the first time, and it is unfortunate that it could not have been described more fully.

The volumes have an attractive format, and furnish a vivid testimonial to a timely conference. One wonders how the field of electron spin resonance will develop in the future. If its past rate of expansion continues, conference proceedings at the end of its next seventeen years will fill an entire bookshelf!

Introduction to Dynamic Morphology. By Edmund Mayer. 545 pp. Academic Press, New York, 1963. $15.00.
Reviewed by Bruce H. Billings, Aerospace Corporation.

A few years ago, I visited one of the newly independent countries of Africa. I explored the capital city and got to know some of the indigenous inhabitants. Although I felt I could hardly call the country backward, there was no question but that it was different from Boston. For a physicist the 545 pages of *Introduction to Dynamic Morphology* makes a fine analogue to the African country. The book is clearly about a science but it is certainly different from physics. It might be considered a condensed guidebook to the study of the measurable characteristics and functions of living material and how it got that way. Dr. Mayer has tried to provide the nonmedical reader with a vocabulary. To do this for every term would have made the book unreadable. The particular compromise leaves the physicist with very few difficulties. Although the general idea is usually clear, an occasional sentence necessitates modest research on the part of the reader. "The collection of 'hypophyses' from a whale on a whaling vessel requires procedures comparable to those used by the veterinarian in autopsying a dead horse on a farm." The fact that "hypophyses" remains a mystery in no way prevents the physicist from enjoying the book quite thoroughly. I am sure that a similar book in physics would be quite unreadable to one of Dr. Mayer's medical colleagues.

The guidebook comes close to being a "Handbuch" since it covers in a condensed fashion a large part of the material in embryology, pathology, biology, histology, etc., that goes into the concept of dynamic morphology. It is particularly interesting for the physicist to read the experimental techniques which are used by biological scientists in order to determine the relationships between structure and function. The experiments have the same clear-cut precision that is associated with physics, but the number of parameters and the cleverness in the techniques sometimes seem greater than in most traditional hard sciences. There are also many topics such as "tagging" which come close to the sphere of the physicist. The methods of labeling individual molecules or sections of organs or even whole organisms go far beyond the simple tagging techniques that are found in radiochemistry. Dr. Mayer's examples reach from the necessity of scratching orientation marks on a slide of a mounted section, through staining of living cells in embryos, to the banding of birds.

A delightful feature is the historical background presented with many of the concepts. Structures are described not only in terms of their microscopic, macroscopic, and electron-microscopic features but also in terms of the previous ideas and experiments associated with them. An example is the story of insulin, which begins with the 1889 observations of von Mehring and Minkowski that dogs developed severe diabetes with the removal of the pancreas. Demonstrations by Schulze and Sobolev in 1900 showed that the islets of Langerhans and not the pancreatic tissue proper were responsible for protection from diabetes. Finally, in 1922, Banting and Best isolated insulin.

Every fact or notion is given a reference to the literature. Occasionally, the references are described in such tempting fashion that the reader might be induced to explore this other literature. Since there are over 1100 references this is perhaps difficult.

Perhaps the principle difference between *Dynamic Morphology* and a typical physics book is the number of unsolved problems. These range from the primeval origin of optical isomers to the fact that the end product of purine metabolism in apes, humans, and Dalmatian dogs is primarily uric acid, whereas allantoin is the primary end product in all other mammals including monkeys and dogs other than Dalmatians.

Perhaps the most disillusioning part of the experience of this physicist was the growing feeling that medicine was more difficult than physics and that the barely suppressed dream of a medical career could never be realized. One section describes some of the steps that must be taken in performing an autopsy on an experimental animal or on a human. The number of things an experimentalist could do wrong seemed infinite. The steps had to be taken in a special order and Dr. Mayer points out exactly what is significant about the steps and their order. Finally this particular physicist developed an awe of Dr. Mayer. It seemed that the number of fields of biological science which he covered were greater than even an extraordinary medical man could cover in one lifetime.

There is no doubt that a physicist who is interested in gaining some understanding of the research now going on in biological sciences could gain immeasurably from a series of evenings with Dr. Mayer's opus. He might even be inspired to consider the possible ways by which his own particular research could be applied to unraveling some of the many problems in dynamic morphology which still need to be faced.

