

college who have selected engineering and plant management for study differ materially in their interests from those who have selected sales as a future occupation. Within the college group of engineers, it has been demonstrated that there are many who are more closely related to salesmen in their interests than they are to practicing engineers. Though we assume the engineering profession can assimilate all persons graduated as engineers, it has, nevertheless, been shown by statistical studies made at the larger engineering colleges that from sixty to sixty-five per cent of the graduates are to be found in occupations other than engineering five years after graduation.

We are all familiar with the isolated cases, which in the aggregate are numerous, of boys and girls fighting for an opportunity to follow a particular interest. With these things in mind, I believe that it is important for turnover analyses that we know more accurately the opportunities associated with special interests and more thoroughly the nature of interests themselves. It is important to be able to determine the permanent interest and to separate from it those which are more or less adventitious and dependent upon temporary circumstances.

It is necessary to establish more thoroughly and more generally the truth of the causes for turnover I have suggested. The specific program I would recommend breaks up into four lines of statistical inquiry. To test the meaning of adolescent restlessness there is need for detailed and systematically compiled work histories of many individuals. Further research and the presentation of data in usable form on the qualities and aptitudes of human individuals is needed by the employment office. A psychological and sociological investigation of the reasons why any particular task obtains a definite social status is desirable. The fourth line of attack will attempt to distinguish between permanent interests and those dependent upon temporary circumstance.

#### IV

The limits of time do not permit us to pursue the topic further. Experimental psychology as a branch of psychological inquiry differs only in its efforts to quantify and to hold constant, or to vary, the factors in any given situation. When it finds a factor, its scientific caution prevents a precipitate artistic or mathematical application to the complex situation. Training in statistical procedure is one factor in helping us to maintain this balance. I have endeavored to show by analysis rather than criticism that

much of the effort we have expended in wage payment plans is of no avail because of the non-observance of a scientific caution. The analysis presented in connection with the question of turnover leads us to a similar conclusion. Except that here we have not progressed so far along the least fruitful path. Attempts to solve the questions by cost accounting methods without the collection of all pertinent statistics are, however, direct wastes that go into overhead.

Detailed statistics with complete descriptions of the conditions out of which the data arose would be of immensely greater value for solution of proper incentives, than the generalized ratios with which we now attempt to work. I respect mass data when treated with the proper statistical tools. I do not believe that year to year comparisons are adequate mass data. The familiar statement that this or that phenomenon is an improvement over last month or last year carries little conviction. Quantification that goes no further into the variables whose change in weight have produced the changed ratios gives no basis for stabilization of an improvement.

The continuous struggle with spoiled work, absenteeism, turnover, unemployment, wages, etc., is in the forefront of things we seem always to have with us. My contention is that with a better appreciation of the human factor, these, together with accidents, selection, promotion, and the understanding of each other, are open to solution. This better appreciation necessarily results in the recording of an entirely different series of data than is now customary. It also involves an agreed-upon willingness to experiment. Step by step it is being proved that every worker who understands an experiment finally enters into it with zest.

#### Discussion

**Adelbert Ford.**<sup>14</sup> When Professor Yoakum emphasized the fact that the solution of labor problems must come from a nice balance of artistry and scientific precision he stated a principle which offers a solution to the general problem of correlating the best there is in the scholastic world with the best there is in the world of practical living. Certainly our employment "expert" must be a man capable of the finest conceptions of human living, and yet the mere enthusiasm over ideals, if unchecked by careful quantitative measurements, can lead to the grossest

<sup>14</sup>Instructor in Psychology, University of Michigan.

illusions and the most painful forms of injustice. And certainly it seems that a bare statistics of muscular efficiency can lead to such an automatization of labor that a worker may leave an objectively productive career mentally mutilated.

We cannot blame either method of approach as being totally false, however. It is as Professor Yoakum has indicated—there is a need for a combination: the keen insight into the values of human life, coupled with such a scientific method as will insure that we are not embracing fallacies under the guise of great ideals. It seems to me, therefore, that the greatest problem confronting employment management is the employment of a good employment manager. Dealing with the most complex science yet developed—human behavior—requires a man of unusual calibre. Because he is an integral part of an industrial organization, he must be able to see, in a practical way, his function in the work as a whole; and because the rules for labor management are as yet either unformulated or insecure he must also be trained into that mental attitude of method and precision characteristic of the research student. It is only too true that such a combination of traits is seldom found; he can possess one or the other but rarely both.

Therefore, what kind of training? Psychological? Yes, but not the kind of knowledge which consists in mere abstractions from experiments on nonsense syllables, or the technique of an Army Alpha test, unless the experimenter knows that such information is an adequate measure of real life. But let it not be assumed that the laboratory psychologist is necessarily divorced from real life. These same experiments in the hands of a man who has really mixed with human beings take on relations of the greatest significance. After all, the research worker in the field of labor conditions who is untrained in the field of pure psychology and the work of abstract science is generally short of an accurate view-point; his aim is lacking. He may be shooting at his problems with a shotgun load of statistical formulae, and a stray correlation may hit something, but unless he has the imagination to see what he is aiming at, the success of his work is a matter of chance. And that imagination, according to recognized laws of psychology, necessitates an adequate experience. In this case we mean experience with the conditions of human living. Such an experience is not satisfied by a little dabbling in the field of social service; slumming is not a substitute for experience with human nature.

The old type of employment manager, with his unstandardized procedure, his superstitions, his biases, his grudges, and his awful ignorance of the laws of exact measurement, is passing. The chasm between the man of pure science and the man of business is getting narrower. Occasionally the world of industry reaches into the world of scholars and picks a helper. It is a compliment to us that we are given this great opportunity. But the newcomer, I fear, has frequently proved a disappointment. Not every young girl, fresh with her Ph.D., is a qualified labor expert, though she may know ever so much about the technique of mental testing. Of course, she sometimes shows the world she knows what she is doing. I know at least of one such case—I believe the one cited by Professor Yoakum—but she is the exception, not the rule. Generally the green graduate lacks something of the mature scientific viewpoint, or the fundamental experience with human nature—the kind of rough, primal human nature, with its mental unbalance, its uncontrolled emotional expression, its warped reason, its sympathy, its pride, its sensitiveness, and its social power. We need the employment expert who knows pure science, who can handle mathematical measurements as a familiar tool, who has high ideals for human nature, who knows that human nature from actual experience, and who knows how to be precise in his measurements without being petty.

Such people are rare, but we do have a few, both men and women—so few that we shall probably have to share their contributions for the benefit of all. Of course we can hire the young graduate for a nominal sum. A Chicago taxi-cab company decided, instead, to hire her professor, and he proceeded to give results so rapidly, with such certainty, that he proved beyond all doubt that he knew what he was aiming at. In the face of the saving in property, the saving in human lives, to say nothing of the purely selfish advertising value of the experiment, the salary of a well-trained man proved an investment. Of course, the requirements of modern research sometimes prove too expensive for one industrial institution to support. The attitude of sharing good methods has already been mentioned this morning as one of the most beneficial advances in progressive modern industry.

We have a new thing—a precise science of labor management. Let's get together and help it to grow to a more sturdy and mature condition.