the Actinomyxidia. The coccidians *Eimeria sardinae* and *E. clupearum* are not mentioned, though both are common in the herring and have been concerned in erroneous diagnoses of human coccidiosis, but the monocystid gregarine *Apolocystis gigantea* is dealt with, though it does not occur in Britain. Among ciliates, *Balantidium coli* has been given only trivial mention, yet it is "the most studied form" and the medium on which it may be grown is specified.

In spite of such defects, however, the book is commendable and will play a useful part in the teaching of protozoology. It has a subject index and an index of authors' names and there are 180 figures, many of which are excellent, although some are mediocre and a few should have been omitted. The frontispiece depicts the cilium of *Paramecium* and the kinety of *Stentor* without stating magnifications, but, good as these electron photomicrographs are, I would have preferred a portrait of the gracious lady who laid the foundations of this book. BEN DAWES

ART AND SCIENTIFIC ILLUSTRATION

Art and the Scientist

By Dr. Geoffrey Lapage. Pp. xii + 115 + 22 plates. (Bristol : John Wright and Sons, Ltd., 1961.) 42*s*.

THE amount of material which Dr. Lapage collected for his book must have been enormous. It is obvious that he had great difficulty in selecting from it the little he could use for a volume of this size. If one feels that he has not been wholly successful, particularly with some of his coloured illustrations, one must bear in mind that in such a matter it would be hard to find two people in agreement. Everyone will be grateful to him for including two hitherto unpublished illustrations from *Jamacia Studies* by P. H. Gosse.

Sections I–IV deal with illustrations from works on botany, zoology, human and comparative anatomy, produced by various deceased scientists, and describe their methods and artistic capabilities. They consist of innumerable snippets of information, liberally sprinkled with anecdotes, from which it is difficult to gain any general impression. If the facts had been presented differently, either in a historical fashion or in tabular form, they would have been more useful, if only for reference. As it is, apart from humorous incidents, it is rather like trying to read an unalphabetical directory, written out as an essay.

Sections V and VI discuss scientific illustrations and their characteristics, and although less tiresome to read, are still very scrappy. One wonders for whom these chapters are really intended. If they were given as a series of informal talks, with good lantern slides, they would be very pleasant, but do not seem so happy presented as part of a book.

The last section, "Creative Processes in Science and Art", is a far more interesting and sustained study. The chapter begins with a discussion of scientific and artistic methods and approach, and goes on to the most difficult subject of beauty—what it is, and where it may be found. Very extensive and well-chosen quotations are taken from Alexander, Kallen, Poincaré, Whalley, Wittkower, etc. One cannot, of course, always agree with Dr. Lapage. An artist does not necessarily care in the least about enabling others to experience the reactions which his paintings aroused in him. He paints for himself and is his own audience and critic. If his work satisfies him, it is 'off his chest' as it were, and he can even regard his accomplishment with something akin to indifference.

The comparisons between the mental processes of artists and scientists are full of ideas, but to say (p. 97) that if Newton, Pasteur and Einstein had not lived, no one else would have made their several discoveries is surely rather dubious. Once a discovery has been made, work goes onward from that point; identical discoveries can be made by independent workers; the net of human beings is too wide to assert that there can be no repetition or equality of one particular person's powers.

The final paragraphs, concerning other views on the relationships and origin of art and science, end in an almost impassioned plea for the synthesis of art and science. Leonardo da Vinci made the most serious attempt at this, but to-day, with the vast increase of knowledge of all kinds, a super-mind far beyond even his would be required. Where could this be produced in an age so desperate and swiftly moving? ANNE STEPHENSON

PHOTOCHEMICAL AIR POLLUTION

Photochemistry of Air Pollution

By Philip A. Leighton. Pp. ix + 300 (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1961.) 88*s*.

ALTHOUGH both the London and Los Angeles 'smogs' are caused by polluted air being trapped near the ground by a temperature inversion, the other conditions under which these phenomena occur are very different. On a cold foggy November day in England, it is small consolation to realize that the irritants present in Californian smog are produced photochemically by the action of sunlight on polluted air.

The group of compounds mainly responsible for eye-irritation and plant damage was only discovered as a result of investigations on these smogs. The structures of these compounds are not yet certain, but they are probably related to peroxyacetyl nitrate. The mechanism of formation of these compounds and of aldehydes and ozone in polluted air is discussed in great detail in Prof. Leighton's book. This detail is largely dictated by the complexity of the reactions involved, but some simplifying factors emerge, notably the dominance of one initial photochemical process—the formation of oxygen atoms from nitrogen dioxide. These oxygen atoms or the ozone formed from them react olefins to form eventually the more important pollutants. The blame for smog lies clearly with the olefins and nitrogen oxides emitted by internal combustion engines.

Apart from its importance to those concerned with air pollution in sunny climates, the main interest of this book will be for photochemists and kineticists, who will find it a useful source of information on the reactions of oxygen atoms and ozone with organic materials and nitrogen oxides. Even allowing for the complexity of the subject, the amount of detail presented too often submerges the conclusions which are given at the end of each section, making it hard for the more general reader to obtain a broad picture of the field. The specialist reader will find this book stimulating and useful. B. A. THRUSH