a native Christian movement. Albert Tritt, a former shaman, experienced conversion to Christianity in a blinding flash of light and a swoon. Tritt set himself to master the language and the message of the Bible. He took both literally. In his King James' English, young women were "damsels" and "virgins." And, among other monuments to his Deity, Tritt persuaded his followers to prepare a straight-line, 20-foot-wide cut through the timber toward Fort Yukon. For, as the Bible commands, "Prepare ye the way of the Lord, make straight in the desert a highway for our God" (Isaiah 40:3).

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## Biochemical Pharmacology

Volume 1 of **Progress in Biochemical Pharmacology: First International Symposium on Radiosensitizers and Radioprotective Drugs** (Butterworth, Washington, D.C., 1965. 760 pp., $28.50), edited by R. Paoletti and R. Vertua, is a well-edited volume, with name and subject indexes. The volume, which shows the importance progressively acquired, since 1949, of the problem of chemical radioprotection or sensitization, is based on a symposium organized by the European Society for Biochemical Pharmacology and held in Milan, Italy, in May 1964.

This field interests both fundamental science, because it provides facts for interpretation of radiation effects at the molecular and cellular levels, and applied science, because there are possible applications in radiotherapy, astronautics, and the protection of civilian or military populations.

The 90 contributed papers are organized in the following sections:

(i) Introductions by E. B. Chain and Belloni; (ii) Effects on lower organisms (bacteria, isolated cells, and seeds); (iii) Irradiation of chemical systems; (iv) Effects on mammalian organisms *in vitro* and *in vivo*; (v) Effects on experimental tumors; (vi) Chemical sensitization; (vii) Chemical protection (mainly on mammals *in toto*); the most important section, with 27 contributions; (viii) Biological means of protection; and (ix) Clinical investigations.

The level of the contributions is generally good, sometimes high. I was particularly impressed by the following papers: The review, by J. S. Mitchell (Cambridge, England) of clinical and laboratory studies of radiosensitizers in radiotherapy; the clever contributions, by P. Alexander, C. J. Dean, and J. T. Lett, on the repair processes during and after irradiation, on the sensitization of bacteria and lymphoma cells by an -SH blocking agent and 5-bromodeoxyuridine; the observations from three European laboratories confirming in very different technical conditions the favorable effect of the administration, *after irradiation*, of highly polymerized nucleic acids or nucleoproteins; and the contributions of the Norwegian physical chemists (Eldjarn, Pihl, Sanner) on the chemistry and effects of thiols and disulfides. The variety of substances and biological material used in the studies on chemical radioprotection and the feasibility of combining, for treatment of cancers, the so-called radiomimetic substances with the ionizing radiations should be emphasized.

I do not hesitate to recommend this book to those students or research people who already have a certain knowledge of the problem. They will find a good survey of the general spirit and the basic hypotheses prevailing in eastern as well as western Europe; only nine authors from the United States contributed to the volume.

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## Biochemistry

In **Biochemical Energetics and Kinetics** (Saunders, Philadelphia, 1965. 122 pp., $3.75), A. R. Patton proposes to supplement biochemistry textbooks, especially their "rather large gaps in the mathematical derivations."

The author alludes first to "much that cannot be explained, in equations or in words . . . that thread of silent knowledge which always runs through the tapestry of science." What eludes me is an explanation of how the editors of a reputable publisher passed this concoction of mathematical nonsense, logical lacunae, missed opportunities, non sequiturs, inept metaphors, and outright solecisms, amid which the equations struggle vainly.

Patton begins with "Velocity includes direction in space and is known as a vector quantity," and on the next page "subdivides" the motions of particles into vectors with "coordinates" on the $x$-, $y$-, and $z$-axes; this is his treatment of vectors. A definite integral is evaluated, after which the author tells us that the integration constant must be zero on physical grounds. He refers to "the kinetic energy of acceleration of a particle."

The same level is maintained throughout; and the book is concluded with an appendix on calculus, in which "rate" is identified with "differential," integration is explained by analogy with experts piecing together the debris of a plane after it has exploded in midair, and partial differentiation is illuminated by reference to a student with two jobs: "On job $x$ he is paid at an hourly rate du/dx, etc." It seems unlikely that this appendix will teach calculus to students whom the author does not trust to cancel terms of opposite sign in an algebraic sum.

It is frustrating, with so little space, to choose among the examples that illustrate my points. For instance, there is the explanation of "half-life" with a sexy version of the Zeno paradox of Achilles—boy approaches girl—which concludes tragically: "According to the half-life theory (!), they would never touch." And there is the triumphant demonstration, after steady-state concentrations in a kinetic system have been found by setting the time derivatives equal to zero, that the steady-state values really are constant!

The level of comprehension exhibited in this book is deplorable. For the level of the pedagogy, words fail me.

