ally the events go the other way: a conditioned stimulus of specific sort can be the signal for varied activity, while here the stereotyped activity takes place to a great variety of cues. There follows a brilliant discussion of laughter and the nature of the humor, and here our psychology textbooks are very weak by comparison.

Weeping is distinguished from crying, and the occasions for weeping are discussed in detail. Here again we find topics searchingly examined that ought to be, but are not, found in experimental psychology, and the special bibliography is provided to call attention to the lack.

Many of these discussions are only marginally related to the central topic of creativity, although an occasional summary attempts to show their relevance. The lack of a strong pattern of organization that lets the reader know where he is in the argument is one of the book's weaknesses; the author has much to say and says it where it occurs to him (and I am pleased that he does), but the book is lacking in classical quality as a result of this divagation. One summary (among many) places the creativity of the comic, the scientist, and the artist in this perspective: "We have seen how laughter is sparked off by the collision of matrices; discovery, by their integration; aesthetic experience, by their juxtaposition" (p. 408). Such a condensed statement is gradually enriched in meaning as one reads through the book; there are many such *prägnant* statements for the reader to ponder over.

The second book, which the author notes could not be written without some pedantry, is an ambitious effort to root the thesis of the first book in the facts of biology, to show that the basic principles of creativity are exhibited at all levels of biological organization from the fertilized cell to the adult brain. At all levels there is unused potential, whether in the material latent in the genes which is used when the organism faces new demands upon it, or in the possibility of returning again to the growth processes of the embryo as when, following injury, regeneration is demanded. A favorite way of summarizing these effects is *reculer pour mieux sauter* (to draw back in order better to advance), so that experimental results with primitive organisms give a scientific underpinning for what the psychoanalyst Kris has called regression in the service of the ego. An amazing amount of scientific knowledge is crammed into these pages, but, as I have already indicated, they were not for me the most illuminating. That is not to say that the evidence is superficial or inadequately mastered; there is no doubt that Koestler has been to the sources and has talked with many of those who have done the primary experiments. It is rather that there is something very tricky about the notion of hierarchial organization, with each succeeding stage somehow anticipated in the earlier ones; one is reminded of some of the romanticism associated with the doctrine of emergent evolution in the 1920's. The restitution of function with nerve transplantation is a case in point; Koestler is most optimistic about reorganization of function when he wishes it to support his theory (pp. 457 to 460), but, where the evidence runs counter, he finds this limited flexibility a beautiful illustration of autonomy (p. 444). How does one pick and choose, when by analogy we move to higher mental processes?

The examination of psychology takes him through instinct, imprinting, motivation, perception and memory, motor skills, learning to speak, learning to think, and critical chapters on psychological theory. This is a large order. In keeping with his critic's role, familiar whether he is looking at Communism, the Kibbutz of Israel, or oriental religion, we find him casting a cold eye on much of academic psychology. He notes the decline of the reflex (yet its persisting influence upon S-R psychology), the pitfalls of learning theory ("rarely in the history of science has a more ambitious theory been built on shakier foundations"), and the pitfalls of Gestalt (which, despite its acknowledgment of insight, misses the boat because of Köhler's nativistic emphasis upon isomorphism). The issues that he raises all seem to be legitimate ones; it seems too much to ask of him as critic that he should present an entirely balanced argument or be kind to everyone. Even though he fails to cite much of the contemporary psychological literature on creativity, it would take a hearty spirit to say that he would have been much edified by what he missed.

Reading the book is a rich experience, for the author wanders widely through science, art, and literature, uses charming and varied analogies, and says countless quotable things. If his book is not the last word on creativity, that is not much of a weakness. It is a serious work, immensely learned and thoughtful; if perhaps a little pretentious as a work of science, it places at the disposal of psychologists and other scientists the matured thoughts on creativity by one who himself possesses the creative gift.

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Botany

Common Trees of Puerto Rico and the Virgin Islands. Elbert L. Little, Jr., and Frank H. Wadsworth. U.S. Department of Agriculture, Washington, D.C., 1964 (order from Government Printing Office, Washington, D.C.). x + 548 pp. Illus. $4.25.

The authors have selected 250 species of "the commoner and more important native and exotic tree species, those most likely to be seen" to illustrate and describe in their book, and with these they compare an additional 130 related species. The 72 exotic species that are included are of pantropical distribution and, as only 28 species of native plants are endemic, this book will be useful in many areas throughout the Caribbean region.

The plan of the book provides, for each of the 250 selected species, an illustration of approximately natural size, accompanied by a page of excellent descriptive material, and, for 100 of these species, a distribution map that indicates the municipalities in which each occurs. For each species a single scientific name, which does not necessarily agree with the most recent taxonomic revisions, is given as well as a "preferred common name" in both English and Spanish. Additional common names used in Puerto Rico and other areas of the American tropics are also listed. Botanical synonyms, including the names used in Britton and Wilson's *Flora of Puerto Rico and the Virgin Islands*, are given. Keys are provided for the species illustrated in each family. The botanical descriptions emphasize the characteristics useful in recognizing the family, genus, or species; consider the size and appearance of the tree, its leaves, flowers, and fruit; and include original and compiled notes on bark, latex, fiber, odor,

color, taste, and other characteristics commonly used by foresters but rarely recorded for the tropics. The wood of the tree (cacti, ferns, and bamboos are "trees" in this text) is described, and compiled data are given on its specific gravity, hardness, uses, and milling properties.

