Mathematics Textbook

A First Course in Calculus. Serge Lang. Addison-Wesley, Reading, Mass., xii + 258 pp. Illus. $6.75.

In the foreword Lang states that this book "is written for the student, to give him an immediate, and pleasant, access to the subject. I hope that I have struck a proper compromise between dwelling too much on details, and not giving enough technical exercises. . . ." It is readily discernible that the goal of avoiding too many details has been attained.

The author reflects a thorough knowledge of the subject about which he is writing and of related mathematical specialties. Many notions which are basic to the study of calculus are explained in an excellent manner—among these are the treatment of inequalities (in section 1.2) and that of the slope of a curve (in section 3.1). The concept of a derivative and the theorems on derivatives are clearly presented. Chapter 9, "Integration," and chapter 10, "Properties of the integral," are worthy of special commendation.

Informal language is frequently used; some examples are—"We can then make up a right triangle" (p. 26) and "to prove that e^x/x^m becomes very large when x does, it suffices to do it for its log" (p. 131). Some concepts are defined in a fairly precise manner (derivative, p. 40; indefinite integral, p. 134; definite integral, p. 145), but others are rather loosely characterized [the equation $y - b = 1/(x - a)$ is known as a hyperbola (p. 33); an ellipse is a stretched-out circle (p. 31)].

Lang defines a function as a rule (section 1.3), and generally elects not to distinguish between a function f, its defining equation $y = f(x)$, the expression $f(x)$, and the graph of f. A closed interval is denoted by $[a, b]$, but the conventional symbols for other types of intervals are not used. The form in which the mean value theorem for derivatives is given is different from the standard form of this theorem, in that differentiation over a closed interval is required. Consequently the mean value theorem as stated is not applicable to such situations as $f(x) = \sqrt{x}$ over the interval [0,9].

Antiderivatives, inflection points, and differentials are not mentioned, and relatively little attention is given to differentiation of composite functions. Chapters 9 and 10 (on integration) give practically no attention to integration of composite functions, but brief consideration is given to this in chapter 11. Integration by use of trigonometric substitution appears in one brief illustration (p. 172), apparently without mention by name and without further discussion. In this respect one wonders if the student who uses this book may not be handicapped in subsequent study of intermediate calculus and differential equations.

The book has a pleasing, uncomplicated appearance and I noted only a few misprints. To those who are looking for a short calculus book, of limited coverage, written in an informal manner, I recommend Lang's book.

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Constituents of Life

Comparative Biochemistry. vol. 5, pt. C, *Constituents of Life*. Marcel Florkin and Howard S. Mason, Eds. Academic Press, New York, 1963. xx + 637 pp. Illus. $20.

The varied styles and approaches make the multiauthorship of this book very apparent. Chapter 1 (by Tschierish and Mothes) is a rather dull compilation of the known amino acids (122), their structural formulas and dates of isolation, as well as the elucidation of their structure and their syntheses. Their role in metabolism and comparative biochemistry is very sketchily reported. The article is marred by the poor quality of its translation; particularly jarring is the repeated statement that a particular amino acid contributes "x % to the synthesis of a protein." There is a record number of 842 references at the end of the chapter.

On the other hand, chapter 2 (by Takahashi, Taniguchi, and Egami) is a capable and up-to-date résumé of our present-day knowledge of the distribution and metabolism of inorganic nitrogen compounds. This chapter, which is concerned with the comparative aspects of the biochemical transformation of nitrogen, fits in extraordinarily well with the original aims of the editors.

The same can be said about chapter 3, "Acid metabolism: The citric acid cycle and other cycles" (by Lioret and Moyes). In this chapter, which is illustrated with many excellently executed diagrams, the authors discuss all the information concerned with the organic acids and their cycles and, at the same time, stress the comparative aspects of their subject. This chapter, and the preceding one, should be required reading for graduate students in biochemistry.

Chapter 4, "Comparative biochemistry of collagen" (by Gross), seems out of place in this volume, which is primarily devoted to the more dynamic aspects of comparative biochemistry. (It probably would have fitted better into volume 4.) Although this chapter provides the casual reader with a glimpse into the problems associated with the study of macromolecules, it may be too elementary for the specialist.

The next chapter (146 pages), a summary of the modern aspects of photosynthesis, was written by E. C. Wassink, an expert in the field. One is especially struck by the unsatisfactory and contradictory state of our knowldege about the actual photoreaction, quantum yields, and efficiency of the light energy conversion compared with the great progress that has been made in the elucidation of the path of carbon in photosynthesis. The chapter is a well-balanced effort to arouse the interest of the general reader and to provide the researcher in the field with thought-provoking ideas.

In the final chapter Roche, Fontaine, and Leloup discuss the comparative aspects of halides, which are almost universally distributed in all living organisms. Of the four halides—fluorine, bromine, chlorine, and iodine—iodine has received the most attention. Investigations have revealed many diverse problems, which emphasize the fact that the analogies, coincidences, and uncritical interpretations of the results have tended to oversimplify the problems of biochemical evolution in this field.

