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Books

Introduction to Chemical Engineering Problems

by William H. Corcoran and William N. Lacey

McGraw-Hill \$6.90

Reviewed by Paul D. V. Manning,
professor of chemical engineering

Many Caltech alumni who, as undergraduates, pursued the applied chemistry option will remember the course from which this book takes its title. They were the "guinea pigs" used by the authors. Both authors have participated in presenting this course, and their patient understanding of student psychology has done much to develop enthusiasm for the subject and is no doubt responsible for the underlying method of handling it.

Since chemical engineering fundamentals make use of physical chemistry in the consideration of chemical changes which result in processes, this book might be called "An Introduction to Applied Physical Chemistry." The authors have begun with the premise that the student has been exposed only to general inorganic chemistry.

The book is just what it purports to be — an *introduction* to the subject, and therefore its coverage is limited to several important essentials. For this reason, one who is more sophisticated may be tempted to put it aside as somewhat elementary. This criticism might be apt if applied to the first three chapters, but the authors had no intention of developing a reference book. Nevertheless, the chemical engineer who finished school ten years ago may find it a very worthwhile means of reviewing his grasp of this subject.

Anyone who has had the privilege of studying with the authors will remember their penchant for perfection, exactitude, and attention to detail. The book exhibits this, together with some boldness in method of attack. The result is an accurate, logical presentation. The student is led by means of the concept of internal energy through the solving of exemplary problems relating to chemical processes. The examples selected are

such as to stimulate student interest not only because the chemicals involved are familiar, but also because the processes are of the relatively few concerning which very complete data is available in the literature. This makes it unnecessary to fill in with guesses — always a distracting thing to students.

The approach used is patently logical and develops the feeling that the fundamental methods involved can be successfully applied in studying other and more complex examples which the student may later meet. As stated in the preface, the effort is pointed towards learning by "active application of principles."

With characteristic care, the authors first set up two pages of symbols used. These are followed by chapters on units and an 18-page summary on methods of using mathematical procedures in solving engineering problems. Next comes a chapter on engineering measurements which is possibly more elementary than the rest of the treatise.

It is logical that the behavior of gases is then taken up. This is followed by an excellent discussion of material balances as applied to different methods of process operation. There follows the study of energy and the development of the energy balance. These lay the groundwork for a somewhat brief but well executed consideration of equilibria and kinetics of chemical reactions.

Four final chapters provide exceptionally good treatment by application of the preceding principles to processes. Those used include the synthesis of ammonia, production of nitric acid by ammonia oxidation, the manufacture of sulfuric acid, and finally of caustic soda.

Fifty-one problems bring this small volume to a close. The solution of at least some of these will tax the knowledge and resourceful thinking of many of our older chemical engineers.

Errors appear in almost every book and this one is no exception. However, these do not detract from its usefulness and the treatise will be found worthwhile by the chemical engineering profession, even at the somewhat astonishing price of nearly four cents a page.