qualifications" is used to denote academic training in the field being taught. It is recognized that other forms of professional training constitute valuable qualifications of a teacher. Be that as it may, the formal educational qualifications index is offered only as a measure of the pertinent academic training of a college faculty. As used in this paper, the index does not take into consideration academic training in excess of the requirements for a lower degree but insufficient for a higher degree. Such training could be recognized by using appropriate fractional values.

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Book Reviews

An Explorer-Scientist's Pilgrimage: The Autobiography of William Herbert Hobbs. Ann Arbor, Mich.: Edwards, 1952. 222 pp. Illus. $3.75.

The reviewer has often tried to figure out what a well-matured man was like when he was a lad. This book answers the question effectively for one. The reverse question has also been pondered. What will the student of today be like when he is 60? 80? 90? If Dr. Hobbs' tutors ever let their imaginations thus wander they will be interested in reading this satisfying story!

Dr. William Herbert Hobbs studied at four universities, taught at three, and lectured at many. Some of these contacts were important in his development, but the contacts with men were more valuable than those with institutions.

As the title suggests, Hobbs was a traveler—particularly a geologic traveler—and an observer-student. He visited Europe several times, Africa twice, the Pacific Islands, Japan, Australia, New Zealand, the Hawaiian Islands, Greenland several times, and apparently most of the United States, always with his eyes open to minerals, rocks, and geologic phenomena. He became an authority on earthquakes, volcanoes, and glaciers, and his more than 400 articles and 15 books show his magnificent range of interest and scholarly approach to the problems that caught his attention. Translations of some of these have been made into French, German, Italian, Spanish, and Rumanian. He met men easily and was privileged to possess acquaintance with a long list of leading men in science, education, government, and business, both in America and abroad.

Besides all his valuable personal and institutional contacts, there have been the projects and field problems with which he has wrestled. All have been important in his development. Hobbs' research has included volcanoes, present and past, in Italy, Greenland, Germany, Parícutin in Mexico, Lassen in California, and Halemaumau in Hawaii; earthquakes in Spain, Calabria, Malta, and the eastern and western United States; glaciers in Alaska, Greenland, Switzerland, and ancient glaciers in Wisconsin, Iowa, New England, and the scablands. He has studied and written upon arctic and antarctic problems. After careful study of maps and literature he has presented new interpretations of several exploratory journeys by others. He has made great contributions to the problem of winds on Greenland's icecap, and on continental glaciers.

The book should be read by young scientific aspirants and by any who doubt the value of environment and contacts or the reaction of native ability and application to environment.

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Intermediate College Mechanics: A Vectorial Treatment. Dan Edwin Christie. New York–London: McGraw-Hill, 1952. 454 pp. $7.00.

With the emphasis of present-day mechanics on vectorial methods, it might be considered too much to ask that a completely adequate treatment of the analysis involved could be incorporated in a text on intermediate mechanics without, at the same time, obscuring the physical principles involved. Too often, the college junior, in his preoccupation with the complexities of the vector mode of treatment, sacrifices physical understanding to mere manipulation of symbols.

As a vectorial treatment, Christie's book provides a well-consolidated body of physical material, while still presenting the requisite mathematics in some detail but without undue prominence. Each concept has been given careful attention with regard to illustrative examples and has, on the whole, been complemented by a set of well-graded exercises.

In the arrangement and development of the text, the author largely follows the standard pattern of procedure. The notion of force, encountered after the preliminary treatment of vector algebra, is taken up from a semi-intuitive point of view. With the statements of Newton's three laws, the analytical basis for statics of a particle is established. The case for equilibrium of rigid bodies follows in the very lucid chapter on couples and moments.

Time, the "third basic ingredient of mechanics," is added next. Here the student is introduced to the fundamental nature of vector rates of change. The author very skillfully keeps the purely formal aspects of the analysis subordinate to the principles embodied in their formulations. The logical development of the kinematics of a particle and of rigid bodies follows,

yielding the usual expressions for velocities and accelerations.