The introductory material contains an excellent review of forests and forestry in Puerto Rico and the Virgin Islands. A bibliography of 40 titles, published between 1866 and 1964, includes a reference to a Spanish edition of this book (planned to include colored plates) which, in December 1964, is still in page proof. The lists that group species according to special characteristics—for example, colored sap—present a laborious exercise when referred to, rather than serving as an informative compilation, because numbers are used instead of names to "save space." Although the species treated in the text belong to 68 families, a key to the plants contains entries for 88 plant families and numerous genera not otherwise listed. A remarkably complete index of 20 pages, each with three columns, is a valuable section of the book.

A book of this size with 254 illustrations and figures, and priced at $4.25, is a botanical bargain. Regrettably it is not completely praiseworthy. The book has been in preparation since 1939, and many of the illustrations were prepared by obviously unskilled helpers. Although, superficially, the illustrations give an impression of each of the plants being described, the majority are, in fact, poor examples of botanical drawing; many are unfinished, many are inaccurate in detail, and all cast unjustified suspicion on the actual reliability of the text. Although the text has been brought "up-to-date" in some ways, careless proof reading, numerous errors in terminology, and unclear sentence structure decrease its usefulness. A one-page key (p. 25) contains eight erroneous page references among the 17 listed. Descriptive absurdities, such as Tree Fern Family having leaves with "spores in brown dots beneath" and the Bombax Family having "fruit a large oblong capsule with hairy seeds," are all too numerous. Nevertheless this text does serve a useful purpose, and it provides a basis for improved future editions.

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Mathematics

Functions of a Complex Variable. And some of their applications. vol. 1. B. A. Fuchs and B. V. Shabat. Translated from the second Russian edition (Moscow, 1959) by J. Berry. J. W. Reed, Translation Ed. Pergamon, London; Addison-Wesley, Reading, Mass., 1964. xvi + 431 pp. Illus. $10.

A reasonable balance has been drawn between theory and applications in this introductory textbook on functions of a complex variable. It includes the standard topics in the theory and at the same time abounds in significant applications. Although all of the material found in a complex analysis course is mentioned in the book, the level of rigor and depth of the treatment falls short of that needed for a one-year course in complex analysis. This is the kind of a text that is suitable for undergraduates or beginning graduate students who are interested in applications (engineers and scientists) and for a one-semester introduction to the subject for the pure mathematics students who will take a more penetrating course later. There is probably much more material between the covers of this book than can be covered in a one-semester course, but it is so organized that the topics (pure and applied) can be sampled as the teacher wishes.

The approach is very strongly geometrical. Stereographic projection is introduced to define the complex sphere. The elementary functions are studied by means of the conformal mappings they give. Although the Riemann mapping theorem is not proved in the book, it is carefully stated and frequently used as a tool in developing both the theory and the applications. The book contains an excellent intuitive discussion of the idea of a Riemann surface, with many examples and applications. The physical applications concern three basic fields: the velocity field of a fluid in motion, the electrostatic field, and the heat flow field. These subjects are developed rather extensively to illustrate how conformal mapping and the consequences of the Cauchy integral theorem are used.

The eight chapters are "The fundamental ideas of complex analysis"; "Conformal maps"; "Elementary functions"; "Applications to the theory of plane fields"; "The integral representation of a regular function"; "Harmonic functions"; "Representation of regular functions by series"; "Applications of the theory of residues"; and "Mappings of polygonal domains." Chapter 3 includes a rather thorough treatment of the linear fractional (bilinear) mappings, although the cross ratio is omitted. Chapter 5 contains a discussion of the Dirichlet problem for harmonic functions and the Green's function. Chapter 6 includes an analysis of the singularities of analytic functions and analytic continuation. Chapter 7 discusses the Mittag-Leffler theorem (without a proof) and the gamma function. The last chapter treats the Schwarz reflection principle, the Schwarz-Christoffel mappings, and a geometric introduction to the Jacobian elliptic integrals. There are approximately 17 problems at the end of each chapter and answers and hints at the end of the book. The translation from the second Russian edition is very good, although some slips, such as the incomplete statement of theorem 15 (p. 266), seem inevitable in any first printing.

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Radioisotopes and Biology

Dynamic Clinical Studies with Radioisotopes. Proceedings of a symposium held at Oak Ridge, Tennessee, in October 1963. Ralph M. Knisely, W. Newlon Tauxe, and Elizabeth B. Anderson, Eds. U.S. Atomic Energy Commission, Washington, D.C., 1964 (order from U.S. Department of Commerce, Washington, D.C.). vi + 634 pp. Illus. Paper, $4.50.

Here is a paperback that no biology laboratory can afford to be without. And in "biology" I would include all applied human biology (that is, medicine, surgery, pediatrics, and the like) centers as well as preclinical departments and research foundations.

This book is a remarkable one, bringing together the data, interpretation, comments, and discussions relative to an important and emerging new field—clinical data based on isotope kinetics. It is a fit successor to the previous publications of Oak Ridge symposia, the most recent predecessor being the proceedings of the 1962