Book Reviews

What's Happened to Our High Schools? John F. Latimer. Public Affairs Press, Washington, D.C., 1958. vii + 196 pp. $3.75.

This question is not only asked but answered by John F. Latimer in a factual, even-tempered, and scholarly analysis. It is a question that has been asked many times by many people in the course of the present decade. From the critics of our schools and their product has come the deep-throated chorus, "They're worse!" And from the educators has come the high-pitched cry, "They're better!" The argument has virtually reached the 'tis-'tain't intellectual level, as each side eloquently quotes Scripture—and statistics—to prove its points.

Latimer's searching, historical analysis of our changing school system represents the results of four years of painstaking research. His facts and figures will end many a statistical argument, and they certainly demonstrate the fact that our schools are different and that their curriculum has changed drastically—whether for better or for worse may still be open to argument, but on some of the author's thoughtful conclusions it is hoped there will be increasing agreement.

Critics of the high-school curriculum have claimed that only 45 percent of our high-school pupils take work in mathematics. This claim is countered by Harold C. Hand, professor of education at the University of Illinois, with the contention that "only about 5 percent of our high school youngsters are not taking any work in mathematics these days." Using the same source of information as Hand, Latimer finds that the total percentage of students taking mathematics is 55.0. Again, there has been the argument about how many of our high schools offer courses in physics and chemistry. This question, as a matter of fact, is unimportant. What matters is how many students are taking physics and chemistry. Latimer finds that in 1949 only 5.4 percent of the high-school students in grades nine to twelve were enrolled in physics, and only 7.6 percent in chemistry. Even if these figures for a single year are multiplied by four—a dubious procedure, at best—the totals are not impressive, and they represent substantial drops from the percentages of students enrolled in these subjects from 1890 to 1910. Meanwhile, physical geography and geology have virtually dropped out of the high-school curriculum, whereas biology has shown a spectacular rise, and general science an even more phenomenal increase—from 0 in 1910 to 20.8 percent in 1949.

In general, Latimer's story is one of rise and fall for the "hard-core" subjects—mathematics, science, and foreign languages (English appears to have held its own fairly well)—and a sharp increase in social studies, business education, vocational and related subjects, home economics, and physical education.

Thoughtfully, Latimer concludes: "It is no accident that the main core of those subjects without which life in the modern world is inconceivable is the same in all civilized countries: Mathematics, science, foreign languages, history, and one's own native tongue. The logic and principles of mathematics, the laws of science, the lessons of history are the same, no matter in what language they are studied and learned. Native tongues differ, but each is the gateway to its own procreation of culture, thought, and communication. Foreign languages differ, but they constitute the media for the transmission of ideas and for the cross-fertilization of cultures. These are the subjects around which coordinated courses of study for all students, regardless of ability, should be built, from the grades through high school. . . ."

Latimer demolishes what he calls "split-level" education—easy subjects for the slow and hard subjects for the bright. Again, to use his own words:

"That some students are not capable of strenuous mental effort is unfortunately true. The proper solution for the slow-learner is not the notion of 'easier' subject-matter. Tremendous as the task will be, it lies rather in the development and use of special texts and teaching methods and in grouping according to ability, that will give the less gifted an education that will differ in *quantity, not in kind,* from that of his more gifted fellows. This is the essence of democratic education, the opportunity to learn, at one's own pace and ability, the basic principles of those subjects without which life in the modern world is inconceivable.

"But split-level education often results, not from lack of ability, but from *underestimation* of a student's capacity, by himself, his parents, or his advisor, or from the very human tendency to which even students are prone, to follow the path of least resistance. Those who make their own choice in high school, whatever the reason, often realize it too late to make the necessary substitutions or to change their objectives. The effect on the student can be disastrous, in lowered morale and self-confidence, in loss of interest, and in lack of adequate preparation for college or for the larger world outside. Here is the educational wasteland we can and must reclaim."

While the Congress and the public are so keenly concerned about our educational goals, the study of John F. Latimer's book is a "must." As he says: "We must face these facts realistically . . . these data make it possible for the reader to draw his own conclusions, in agreement or disagreement with those suggested by the writer. . . . The use of facts and figures is not meant to imply that the *quality* of education is measured by statistics. But by means of these facts and figures, cold and lifeless as they may seem, we may be able to take the educational pulse of America and prescribe with confidence for her educational health in the years to come."

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Antiseptics, Disinfectants, Fungicides, and Chemical and Physical Sterilization. G. F. Reddish, Ed. Lea and Febiger, Philadelphia, ed. 2, 1957. 975 pp. Illus. $15.

With its appearance in 1954, this volume became a standard reference work on the subject of applied disinfection and sterilization. The publication of a second edition within a relatively short time is indicative of the active interest of the editor and his 27 collaborators in maintaining this book as an up-to-date reference standard in this area.

Like the first, this second edition is concerned for the most part with the practical aspects of chemical antisepsis, disinfection and sterilization, and heat sterilization of canned foods and similar products. Antimicrobial compounds, other than the chemotherapeutic drugs, are considered in detail, this edition including new material on the extensively studied phenolic compounds and on the use of antibiotics in food preservation and for other purposes and completely new chapters on sterility testing, by Brewer, and on the applications of ultraviolet radiation, by Schechmeister. The outstanding chapter, by Spaulding, on chemical disinfection of surgical instru-

ments has been made even more comprehensive.

The editor has wisely chosen to accept a certain amount of repetition to make possible a more rounded presentation of relevant material in the subdivisions of the text so that each tends to stand alone, adding to reference value. At the same time, other than the chapter by Wyss concerned with natural and acquired resistance to antimicrobial substances, there is no general theoretical discussion of microbial growth inhibition and death, or consideration of the implications of the dynamics of the processes of disinfection. Possibly the authors assume an adequate background on the part of the reader, and this assumption is doubtless justified, but in my opinion the book would gain in stature by presentation of the subject material against an authoritative theoretical discussion.