In the treatment of dynamics and "energetics," there are many points of pedagogical merit. Having introduced the concept of mass and the vector formulation of the second law, the author deals with motion relative to a noninertial system of reference. In this the resultant force acting is reinterpreted to include "frame" and Coriolis forces—the presentation of this artifice being direct and appealing and not having the vague touch of mystery engendered by the use of the term "reversed effective."

The development of work and energy principles is more or less standard in approach. Here again the coherence of text, examples, and exercises, and their orientation with respect to preceding work, are explicitly brought out.

It is not until the time integral of the principal equation of dynamics is treated that the second law of motion is given in general form. Logically this arises as a natural outcome at this point. Little attention, however, is given to this form as such: rather, the impulse-momentum principle is preferred.

The more sophisticated ideas of force fields, with the concomitant utilization of vector operational methods, appear in the final chapter on rigid mechanics. The approach again is purely functional, since two of the final chapters of the text are devoted to rather concisely analytical expositions on the mechanics of deformable bodies and of ideal fluids. A brief treatment of one-dimensional wave motion and kinetic theory constitute the final chapters.

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The Lipids: Their Chemistry and Biochemistry, Vol. I, ***Chemistry.*** Harry J. Deuel, Jr. New York–London: Interscience, 1951. 982 pp. $18.50.

The great mass of knowledge already accumulated, and the accelerating flood of information being published, have made it difficult for the specialist in any one of most fields to keep in mind the innumerable facts of pertinence in that field, and have made it impossible for most scientists to be versed to their own satisfaction in related fields. To mitigate the difficulty, there is fortunately an increasing number of periodic reviews, comprehensive symposia, and monographs.

Professor Deuel, well known for his many contributions to the biochemistry of the lipids, has undertaken the formidable task of preparing a compendium on the lipids. In this volume he has assembled the information on the chemistry of the lipids in an admirably organized way. The biochemistry of the lipids is to be the subject of Volume II.

The author has covered the area so intensively into 1950 that most individuals, even specialists, will find practically everything they desire, and the extensive bibliography of over 3500 citations will certainly, in most instances, make possible the convenient location of any available additional information sought. The lengthy table of contents provides an outline of the material covered and will usually lead at a glance to any desired topic. The text itself displays this carefully prepared outline by the use of typographically distinct headings, subheadings, etc., facilitating the location of desired information. The index has been most exhaustively assembled, approximately a sixth of the total pages being devoted to the indexes of authors, subjects, and plant and mineral sources of the lipids.

Extensive discussions are included of all the well-known and apparently of the other less well-known simple, compound, and derived lipids. Each substance is discussed with respect to provenience, isolation, purification, and physical and chemical properties, including methods of preparation. Physical properties are correlated with chemical nature. Solubilities, melting points, boiling points, and spectral behavior, for example, are considered in detail with respect to structure of the various types of fatty acids. Among the many topics discussed are crystalline habits and polymorphism of the fatty acids, analysis of fats, constants used in identification of fats, oil and fatty acids, interesterification, inhibitols and antioxidants, chromatographic separation, including an admirable concise presentation of the theoretical basis for adsorption phenomena, stereoisomerism of the carotenoids and vitamins A, activation of provitamins D, and biological activity in relation to chemical structure of vitamins E and K and related compounds. Every topic, in fact, that could be expected is treated in adequate detail, and every constituent of living tissues, insoluble in water but soluble in fat solvents, or related to the accepted lipids, is discussed.

Structural formulas are generously employed, with very few detected errors; 102 figures and diagrams are included. Of the 204 tables, some are taken from or based on tables of other authors, but many have been newly prepared.

Biochemists, and all others whose work relates to the constituents of living tissues and their functioning, will find this a valuable source of ready, comprehensive information on the chemistry of the lipids, and many will find this an indispensable addition to their personal libraries.

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Morphogenesis: An Essay on Development. John Tyler Bonner. Princeton, N. J.: Princeton Univ. Press, 1952. 296 pp. $5.00.

The problem of development of form has been variously considered by many individuals, most of whom become bewildered by the multiplicity of types and by the inadequacy of any generalization to explain the many differences. Most biologists accept form without thinking of it as one of the fundamental problems which every living thing must solve in its own peculiar species' way.

In the search for a single generalization to cover all the contingencies of the three fundamental construc-