particularly important, since any useful example is not a thing to be studied by casual geometric inspection, but rather by a deep and detailed analysis. There is a detailed study of the symbol spaces of symbolic dynamics, the geodesic flows on manifolds of constant negative curvature, and of cylinder flows.

The general theory portion of the book is undoubtedly hard to read. This is probably inevitable, for the authors have been able to place the theory in an exceedingly general setting; in so doing, they have had to overhaul the vocabulary of dynamics and place the subject in a considerably more abstract setting. Their account of modern topological dynamics should provide a new area of problems for the future development of the subject.

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Histologie und Mikroskopische Anatomie des Menschen. W. Bargmann. Georg Thieme Verlag, Stuttgart, ed. 2, 1956. (Order from Intercontinental Medical Book Corp., New York 16.) 796 pp. Illus. $16.55.

In this second edition, Bargmann has thoroughly revised his well-known textbook of histology and has brought it up to date. The general part on living matter and the tissues opens with a presentation of the methods of investigation, ranging from those applied to living material to those serving for the study of fine structures. In the chapter on the cell, a very good way of introducing the student to the complex structure of cytoplasm was found by dividing the material into cell organelles, paraplasm, metaplasm, and hyaloplasm. One wonders whether the surface and permeability of the cell should not have been given more special consideration in this chapter.

In his presentation of mitosis, the author adopted, to my satisfaction, the distinction between the two types of the spindle and the distinction between metakinesis and diakinesis as the first and second movements of the chromosomes. Statics, kinetics, metabolism, and irritability of the cell are dealt with under the heading of functional morphology. This way of approaching function within the histologist's own domain is one of the characteristic features of the entire book.

The second part, which deals with organs and systems, begins with a significant discussion of growth, differentiation, functional adaptation, and other topics in relation to microscopic anatomy. M. Heidenhain's theory of histiosystems is given its rightful place in this context. The chapter on the salivary glands, usually a somewhat dry subject, is an example of Bargmann's mastery in correlating architecture, vascular pattern, innervation, and functional mechanism of organs. Almost half of the illustrations are taken from studies of the author and his coworker. In selecting electron micrographs, Bargmann correctly refrained from going too far in a book designed for students who have yet to learn how to employ the light microscope, but a few more such illustrations—demonstrating, for example, the fine structure of muscle (H. E. Huxley, who is referred to in the text) and of bone (Robertson and Watson)—would be welcome. In bibliographies at the end of each chapter, both domestic and foreign publications are listed. An index of 20 pages facilitates the use of the book.

Bargmann deserves special thanks for stimulating interest in the history of histology. Portraits of Leeuwenhoek, Schwann, Virchow, Nägeli, Kölliker, Aschoff, Cajal, and Held serve this purpose and are an additional ornament to a book that does much credit also to the publisher. Bargmann's clear, straightforward use of the German language makes for good reading. This is the kind of textbook we like to see in the hands of students in medicine and biology; as the work of a leading histologist and an excellent teacher, it will be appreciated and enjoyed by the expert.

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Science and Information Theory. Leon Brillouin. Academic Press, New York, 1956. 320 pp. Illus. $6.80.

The large and still rapidly growing literature of information-communication-cybernetics now includes hundreds of papers and a number of books. Many of the latter are symposia proceedings in which many specialized contributions, more or less independent of one another, are brought together in one binding. Sometimes there is a grouping about some major central theme, for example, information theory in biology or psychology. Others are engineering textbooks or specialized monographs. Leon Brillouin's book has the merit of combining a unified logical development, such as one hopes for in a textbook, with the breadth of coverage heretofore found in the less coherent, collective kind of compilation. Many of his own contributions are incorporated in the general treatment. The novice will rejoice, and the specialist will sometimes be disappointed, that the presentation is at a mathematical level readily understood by the average physicist or engineer; this entails the omission of a number of advanced topics (for example, most of filter and prediction theory, stochastic processes, ergodic theory).

The book's 20 chapters fall roughly into three parts. The first eight define and apply the concepts of information, redundancy, and channel capacity, give a good treatment of coding problems (including error detecting and correcting codes), and discuss signal analysis (Fourier methods, sampling theorem, Wiener-Khintchine formula, and so forth). Together with Chapter 17, of the third part (in which the effects of noise on channel capacity are discussed), they give a fine presentation of the standard results used in communication theory.

The next eight chapters are concerned with aspects of scientific interest. After three introductory chapters on thermodynamics, thermal agitation, Brownian motion, and noise in electric circuits, two are devoted to the connection between information and entropy, and the problem of Maxwell's demon. The former is called the "negentropy principle of information" and is applied in the last three chapters of this group to general problems of physical measurement, limits of observation, and a discussion of the interactions between informational and quantal limitations on measurement. Many "thought experiments" and physical examples are included. Much of the discussion represents original work by the author. These chapters are at once significant, stimulating, tantalizing, and a little disappointing in that the discussion often concludes when one's interest has been aroused to a high pitch.

The author has carefully avoided questions with much of a philosophic tinge, preferring to discuss concrete physical situations. In my opinion the book would have been more satisfying with more attention given to semantic and methodological questions closely related to the information concept and the operational viewpoint (although perhaps it is unfair to reproach a scientist for not being more of a philosopher).

Many sections should be viewed as posing questions for further investigation and subject to possible future revision. The use of a characteristic length, Δx_T for temperature T, given by hc/kT (approximately $1.44/T$ centimeters) seems to be misapplied occasionally via a semantic slip. It originates (p. 207), in essence, from considering the precision in length measurement obtainable using radiation from a resonator at temperature T. It is then stated (pp. 232–233) that this length is the boundary between