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Handbook of Chemical Data. F. W. Atack, Ed. Reinhold, New York, 1957. 629 pp. $6.75.

This is a handy little pocket-size volume of essential chemical information in tabular form. Although by no means as complete as the familiar *Lange* and *Chemical Rubber* Handbooks, it lists the properties of 2100 inorganic and 5500 organic compounds and contains useful tables of specific gravities of solutions, logarithms, formulas, gravimetric factors, and so on. The book is small enough to fit a pocket or a brief case, the typeface is easy to read, and the arrangement of headings makes it possible to find information quickly without using the index.

Psychology, Evolution and Sex. Cecil P. Martin. Thomas, Springfield, Illinois, 1957. x + 166 pp.

Evidence for any biological theory is never complete. Destructive criticism points out the gaps in the evidence without offering a better explanation of the demonstrated order of facts. Constructive criticism offers an alternative theory that is more in accord with the evidence, or provides new facts that logically force modification or overthrow of inadequate theories.

Martin's book attempts to refute the "mutation-selection theory" of evolution, and, in its place, he offers the alternative theory which is little more than a modern restatement of Lamarckian inheritance of acquired somatic characters—psychological, physiological, and structural. He does not claim proof for Lamarckism, but he is strong in his opinion that the "mutation-selection" theory is less well established. He does not incorporate adequately the advancing information on the roles of recombination, inbreeding, and population genetics. He thus fails to understand how complex functions or regressions can evolve in conformity with modern genetic and ecologic principles. Many sweeping statements are made in contradiction to available evidence not mentioned in his limited bibliography. For example, he says (page 23): "That the modificatory preferences become, in time, hereditary seems fairly certain. That they do so through mutation and natural selection has not been proved and appears to be virtually impossible." He seems sincere in his viewpoint and convictions but, in my opinion, too often substitutes biased generalizations for a careful analysis of the facts, pro and con. When he does gather facts together, he often leaves out evidence opposed to his conclusions. It would take far too much time and space to supply the data that would tend to refute his major conclusions, but I suggest that the interested reader examine the following books and papers: (i) W. C. Allee, A. E. Emerson, O. Park, T. Park, and K. P. Schmidt, *Principles of Animal Ecology* (Saunders, 1949); (ii) G. L. Stebbins, Jr., *Variation and Evolution in Plants* (Columbia University Press, 1950); (iii) T. Dobzhansky, *Genetics and the Origin of Species* (Columbia University Press, ed. 3, 1951); (iv) J. Huxley, A. C. Hardy, and E. B. Ford, *Evolution as a Process* (Allen and Unwin, 1954); (v) H. J. Muller, "Life," *Science* **121**, 1 (1955).

These publications give both discussions of concepts and many pertinent bibliographical references that will supply much of the critical data lacking in Martin's book. Of course, these references do not solve completely all of the problems raised, and there are some differences of opinion and interpretation among the active investigators of evolutionary dynamics, but I think the major questions raised by Martin are largely answered. Old-fashioned Lamarckism is now rather thoroughly discredited. I would also suggest that "The evolution of adaptations" by C. H. Waddington [Endeavour **12**, 134 (1953)] be read. This essay shows how examples once used by Lamarckians may be harmonized with modern genetic and ecologic theory. Instead of a cause always preceding an effect, genetic substitution indicates that the effect, in a sense, causes the selection of genetic triggers setting off processes once physiologically acquired. In time there may be an evolutionary feed-back from effect to cause, provided only that the cause is continuous or repeated.

It is well to have a healthy skepticism concerning any theory, major or minor. Science grows by the accumulation of new evidence and the refutation or verification of theories explaining the order of facts. Relationships are observable facts as much as are the facts that are related. However, in the book under review, I am not convinced that the alternative of Lamarckism is justified by the evidence, nor am I convinced that Martin has penetrated thoroughly enough into the evidence that supports the theory he attempts to refute. He accuses others of approaching the problem with fixed preconceptions and dogmatic attitudes, but it seems to me that Martin may have erred by proceeding from a somewhat subjective bias himself. Unfortunately none of us can be thoroughly objective and remain human.

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Introduction to the Mechanics of Stellar Systems. Rudolf Kurth. Pergamon Press, New York and London, 1957. ix + 174 pp. $9.

A stellar system may be characterized as an assemblage of mass points, each moving under the combined gravitational influence of all the others, with no spatial bound on the motion of any individual particle. No straightforward theory has ever been developed for the mechanics of such a system; instead, techniques have been drawn in catch-as-catch-can fashion from theories of the *n*-body problem, the motion of continuous media, statistical mechanics, and kinetic theory. Rudolf Kurth says he has attempted to bring out the essential parts of this subject, but the scope of his book is not as broad as the title would indicate. He concerns himself chiefly with the abstract mechanical principles that may be applied to stellar systems. He cannot claim to give a systematic presentation of current theories of stellar dynamics and their application to actual stellar systems.

The book begins with a short summary of observed characteristics of existing stellar systems, followed by a consideration of the basic assumptions and methods on which a theory of their mechanics may be based. Next comes a discussion of the dynamics of many-particle systems. The two central chapters deal successively with stellar systems as assemblies of gravitating mass points and as gravitating continua. The book closes with a brief discussion of the relation of statistical mechanics to the mechanics of stellar systems.

The author's point of view is abstract and general. Such an approach can be very powerful, but in this book it is not.