Volumes 3, 4, and 5 of this treatise provide a veritable smörgåsbord of information [for reviews of volumes 3 and 4 see *Science* **137**, 745 (1962) and **139**, 326 (1963)]. Some of the chapters will appeal only to the specialists, others will lead to a better understanding of the varied biochemical mechanisms used by the biological world to capture and conserve energy. The vast domain of *Comparative Biochemistry*, as the editors envisage it, encompasses all of

biochemistry and that part of organic chemistry which is concerned with natural products. It may be too much to expect a more uniform treatment of the subject, but in the forthcoming volumes the editors should hold a tighter rein on the contributors.

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Testing

Testing: Its Place in Education Today. Henry Chauncey and John E. Dobbin. Harper and Row, New York, 1963. xiv + 223 pp. Illus. $4.95.

They Shall Not Pass. Hillel Black. Morrow, New York, 1963. x + 342 pp. $4.95.

Testing is a very timely book. There has been an enormous increase in the number of educational activities, as well as in the functions, in our society which require selection and grading of persons by using measures related to the intellect. Sheer necessity has forced the development of tests and testing procedures, but not all persons are happy with the fact nor with the present state of the art. As a result there is a philosophy of criticism and dissent, and at times of revolt, against the whole testing movement, as well as criticism of specific tests and test procedures. Thus, an authoritative book on testing is needed.

Chauncey and Dobbin have been admirably restrained, factual, and objective in their book. A brief history of testing constitutes the first chapter. The second chapter deals with tests of learning ability. These chapters form an indispensable background for anyone seeking orientation with respect to the understanding and use of tests. They should be required reading in many contexts.

The remainder of the book is concerned with how tests are made and used. The uses covered are varied—uses in measuring academic achievement and aptitude, in teaching, in selection for and admission to school, in competitions for fellowships, and in similar situations. The considerations involved and their bearing on the nature and use of the tests selected are admirably and fully presented.

Testing should be of great value to the manifold users of tests, and it should become a landmark as well as a point of departure for future literature on testing.

Hillel Black's book, on the other hand, is a curious document, written by a layman in the testing world. At first blush (judging by the title and dust jacket), it would seem to promise to be a finger-pointing, "how terrible" exposé of the seamy side of testing. In actuality, one has the feeling that, although this may have been the author's original intent, he was more than a little persuaded that on the whole testing is necessary, inevitable, and only in certain respects occasionally vulnerable to attack. Much of Black's attack relates to undue rigidity in the use of test scores. Much of his comment, however, is aimed not at testing so much as at the unhappy psychological effects of the highly competitive situation with respect to admission to college. Most of his "viewing-with-alarm" is with respect to situations wherein testing is an element only. But, primarily, it seems to me that Black is speaking for common sense, and reasonably good judgment, in the selection and use of tests—an admonition in which he agrees with Chauncey and Dobbin.

Black says, on page 276, that "much of the alarm and concern over mass testing has been misplaced. It is not the tool itself that is dangerous, but how we employ it." Chauncey and Dobbin would no doubt concur.

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Japanese-American Relations

America Encounters Japan: From Perry to MacArthur. William L. Neumann. Johns Hopkins Press, Baltimore, Md., 1963. xiii + 353 pp. $6.50.

Scientists have little time to read outside their own fields of interest, but this book is worth their attention. Although it deals specifically with Japanese-American relations, its conclusions could be reached through similar studies of American relations with China or the U.S.S.R., with England or Germany. The book covers the century from Perry to MacArthur.

Neumann believes that Pearl Harbor was neither an accident nor a coincidence but wholly in the logic of American history. He suggests, in a disturbing way, that it might have been due to a clash over principles which had already become irrelevant in the face of rising Asian nationalism and the shifting balance of power in the Far East. In his view, wise policy might have avoided war with Japan without national humiliation or the surrender of vital interests.

He uses Japan to show how policies change to implement fundamental interests and the extent to which government policies and popular attitudes tend to coincide. Throughout the years when Japan's foreign policies harmonized with those of the United States, the Japanese were regarded as exotic and hard working people. When their interests clashed with ours, the Japanese were pictured as aggressive and arrogant. At the present, Japan seems to be our natural ally, but we must recognize that, in its own national interest, Japan could conceivably turn neutral or align with the new nationalisms of Asia.

The author's conclusions go beyond Japan and deal with all Asia. He suggests that, for American policy, Chiang's flight to Formosa was an even greater disaster than Pearl Harbor, for it signalled the death of the Open Door policy, America's century-long strategic concept for the extension of its way of life to Asia. Neumann asks whether in Asia America's great empire of influence, prestige, trade, and power will decline as drastically as have the earlier territorial empires of Britain, France, and the Netherlands. He underscores the American tendency to identify its own interests with those of the world, to fuse American expansionism and idealistic internationalism. He cautions that ambitions and goals which are beyond the range of power lead to heroic but futile gestures. He thinks that, in the quotation which follows, Secretary Acheson laid down the only acceptable formula for constructive relations with new Asian governments and their restless peoples: ". . . We are interested in the people of Asia as people. . . . We do not want to use them for any purpose of our own. . . . We want to help them in any sensible way we can to achieve their own goals and ambitions in their own way."

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