and heredity. This is followed by a larger section (631 pp.), containing an intensive survey of the individual taxonomic groups. In each case this survey begins with a characterization of the group and extends through definitions of representative species of each genus; a running taxonomic key is helpful in separating forms within each group. Special effort has been devoted to insure adequacy of treatment of parasites without restriction to those of concern to medical parasitology. A terminal chapter (25 pp.) presents a compact, useful outline of methods of collecting, cultivating, and staining protozoans.

Each student will have his own opinion of the adequacy of particular portions of the text. Some may be disturbed by the failure to modify the taxonomic system itself in light of recent, well-documented proposals by Fauré-Fremiet for the entire ciliate assemblage and by Kirby for the morass of animal flagellates. Others may regret the failure to include Lowndes' fundamental analysis of flagellate locomotor mechanisms and, on a still more physiological plane, may decry the absence of a clearer exposition of our present knowledge of protozoan nutritional patterns. In a few places minor errors have crept in, such as the failure to distinguish between the blepharoplast and kinetoplast of hemoflagellates.

The fact remains, however, that the present edition incorporates solid improvements and still further strengthens the outstanding value of this textbook as an introduction to the structural organization of the Protozoa.

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The Pineal Gland. A review of the physiologic literature. Julian I. Kitay and Mark D. Altschule. Published for the Commonwealth Fund by Harvard Univ. Press, Cambridge, Mass., 1954. xiv + 280 pp. Plates. $5.

In many quarters, particularly in America, the function of the pineal body is generally assumed to be unknown. For example, in Maximow and Bloom's widely used *Textbook of Histology* (Saunders, 1952, ed. 6), the question is summarized as follows.

> Unfortunately, extirpation and injection of extracts of the organ have given inconstant and highly contradictory results. Typical secretory granules are not found in specific pineal cells.

In their book Kitay and Altschule subject this belief to a critical examination by analyzing statistically the widely scattered physiological literature on pinealectomy, pineal-extract administration, and pineal implantation in various animals (mainly frogs, chicks, rabbits, mice, and rats). As a further means of appraising the question of pineal function, they reexamine the clinical evidence that indicates a possible correlation between pineal tumors and changes in the genital system of boys.

Analysis of the experimental data, the most reliable and best controlled of which have appeared in recent years, supports the conclusion that pinealectomy affects the genital systems, causing gonadal hypertropy, acceleration of vaginal opening in immature rodents, and prolongation of estrus with shortening of diestrus in mature rodents. Contrariwise, pineal-extract administration produces gonadal atrophy, retards vaginal opening, and inhibits the action of pituitary gonadotropin. Pineal extracts are also said

> . . . to inhibit changes in blood chemistry that are consistent with the action of corticotrophin and the adrenocortical hormones; they also decrease 17-ketosteroid excretion.

The evidence of correlations between the pineal body and other endocrine glands is said to be inconclusive, as are also effects of the pineal on body growth and development. Pineal-extract administration is reported to cause statistically significant elevations in blood glutathione in psychotic patients as well as a marked decrease in hyperketonuria caused by stress of surgical operation. Unfortunately, the authors do not inquire or attempt to establish whether these "statistically significant" effects of the administration of "extracts" are *biologically significant* or *specific in character.*

Since the inquiry is confined to a statistical analysis of selected physiological data, no mention is made of possible physiological implications of the observed age involution of the human pineal gland or of the fact that in some vertebrates, including several groups of mammals, the pineal body is rudimentary. Nor are the neural connections of the brain and pineal body considered with respect to the changes following pinealectomy.

The second part, entitled "Clinical correlations," concerns a syndrome of precocious puberty seen in boys. This was first described half a century ago by Marburg, who ascribed it to decreased secretion of the pineal gland, associated with pineal tumors. The present authors claim that this syndrome is associated strictly with pineal tumors composed of nonparenchymal cells, whereas tumors consisting of parenchymal cells are not accompanied by any genital disorder. They attribute the induction of the genital syndrome to the suppression or replacement of the specific parenchymal cells by nonparenchymal (neuroglial) elements with an associated decrease in the inhibition that the pineal body normally exerts in some manner on the male gonads. Although Kitay and Altschule offer no explanation for the failure of such tumors to induce sexual precocity in girls, they regard the clinical findings as consistent with the results obtained experimentally in animals. In view of the importance of the issue of two different kinds of tumors, it is to be regretted that typical histopathological illustrations of them are not included. Such pictures might well have replaced the book's frontispiece, which is a poorly defined, colored reproduction of a histological section (bearing the caption "Pineal gland [presum-

ably normal] of a forty-six year old woman") which reveals nothing of consequence.