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## Prehistory

**Prehistoric Societies** (Knopf, New York, 1965. 356 pp., $6.95), by Graham Clark and Stuart Piggott, is an excellent and up-to-date introduction to the study of human prehistory on a worldwide basis. Any reader, whether student or layman, will find the survey of the problems met and overcome by prehistoric man informative and exciting reading. He will be impressed by the contemporary quality of relationships between ancient man and his problems as seen in his attempts to adjust to

new technologies, new settlement patterns, increased population, and new forms of social organization. These developments were largely haphazard—so much so that, like modern man, prehistoric man usually wasn't aware of what was really happening to him.

The first great step forward was man's emergence from the animal world into the world of culture—that is, into a world in which imagination created new tools and new ideas that transformed the environment. A second major step was taken with the emergence of literate food-producing societies brought about by the domestication of animals and plants, population growth, and the creation of writing. The third and most recent step, which is beyond the scope of this book but which is part of the same story, is the industrial-atomic revolution and present-day population explosion.

Each of these events has radically altered the direction of man's development, initiating vast changes in his relationship to the world around him and in his relationships to his fellow men. The documentation of these changes and of man's response to them during the long prehistoric period forms a basic background to the social and intellectual dislocations we are currently experiencing. *Prehistoric Societies* provides an excellent guide to this background and should be required reading for all those who consider themselves educated but who are unfamiliar with the subject of prehistory.

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## International Series on Dynamics

This textbook, **Foundations of Solid Mechanics** (Prentice-Hall, Englewood Cliffs, N.J., 1965. 539 pp., $18), by Y. C. Fung, is intended to bridge the gap between elementary textbooks and the more advanced literature; it does an incredibly good job of meeting its objective. The text was developed at California Institute of Technology for a graduate course which represents a broadening of the traditional elasticity course. Major emphasis is on the linear theory of elasticity, but about one-third of the book deals with topics that are not traditionally considered a part of static or dynamic elasticity. These include plastic behavior of materials, elasticity and thermodynamics, thermoelasticity, irreversible thermodynamics, and finite deformation. Fluid mechanics is specifically excluded, but the author has nevertheless included a formulation of the constitutive equation for a linearly viscous fluid.

The treatment varies somewhat in depth from topic to topic, but it is nowhere shallow and is almost always exceptionally clear. The basic introductory chapters and the treatment of dynamic and static elasticity are especially outstanding. The thermodynamic formulations are limited to small deformations. In irreversible thermodynamics, the author limits himself to linear processes, states the Onsager reciprocal relations, and presents Biot's treatment of relaxation modes and hidden variables, with application to linear viscoelasticity. In the chapter on thermoelasticity he achieves a practical flavor by calculating the temperature and stresses in a turbine disk as an example. The 22-page chapter on linear viscoelasticity introduces tensorial relaxation and creep functions, formulates stress-strain relations in differential equation form, and discusses boundary value problems and integral transformations, waves in an infinite medium, quasistatic problems, and reciprocity relations. Finite deformation is treated in chapter 4, called "Analysis of strain," and in the final chapter, chapter 16, called "Finite deformation." The last chapter contains the fundamentals needed for formulating equations of motion in the presence of finite deformation and a clear derivation, given in a material (or "Lagrangian") description, of the von Karman equations for the large deflection of plates. There is a useful 27-page bibliography in which other books and important papers are cited.

The reader will find here a carefully written, readable book which assembles a large amount of useful material. The topics treated seem to be sensibly selected with an eye to engineering applications and tutorial value. The book is as up-to-date as can be expected in a rapidly developing field. Naturally, the instructor who is alert to current developments in rational and technical mechanics may decide to omit or present improved versions of some sections, but it should nevertheless be possible to give a very good course by following the book closely. The students who work through this book will get a sound introduction to solid mechanics.

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## An Introduction to Histology

This short monograph, **Living Tissues: An Introduction to Functional Histology** (Pergamon, New York, 1965. 154 pp. Paper, $2.95), by R. L. Holmes, is stated to represent an introduction to the study of the morphology and the function of tissues. It is simply and clearly written and outlines the basic concepts and methods of classical histology. In addition, it stresses the use of newer histochemical, fluorescent, and autoradiographic techniques and attempts to point out the functional significance of structural elements. It is by no means a comprehensive text but consists of a series of examples that illustrate the organization of tissues. A series of 36 photomicrographs are included, which are of good quality and complement the text. References are kept to a minimum and when given refer to more comprehensive texts and to a few classical articles in the older literature. A more thorough bibliography would have been useful to the novice.

This volume appears to accomplish the author's main goals. One decided drawback is the lack of information concerning the ultrastructure of cells as determined by electron microscopy. Material illustrating the qualities of phase-contrast microscopy is also omitted. This volume can be recommended for the biologically oriented high school student and the undergraduate who requires an introduction to histology.

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## History of Science

"Michael Scot may be regarded as the leading intellectual in Western Europe during the first third of the thirteenth century." With this statement Lynn Thorndike begins his most recent book, **Michael Scot** (Nelson, Edinburgh, 1965. 151 pp., 30s.). And certainly Michael