

J. A. Fisher: In the first place, the argument that industrial management or engineering should be taught in an engineering school or in a college of commerce has little weight. Some prominent engineering educators have pointed to the fact that practically all our eminent executives and industrial engineers have been engineers in training. This to my mind merely points to the fact that commercial training based on economics is so new that comparatively few persons who have taken such a course have yet been out in business long enough to acquire the prominence which many engineers have. It seems to me that there is only one phase of this part of the subject which is of importance. In any university these courses should be taught in only one place, and where both schools are in existence, the subject can be taken up as well in one as in the other, and probably the matter of precedence should rule. As my background is largely an economic one, it does, of course, seem to me that the engineering course must be organized with particular care to see that the student does not devote himself too closely to exact mathematical investigation and study, but has ample opportunity to master the ideas based on economics and subsequent courses.

So far as the course content is concerned, I believe that an adequate education is possible in three directions: (1) based almost entirely on economics with practically no engineering, (2) with a fair combination of economics and engineering, and (3) with engineering and very little economics. In any of these a certain amount of broadening subjects should be taken such as English, literature, philosophy, etc. We must remember that the student is not certain to follow the particular line of work for which he is training and that even if he does, he should spend fully half his day at other than business pursuits. It is for this part of his life that we offer him the so-called liberalizing work.

From my point of view the purpose of the university in training the student is to give him (1) the power of analysis or an ability to think and think straight, (2) a certain amount of technique or business sleight of hand which will prepare him to take a definite job when he is through school, and (3), most important, an ideal of what the real accomplishment of his job should represent. We all know that most students when leaving school do not have the op-

⁷Professor of Industrial Management, College of Commerce and Journalism, The Ohio State University.

portunity to go to work for some firm famous in the country for its high ideals and accomplishments in management. The student goes where he can get a job, but if we have instilled into him and sold him thoroughly the ideals of scientific management, he will in many cases leave the place where he cannot see any possibility of approximating these ideals and insist on finding ultimately the job which will give him satisfaction from this point of view.

After all it is the ultimate accomplishment of a student that we are concerned to develop. He can go to a trade school and learn to be an efficient foreman. We must give him only enough of this detail to allow him to use it as a stepping stone to a higher position.

A course which is successful should not leave the student with any idea that he is an executive or that he is an industrial engineer. He merely has some background which will make it much easier for him to serve his apprenticeship in industry where, if he sees fit to hew to the line, he will in the course of time become a successful executive or engineer.

Just a word as to field work. We are thoroughly committed both in thought and action to field work as a necessary adjunct to a college course. We do not, however, expect that such work will train the student to be an expert on any one job. It gives him, instead, some knowledge of what the mechanisms of his future job will be and, if the field work is conducted in scientifically operated industries, he will gain a still further assurance that the ideals presented to him in his courses are practical and not visionary.

C. B. Gordy: The developing and strengthening of any profession depends in a large measure upon the development of a class consciousness among the members of that profession. The Taylor Society, the Society of Industrial Engineers and others are doing yeoman service in fostering this feeling among those interested in and practicing in the management field. The teachers are largely responsible for transmitting right management ideals to succeeding generations of students, and the better their work is done the easier it will be for such societies as this one to function. Certainly it will play an important part in the development of management as a profession.

One of the difficulties under which the authors of this paper evidently labored is the confusion of terms regarding the subject under discussion. The title in-

⁸Assistant Professor of Mechanical Engineering, University of Michigan.

dicates this and it is apparent throughout the paper. The use of the chapter headings in "Management's Handbook" as the working elements of management also shows a lack which the teachers of management ought collectively to help remedy.

It seems to me that one cardinal idea should be kept in mind in developing any curriculum, whether in engineering, business administration or management, and that is that the training offered should be broad in scope, if for no other reason than because the majority of the students cannot choose the specific job which they will have after graduation, and their training ought to be such as will permit them to adapt themselves to a variety of conditions.

The thesis of the paper, "the writers unite in believing that one curriculum cannot cover the field adequately," it seems to me, is a perfectly sound proposition. The fields of human endeavor embraced in commerce and industry are so broad and diverse in their requirements that it might logically be expected that different types of training would be necessary. Business, embracing most of the commerce field and much of the industrial field is, with the growth of schools of business administration, rapidly developing into a profession. The peculiar difficulty from the standpoint of this meeting is the fact that "management" is involved in all of these branches of activity. If we accept the thesis that endeavor embraced in the fields of commerce and industry is so broad as to require different types of training, and the authors of this paper admit this, then it seems to follow naturally that the subject of management must at least be considered in any curriculum which aims to train students for either commerce or industry. This is true even though there is no agreement as to the specific elements that make up what we think of when the term management is used.

The question as to whether management shall be taught in the schools of engineering or of business administration does not seem to be of any great importance. The prime requisite is experience on the part of the teacher rather than an engineering or a business administration type of training. However, teachers of individual courses, particularly in business administration courses, cannot escape considering the subject; in a course in finance, for instance, the instructor could hardly cover his subject adequately unless he gives some consideration to ideas of proper financial management.

When we begin to think in terms of the type of

training to be given in preparation for industrial engineering, or production engineering or management, the matter becomes somewhat more difficult. The technical aspects of many subjects must be considered apart from their managerial aspects as well as the specific things which the practitioners in these fields may be called upon to do. Considering the latter point it seems to me that the basic elements should be engineering rather than business administration, and that training in management, when considered separately, should be superimposed on this foundation. By this I do not mean that the engineer is the only and anointed one to be permitted to practice in the two fields mentioned above, but that in view of the increasing complexity of industry his training will enable him to grasp more quickly than a man trained in business administration the technical aspects of daily production problems, in consequence of which his advancement will be the more rapid in this field.

If we approached the subject entirely from the business administration angle we should be training production clerks; at least the student would be under a considerable handicap, out of which he would have to extract himself unaided. I do not believe that a few abbreviated courses in engineering would help materially. The matter of prerequisites would prevent anything but a bare smattering and a smattering is frequently worse than nothing.

The superstructure of management can be taught in either school. At Michigan instruction in the managerial aspects of finance, accounting, marketing, statistics and labor are of course taught in the School of Business Administration, and these subjects are all included in our 5 year curriculum in Industrial Engineering. Most of the other items mentioned in table one of the paper are taught by a group of men handling both engineering and business students. It happens that these men are graduates of business administration schools.

Hudson B. Hastings: It seems to me the chief value of the paper by Professors Roe and Burleigh is in calling attention to the fact that the educational institutions of this country are today offering two very different types of courses as a foundation for an industrial career which it is anticipated may lead to the top of the executive ladder, and by "industry"

⁹Professor of Administrative Engineering, Sheffield Scientific School, Yale University.