Fully two-thirds of the volume consists of a bibliography of some 1800 references cited by titles. Six hundred of these have nothing to do with the subject but are references to the anatomy, embryology, histology, and physiology of various other structures that comprise the parietal region of the vertebrate brain (paraphysis, pineal eye, subcommissural organ, and the habenular ganglion and commissure). They were probably included for the sake of completeness, but since they are for the most part written in foreign languages, including Japanese, they afford little information for the average reader.

This book succeeds, to some degree, in dispelling the current belief that the pineal body is functionless. In the rabbit and several rodents at least, it seems evident that the pineal body does exert an inhibitory influence on the gonads and accessory reproductive structures. The nature of this control and its possible interplay with various endocrine and neurohumoral mechanisms remains totally concealed. The sexual precocity encountered in boys in the presence of some kinds of pineal tumors suggests that in man the gland may play a similar role.

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K* (*Krebiozen—Key to Cancer?). Herbert Bailey. Hermitage House, New York, 1955. viii + 312 pp. $3.50.

A few years ago Stevan Durovic, a Yugoslav refugee physician working in Argentina, extracted a substance from the blood of cattle that he thought was produced by stimulation of the reticuloendothelial system. This substance, tested in a local clinic, was encouraging in the treatment of hypertension and, under the name of Kositerin, was brought by Durovic to the United States for further clinical testing.

Later Durovic revealed that at about this same time, working in secret, he had discovered that, by injecting horses with extracts of the fungus *Actinomyces bovis,* he was able to stimulate in the host the production of a growth-regulating substance that, according to this hypothesis, would be effective in cancer control. Only 2 grams of the substance, later named Krebiozen, was obtained from 10,000 gallons of horse blood. Initial tests of Kositerin in hypertension proved disappointing.

Durovic then presented to the distinguished physiologist, Andrew C. Ivy, at that time a vice president of the University of Illinois, the problem of determining whether Krebiozen was effective in causing the regression and possible eradication of tumors. This was in the summer of 1949. Late in 1950 all the remaining supply of Krebiozen was placed in about 200,000 ampules with mineral oil, making a satisfactory chemical analysis of it difficult or impossible. In March 1951, Ivy assembled the available data on 22 patients into a brochure entitled "Krebiozen: an agent for the treatment of malignant tumors," and set a date for the announcement of the drug to a group of 80 persons, including physicians and newspaper writers.

The events since that time have been exceedingly confused and controversial. The author of this book presents the case for the substance, Krebiozen, and for Ivy, Durovic, and their friends. It is interestingly written, apparently primarily for the layman. It presents the thesis that Krebiozen and Kositerin existed as two substances, that its backers deplored and attempted to prevent the early newspaper publicity, and that they were persecuted by certain officials of the American Medical Association, the organization that has prevented effectively the further testing of the drug.

In discussing the failure to seek a patent, the author seems unaware that it is the practice of pharmaceutical manufacturers in the United States to reveal to clinical investigators, in confidence, as much as is known concerning the origin, composition, and actions of new drugs prior to their study in patients.

It is of some interest that the early cases responded, if at all, to a single ampule of the drug, but the dose was increased to an average of 80 ampules in a later series of cases treated by Ivy. Also there was a gradual shift of emphasis from the carcinostatic action of the drug to its analgesic or euphoric action. Failure to obtain tumor regression often is accredited to inadequate dosage, and success often is measured in terms of lack of pain until death.

Obviously this book presents only a part of this controversial subject.

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Elements of Ecology. George L. Clarke. Wiley, New York; Chapman & Hall, London, 1954. xiv + 534 pp. Illus. $7.50.

Academic ecology has been slow in maturing. The student who elects the subject in an American university may spend most of his time bird-walking, or on the other hand he may at once be put to testing Pütter's hypothesis. One suspects that the field will become set in pedagogic molds only after drastic subdivision; meanwhile student transcripts make common currency of all sorts of odd experiences because they bear the name *ecology* in the catalog.

In this book George L. Clarke has made a helpful contribution toward the averaging of current views on what should go into a course in general ecology. It was his purpose "to bring together in one place and in a simple way the elements of ecology with special emphasis on the modern viewpoint of the science." The first chapter gives definitions and a statement of the divisions and scope of the subject. After this come 286 pages (seven chapters) describing the physical and chemical constitution of the environment, with varying amounts of illustration of