily to philosophical and rhapsodical periods. By refusing myself this indulgence, I have undoubtedly left room for the criticisms of those who are interested in the broadest aspects of the subject. One of these criticisms I may anticipate now. It will probably be said that the following study of education and industry concerns itself too largely with the preparing of individuals for the world as it is and not sufficiently with that type of education which will enable them to change the industrial and economic system for the better. My answer is that an orderly and successful attempt to make things what they should be is impossible without an appreciation and command of things as they are.

The doctrine that education should be, fundamentally, a preparation for life—that is, practical—has played an important part in the history of education ever since the time of the early Greeks. In our day it has been most vigorously sponsored by the Pragmatic School, of which Professor John Dewey is the chief exponent. Instead of entering into a critical discussion of this doctrine my object has been rather to show *how*, in one field, education may be made more practical.

To evaluate past educational activities and to point out practical methods for the future presupposes practical experience on the part of the person who makes the attempt. It is because I have limited myself to those phases of the subject in which I have had actual experience, that this

book fails to treat every aspect of industrial education in which educators might be interested. Within these bounds, I have not hesitated to avail myself of the experience and writings of others, as will be seen from the references given in the ensuing chapters. These references by no means exhaust the literature in the field or the extent of my indebtedness. Among the many sources to which I am generally indebted, but to which no specific references are made, are the following: the many excellent bulletins and reports of the Department of Labor and the Federal Board for Vocational Education; the studies of the National Association of Corporation Training (since absorbed by the National Personnel Association) which represent the work of such well known educators as C. R. Dooley, J. W. Dietz, A. S. Donaldson, Lee Galloway, W. E. Wickenden, and others; Vocational Education, by D. F. Snedden; Training Industrial Workers, by R. W. Kelly; Personnel Administration, by Tead and Metcalf.

I have studied with particular profit the writings and addresses of George E. Roberts, a banker by profession. Mr. Roberts has brought to the field of education the much-needed viewpoint of the man of affairs.

For advice and criticism in the preparation of this book, I am greatly indebted to W. D. Holden, W. H. Lowenhaupt, and Bryce Haynes. At every stage in the work, from its conception to the reading of the final proof, I have had the valuable assistance of Carolyn Crosby Wilson.

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H. C. L.

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I

INTRODUCTION

Vocational Education—Industrial Education—Extent of Education by Private Business Enterprises—Questions Raised by These Activities—Dilemma of Public Educators—Methods of Industrial Education—Necessity for Analysis of Functions and Responsibilities—Aims of Education in Private Enterprises: (1) Ability; (2) Interest; (3) Good-will—Ability, Interest, and Good-will as Criteria—Function of Educational Institutions—A Principle for the Division of Responsibility—Necessity of Co-operation—Pioneer Education.

The center of interest in the field of education to-day is undoubtedly the subject of the relation between education and industry. Since the changes in the social and economic structure of our time have been largely the result of an unprecedented industrial development, it is only natural that this should be so. However, in confining ourselves to a consideration of education in its relation, or rather lack of relation, to industry, it should not be inferred that we are urging the abandonment of all the elements in education which do not contribute to the immediate usefulness of the individual as a bread earner. The uncompromising advocates of the educational traditions of the past are only too prone to draw such an inference from any attempt to give education a more practical bearing on the needs of the times. And such an attitude but serves to maintain the perpetual and fruitless controversy between those who lay stress on making education more practical and those who insist that its primary aim is culture. Without entering into a discussion of the relative merits of these two schools of thought we shall simply take the position that it is impossible to have a radical change in the elements of a

civilization without having a reflection of that change in the elements of its educational system: and that so great a development in the art of living and the conduct of industry as this country has undergone cannot occur without a considerable transformation in its educational methods. Assuming that such a transformation was and is inevitable, we shall concern ourselves entirely with the consideration of certain of its outstanding and most promising manifestations.

The writer makes no claims for the scientific validity of the conclusions at which he arrives. In the field of employment psychology, for example, it was possible to make an intensive study of certain selected phases of employment and to interpret the results in accordance with an established scientific technique. Fortunately or unfortunately, the problems arising out of the relation between education and industry do not lend themselves readily to scientific treatment. No scientific method will help us to conclude which phase of education should be the responsibility of the educational system and which the responsibility of private business enterprises. Neither can we evaluate scientifically the different methods of industrial education which have been tried out in the past, partly because they are past, but largely because of the many uncontrollable factors which were involved. Our conclusions must therefore frankly be in the nature of personal opinions. The only tests of their validity can be their acceptance by educators, industrial executives, and others who have given the matter thought, and the degree to which they are borne out by future developments. If a majority of those who are interested and experienced in the field of industrial education find in the conclusions arrived at here a crystallization and systematic statement of their own opinions the purpose of this book will have been achieved.

In presenting his opinions on the subject of education

and industry the writer has one advantage over others who have written in this field. The few books on the subject now in existence are either by authors whose preparation and point of view were distinctly those of the public educator or by men who, without actual experience in the various phases of industrial education, found it desirable to make a general survey of the activities which were being carried on by others. The writer, although trained for the profession of teaching, has for the past seven years been in charge of the educational activities of two large industrial corporations, and all the phases of education which shall be discussed have come under his immediate administrative supervision. The bias which he may have is, if anything, desirable; for if the educational system must be adapted to meet new industrial conditions, it is well to have these conditions pointed out by some one whose experience has been in the field of industry and who, though in thorough sympathy with the efforts of professional educators, has not been unduly influenced by current educational traditions.