Electromagnetic Fields. By Sergei A. Schelkunoff. 413 pp. Blaisdell, New York, 1963. $9.50.
Reviewed by T. Teichmann, General Atomic Division, General Dynamics Corp., San Diego, California.

The theory of electromagnetism forms one of the most complete and elegant branches of classical physics, and in its presentation it is often most satisfying esthetically to proceed as quickly as possible to the fundamental (Maxwell) equations, and then to utilize these in the solution of problems. While this is generally the most effective approach to advanced problems, it is not the only one, and it is not always the best method to build up the subject starting at a more elementary level. Schelkunoff, in this book, has adopted a synthetic approach, in which the applications and limitations are plumbed at each step,

before proceeding to more general or complex questions. Although this exposition, of necessity, does not lack mathematical content or discussion, the accent is strongly on the physical significance of the results. In those cases where it is appropriate, the author emphasizes (but does not belabor) the macroscopic aspects of field problems, such as equivalent circuits and impedances. An interesting aspect of the treatment is the systematic use of a step-by-step approximate method for the calculation of quasi-static fields, and general attention to approximate solutions (and their validity). In addition to examples discussed throughout the text, the book contains nearly 100 pages of problems with answers or hints for solution. While the presentation begins at a relatively elementary undergraduate level, it proceeds through many important aspects of waveguide cavity and antenna problems. It should prove particularly valuable to those readers who wish (or need) to apply electromagnetic theory in an understanding way to certain specific problems on their own merits, rather than as special cases of more general mathematical solutions.

Astronomy. By Robert H. Baker (8th ed.). 557 pp. Van Nostrand, Princeton, N.J., 1964. $8.25.
Reviewed by Bruce W. Shore, Harvard College Observatory.

Dr. Baker's book has been popular with astronomers since it was first published in 1930. Written as a college-level text, it became a favorite with many amateur astronomers. Newcomers to astronomy, young and old, have used "Baker" as a concise dictionary of astronomy, for it requires no background in science, and only the mathematics of sine, logarithm, and powers of ten. In a direct and compact style, it introduces the nomenclature of astronomy, and presents the facts, as we now know them, about our universe.

The present version retains the sound basic structure of the first edition, patterned after the standard reference by Russell, Dugan, and Stewart. This outline retains its cogency today, despite remarkable advances in all branches of astronomy. Like other older texts, this one begins with "Aspects of the Sky," including useful black-on-white star maps. A description of the earth, its motions, and "Timekeeping" follows. (The section on celestial navigation, prominent in earlier editions, was pruned away here.) Next come chapters on the moon and eclipses, as the discussion progresses through the solar system to planets, comets and meteors, and the sun. Four chapters then discuss the general properties of stars, stellar atmospheres, variable stars, and binary stars. The final four chapters cover star clusters, nebulae and interstellar matter, our galaxy, and exterior galaxies.

Frequent revisions — roughly four years apart—have contributed to the popularity of this book as a descriptive text and reference work. Each edition bears the mark of extensive rewriting. Even so, much remains of the first edition, and nowhere is this more evident than with the illustrations; numerous line drawings and half-tone illustrations from the 1930 version give a "dated" look not found in more recent books. On the whole, the book is adequately up to date, but numerous gaps remain. An obvious oversight occurs in the section on comets: the comet Seki-Lines is pictured and described during its return in 1962, yet it is not listed in the table of recent comets. The table of periodic comets lists no observations since comet Enke's 1957 return; and the reader might suppose this comet went unobserved during its 1961 passage.

The eighth edition inherits several weaknesses. A reference book is no better than its index, and the amateur astronomer seeking answers to common questions will frequently meet frustration in this index. The author index for the first edition was deleted long ago, and the present edition provides no guide to its discussion of the Zeeman effect or the Saha equation. Both G. Kuiper and W. W. Morgan are quoted at some length; neither appears in the index. Equipment too, though discussed in the text, occasionally misses the index (e.g., Coelostat and Heliostat). The several paragraphs on artificial satellites are parceled out among various chapters; none is accessible in the index.

A pedagogical weakness is the descriptive approach. The author stresses