further down p. 60, they can with impunity say: "This epigenetic system" (referring to Waddington's 'canalization of development') "must have been the result of selection acting upon the genes . . ."?

There are several errors and sometimes examples are badly chosen. One of the examples of 'convergence' given is the mimicry by palatable species of Lepidoptera of distasteful models. This is absurd. There are two perfectly good examples of convergence in the same field of study: the acquisition of similar warning colorations by two distasteful species inhabiting the same area, and the mimicry of one distasteful model by two or more palatable species.

The glossary omits a number of more or less technical and obscure terms used, but not explained, in the text, including homozygote, heterozygote, zygote, mutation, chromomere, graft and zygotene. For no apparent reason, in view of these omissions, it includes centromere, character, haploid, diploid, chlorophyll, oxidation, replicate, protein, enzymes. The references are confined to the 'further reading' type, and no guidance is offered for following up many of the necessarily condensed accounts of detailed evolutionary studies of single taxa.

In general, it must be said that an extremely wide coverage of the process of evolution is offered in this book in a relatively small space. Inevitably, no more than a superficial account could be expected. Unfortunately, the superficial often degenerates into the trivial, simplicity into ambiguity, organization into confusion, and for clarity there are contradictions and obscurity.

B. S. Cox

LONGEST RADIO WAVES

Propagation of Radio Waves at Frequencies below 300 kc/s

Edited by W. T. Blackband. (Proceedings of the Seventh Meeting of the AGARD Ionospheric Research Committee, Munich 1962. AGARDograph No. 74.) Pp. xii + 478. (London and New York: Pergamon Press, 1964. Published for and on behalf of Advisory Group for Aeronautical Research and Development, North Atlantic Treaty Organization.) 140*s*. net.

THE parts of the spectrum of electromagnetic radiation in which the frequency is less than 300 kc/s have been named low frequency (LF, 300–30 kc/s), very low frequency (VLF, 30–3 kc/s), and extremely low frequency (ELF, less than 3 kc/s). Their propagation through the atmosphere has been extensively investigated in recent years, partly for the light which it throws on the structure of the ionospheric *D*-region, below about 90 km, and partly because of its possible application to radio navigational systems. These investigations were reviewed at a conference held in Munich in 1962 and the papers presented there have now been collected in a single volume.

The most valuable paper in this volume is a review article by Belrose on "Present Knowledge of the Lowest Ionosphere". In a scholarly and valuable survey it provides an outline description of the experimental methods, and discusses the results and the theories which have been proposed to explain them. The diurnal, seasonal, and solar cycle variations are discussed, together with the nature of changes associated with sudden ionosphere disturbances, solar cosmic ray events, auroral events, sudden commencements of magnetic storms, and anomalous absorption events on high frequencies.

The remainder of the volume contains specialized papers. Some are concerned with experiments made on waves from man-made transmitters: they deal with the determination of *D*-region electron distributions from observations using the phenomenon of ionospheric cross-modulation, with investigations of irregularities in the *D*-region, and with measurements of the phase of very low frequency waves observed at different distances from the transmitter. Results from the last-mentioned type of experiment are valuable in the planning of navigational aids.

Other papers are concerned with observations of naturally occurring waves, usually originated by lightning flashes, and with frequencies less than 10 kc/s. Some of the information derived from these observations relates to the travel of the waves around the Earth in the cavity between the ground and the ionosphere. It overlaps with information derived from observations of magnetic variations made on even lower frequencies. Although one paper deals with the penetration of low frequencies through the ionosphere, and their observation in a satellite, there is no discussion of the naturally occurring waves of audio frequency known as 'whistlers' or 'hiss'.

The effects of nuclear explosions on the phases of waves from man-made transmitters, and on the natural frequency of the Earth-ionosphere cavity, are described. The interesting fact is noted that the diurnal phase variations remained abnormal for several days after the explosion. There are also papers on theoretical aspects of the propagation of low and very low frequency waves through the ionosphere.

Conference reviews of this kind are beginning to take a standard form. They usually contain one or more review articles written for the occasion, together with a series of individual specialized papers. *Propagation of Radio Waves at Frequencies below 300 kc/s* is true to type. The one review article (by Belrose) is excellent and, so far as I know, has not appeared elsewhere. Of the specialized papers, some have been published in the ordinary scientific journals in roughly their present form, others would probably have been so published if this volume had not appeared, and some would probably never have been published, and might never have been missed.

The chief value of the volume is that it brings together in one place many ideas which workers in the subject are actively discussing just at the present time. This it does quite well. It will be interesting to see how long the scientific community will continue to feel that it is worth paying the price (£7) asked for a volume of conference proceedings of this kind.

J. A. Ratcliffe

AGE AND SIGHT

The Aging Eye

By Dr. R. A. Weale. Pp. vi + 200. (London: H. K. Lewis and Co. Ltd., 1963.) 35*s*.

THE subject of *The Aging Eye* is an important one, of great interest to the ophthalmologist, the optician, the illuminating engineer, the gerontologist, the physiologist, the psychologist, and others. It is also one of considerable difficulty and complexity, if only on account of the marked individual differences which can be observed between the eyes and visual efficiencies of the various members of any given age group. At the end of the book the author makes the confession that he wrote it for himself "in utter disregard of a potential market". Now this might appear rather alarming, because an author writing in this way might be expected to summarize drastically, if not to omit altogether, things with which he—but not the reader—is thoroughly familiar; so that his book would be incomprehensible to almost everyone. Fortunately, such a fear would be groundless in the present case. Nevertheless it is, unavoidably, taken for granted that the reader does possess a considerable background knowledge of the physiology of vision.

The book deals mainly with the morphological changes which take place with increasing age in the sclera, the