Vocational Education

The changes in education during recent years have been phenomenal in their rapidity and scope, and these changes have been largely in the direction of making education more immediately useful to those engaged in the practical pursuits of every-day life. Among professional educators this tendency has resolved itself into a great movement definitely organized in an influential National Society for Vocational Education, and in a number of related organizations such as the National Vocational Guidance Association and the Vocational Education Association of the Middle West. The isolated experiments in vocational education throughout the country have been innumerable, and it is one of the chief functions of these societies to consolidate the results of these experiments for

the benefit of the educational system as a whole. The program at the annual convention of these societies includes such subjects as the Junior High School, Apprentice Training Schools, Education of Foremen, Continuation Classes, Vocational Guidance, Manual Training, and others all of which indicate extensive activities in the interest of a more practical type of education.

Industrial Education

The term *vocational education* emphasizes too specifically the need for an education which is also a preparation for work. Vocational courses are designed to prepare the individual for a particular kind of occupation. But the growth of our industrial system has brought about changes far more extensive than those reflected in educational courses which are definitely technical or vocational. Even the more common or elementary aspects of education, such as arithmetic, commercial geography, physics, chemistry, mathematics and many other subjects are seriously affected by these changes. To give but a single example, the perfection and extensive use of the radio has added a new and fascinating subject to the study of physics.

Of greatest importance is the growing recognition of the fact that vocational preparation, while important, is not in itself sufficient. In a time of economic unrest such as the present, the individual must learn not only how to make a living but how to live, how to adjust himself to the complexities of his industrial environment. The widespread and persistent emphasis upon the study of economics may be regarded as an attempt to meet this need, for economics is largely concerned with a consideration of the principles and practices upon which the present industrial system rests. Similarly, Americanization classes and education in hygiene and safety practises, while not strictly vocational, also have

a very intimate bearing upon the ability of individuals to adapt themselves to their working environment. The emphasis upon these phases of education, particularly the study of economics, has come from industrial executives as well as from educators. Indeed, it is largely through the maladjustments and interruptions in industry that their importance has been driven home.

Therefore, instead of the term *vocational education* we shall use the term *industrial education*. Though not without shortcomings, this term is sufficiently comprehensive to include whatever problems may arise in the field of education through its relation with the field of industry. It should also be explained that the term *industry* is used in the sense that includes manufacturing and service corporations, mercantile houses, banking and credit institutions—in short, all types of organized business activity which go to make up a so-called “industrial society.”

Extent of Education by Private Business Enterprises

The rapidly widening gap between education and industry reached a point, some years ago, at which industries felt themselves compelled to take a hand. Gradually at first, but soon with increasing frequency, companies found it advisable to supplement the initial education of their employees with educational projects of their own. During the period of the war, when the demand upon the nation's productive enterprises was at its height, the need for properly trained workers became so urgent that educational activities in private companies received a tremendous impetus. Indeed, during the past five years, industrial organizations have played the chief role in extending the scope of education and in developing new educational methods and a new content of educational thought. Although very important experiments are being carried on in the schools, the great laboratories of industrial education today are not the schools, but

the industries. Some companies are almost as well known for their educational work as for the product or service which characterizes their business. And there are business institutions which pride themselves on the fact that they have an educational staff which compares favorably with that of many schools and colleges, and whose educational activities are so comprehensive and so thoroughgoing that they may with justice be called *industrial universities*.

Probably the oldest and in many ways the most successful company in the field of industrial education is the National Cash Register Co. This company provides classes and educational material for almost every group in its organization. Its activities, lodged in a central school building, bear a most intimate relation to the conduct of its business and the administration of its personnel work (see "A Schoolhouse in a Factory," by Ida Tarbell, *The American Machinist*, March, 1920). The Diamond Chain Manufacturing Company has in effect an educational program which includes every class of employees, from the most ordinary laborer to the highest executive (see "Educating an Entire Personnel," by Mark Reasoner, *The American Machinist*, Feb. 26, 1921). The General Electric Company has trained thousands of its employees, including executives, engineers, foremen, instructors, aliens, apprentices, and office workers. It conducts classes of the utmost variety, including classes in accountancy, business administration, business arithmetic, business English, stenography, typewriting, phonograph dictation, comptometry, switchboard testing, Spanish, French, German, algebra, geometry, trigonometry, mechanics, applied electricity, electrical engineering, chemistry, mechanical drawing, architectural drawing, United States history, cooking, dressmaking, millinery, physical training, besides more comprehensive courses given in connection with advanced educational institutions. Probably the most ambitious educa-

tional program so far planned by any industrial enterprise in this country is that of the Goodyear Tire and Rubber Company. This company has erected an enormous and beautiful building to house its educational and personnel activities. Its many class-rooms are furnished with the latest and most perfect equipment. Its physical, chemical, and mechanical laboratories are models of their kind. Its teachers, drawn from within the organization and from colleges and universities, constitute a faculty of which many public educational institutions might well be proud. It conducts class after class in salesmanship, foremanship, chemistry, physics, mechanical drawing, physical culture, the mechanical trade, cooking, millinery, home economics, commercial courses, stenography, comptometry, book-keeping, and many other subjects. In many of its courses it has developed a technique which is far superior to the methods used in the traditional courses. It has a staff whose sole duty it is to coordinate the various activities to the best possible advantage. Indeed, the educational activities of this company are so comprehensive and far-reaching that they fully deserve the name under which they have been grouped—namely, the Goodyear Industrial University.

Questions Raised by These Activities

The educational work done by industries has unquestionably been of utmost value, from an educational as well as an industrial point of view. On the other hand it has raised a number of questions which now demand the most serious consideration. The enthusiasm of companies for the education of their employees has led them, in many instances, to usurp activities usually regarded as functions of the educational system. There are companies which conduct classes in English, the foreign languages, arithmetic, and many other studies which have been taught in the schools for years and which any employee who has the