SCIENTIFIC BOOKS

DYNAMICAL ANALOGIES

Dynamical Analogies. By HARRY F. OLSON. New York: D. Van Nostrand Co., Inc. pp. xi + 196. 1943.

THERE was a time when the student of physics sought to understand electrical problems by seeking their dynamical analogies. To-day, the correct utilization of electrical methods, the wide potentialities of those methods and the enormous amount of energy which has been expended upon them, has resulted in a reversal of the process of thinking, so that the custom is now to transform dynamical problems to electrical problems as soon as possible, in order that the thinking and ingenuity of the investigator may be more readily exerted in that realm.

Dr. Harry F. Olson has done a distinct service to physicists and engineers in putting the story of this matter into a consistent and connected whole, and he performs no small service in collecting together in eight pages a list of that galaxy of new terms which the engineer has invented to the confusion of the physicist who, in contrast to the chemist and biologist, used to live in a heaven of simplicity as regards nomenclature. He can once more live in comfort in full knowledge of the fact that he knows where to find the meaning of "inertance," "rotational compliance" and a hundred other similar queer expressions.

Most of the discussions in the book are made in terms of comparisons of electrical, acoustical, rectilinear mechanical and rotational mechanical systems, and the foundation of the whole subject, as based upon the dynamical equations of Lagrange in the form contemplated in Maxwell's theories, is exhibited. It may be remarked that while the equations of Lagrange contain the conservation of energy, the converse is not true except in systems of one degree of freedom, and it is perhaps well that the student should clearly realize that conservation of energy is not in itself a sufficient criterion for the solution of problems, except in this case.

Matters are developed in as concise and simple a manner as is consistent with the range of problems studied. There is also a set of useful tables stating conventional symbols for and dimensions of important electrical, mechanical rectilinear, mechanical rotational and acoustical quantities.

Chapters I and II deal with definitions and an explanation of the meaning of the fundamental elements of electrical and mechanical discussions. The third chapter concerns electrical, mechanical rectilinear, mechanical rotational and acoustical systems of one degree of freedom. The fourth chapter extends the discussion to two and three degrees of freedom. Chapter V is devoted to corrective networks, Chapter VI to wave filters, Chapter VII to transients, Chapter VIII to driving systems, Chapter IX to generating systems, and there is a valuable chapter, No. X, dealing with such miscellaneous important theorems as Thevenin's theorems, superposition theorems, reciprocity theorems, etc. The last chapter is concerned with applications.

W. F. G. SWANN

BARTOL RESEARCH FOUNDATION OF THE FRANKLIN INSTITUTE, SWARTHMORE, PA.

PROBLEMS IN CHEMISTRY

General Chemistry Problems. By W. M. SPICER, W. S. TAYLOR and J. D. CLARY. 120 pp. New York: John Wiley and Sons. 1943. $1.25.

IN this book the authors show in detail, with full explanations and many illustrative examples, how to solve most types of numerical problems encountered in the study of elementary chemistry. About 245 unsolved problems are included in the fourteen chapters, some with answers given, most without; and 118 "review problems" without answers are added, in groups with topic headings, at the end of the book.

The language used throughout is simple and understandable, the explanations logical and clear. The authors make an especial effort to induce the student to follow each thought-process involved in working a problem through to the end. They do not use nor advocate short-cuts even to the extent of setting up simple proportions. This full step-wise method, if followed patiently, leads to clear understanding of the principles involved; but at times becomes quite awkward and may distract attention from the central core of information used in solving the problem—as the balanced equation. One doesn't actually decide how many apples he can buy as described on page 32; nor does he, after the beginning phases, calculate the amount of zinc required to displace a given amount of hydrogen as described on the same page. However, this book is intended for use in the elementary stage where it is well to be meticulous.

Very useful features, to the average student, should be the chapter—six pages—devoted to an interesting discussion of "significant numbers"; a chapter on the use of exponential numbers, logarithms and the slide rule; and a chapter on using moles, gram-equivalents —chemical units in general—in solving problems where it is advantageous to do so. There are also frequent illustrations of rapid approximations as a check against gross errors.

On page 49 an error appears: "log of a quotient = log of the denominator—log of the numerator."