

fully set forth. Remarkable instances may be given of universal difficulties students have with some of the problems appearing in this record of thirty days, which is not only interestingly comprehensive, but is most profitably worked out by the embryo business man.

On the tenth and twentieth of the month, trial balances are required to be made and, following the thirty-first day, the following appears.

“Make up inventories; make trial balance; take off a balance sheet; balance cash account and balance or arrange the other accounts to make the business or fiscal year begin with the calendar year.”

In conclusion, let me commend to you who are already in business and have not become sufficiently familiar with accounting to be fascinated by it, the further study and investigation of the subject, that you may not only profit by its helpfulness, but that you may have this additional interest in your work and the added happiness it gives in your lives.

INDUSTRIAL RESEARCH IN UNIVERSITIES.

BY H. K. BENSON.*

Popular interest has lent itself to the problem of a more intensive application of the discoveries of science to the industrial life of the nation. As time goes on and we catch glimpses of the coming reorganization of industry in Europe, we see more clearly than ever the necessity of making this nation more largely self-contained. This burden rests largely upon our productive capacity—the ability to utilize our own stores—and resources. Everywhere this challenge meets with enthusiastic response and our universities have caught the spirit of the new awakening.

The exact manner of participation will, no doubt, vary greatly with the type and character of the institution. The aloofness of the colleges and universities has not been due to unwillingness to participate in industrial upbuilding. It is in part the inheritance of classical ideals and of cultural requirements that has retarded the advent of industrial problems as subjects of study and research in the curricula of our colleges. But now, apparently, a general awakening has come alike to industry and to the educational institutions, with the result that both may be enriched by rational coöperation.

With this thought in mind, the University of Washington has organized a bureau of industrial research to which the industries of the state may refer their problems and by mutual assistance seek their solution. By this plan the University seeks to enlarge not only its usefulness in service, but also its efficiency in the training of its students, and through a greater coördination of its faculty. The general plan is as follows: A given industry submits its problem to the bureau and sets aside a sum of money to establish an industrial fellowship. Thereupon, a committee of the faculty, chosen with reference to fitness or expert knowledge of details required in the solution of the problem, prepares a working plan or outline of the investigation, which is next submitted to a similar committee of the donating corporation and jointly modified and accepted. A graduate student is then assigned to the project and is paid a stipend of not less than \$500 per annum. As additional compensation he is allowed to offer his research for thesis require-

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ments and to carry a limited number of hours to apply on the requirements for an advanced degree. The fellow therefore acquires not only academic advancement but a highly specialized training which frequently leads him into a place of responsibility in the given industry. The university gains, not only in its contact with the given industry through its service, but in the substantial impetus given to its graduate work, as well as the inspiring influence upon its undergraduate work. The industry secures its desired data and is further enriched by the familiarity of the faculty experts with its problems and by securing a scientifically trained worker who may be added to its staff.

Incidental to the practical working out of the plan are a number of features which involve the overthrowing of traditional observances. For example, it may be necessary to withhold from publication for a limited period of time the results of the investigation. During this time the industry is expected to protect itself through the procuring of patents, or in other ways obtain the rewards of its enterprise. The community as a whole, however, always gains in the heightened efficiency of its industries, and thus is recompensed in a material, though perhaps indirect, manner.

The subjects offered for investigation cover a wide range. Problems dealing with iron and steel manufacture, fertilizers, and wood preservation have been assigned to the bureau and are under investigation. These problems bring into action the departments of geology, mining, chemistry, forestry, mechanical engineering, and civil engineering. The school of pharmacy is vitally interested in proposals to investigate the feasibility of a drug plant industry. The mild, humid climate of the Pacific Coast seems well suited to the growth of drug plants. *Digitalis* is found growing as a weed over many square miles of unused logged-off land. *Belladonna* thrives luxuriantly on the sandy loams and yields two crops per year, each of higher alkaloidal content than the pharmacopœial requirements. Golden seal, ginseng, cascara, and peppermint oil are already marketed in considerable quantities. A systematic study of the possibilities, including assays, plot tests, markets, and, finally, an association of growers, seems likely to be of interest and value, not only as a new industry for the state, but as a new source of supply within this country to drug manufacturers.

DRUG PLANT INVESTIGATIONS.

The U. S. Bureau of Plant Industry has carried on for a number of years experiments designed to ensure better methods of cultivating and utilizing drug plants, and noteworthy results have recently been recorded. About 150 species of drug and related plants are now under experimental culture on heavy clay at Arlington Farm and on sandy loam near Glen Dale, Md. At Arlington permanent plantings are being made, which will furnish material, now badly needed, for standardizing crude drugs. One important line of inquiry is in regard to the relation of special feeding to the development of the active principles in medicinal plants. A new strain of *belladonna* has been obtained by the Bureau through breeding and selection which has a greatly increased alkaloidal content and points the way to a notable improvement in the quality of this drug now found on the market.