

possible, an overall account of the past in Africa. This has to a great extent been accomplished.

The book opens with accounts of the Maghreb, Tripolitania and Cyrenaica, Egypt, and the Sahara and its southern fringes. More information will be available on Cyrenaica when the account of Dr. Charles McBurney's digs there is fully published. In the meanwhile, Prof. Alimen's chapters are very useful. I sometimes feel that not enough has been allowed for the impassability of the great desert. During pluvial times the area could be traversed and the central African elephant found its way into the Atlas Mountains; but surely at all later times there must have been an impassable barrier which prevented north-south contacts. Thus, the evolution of the cultures to the south of this barrier has been different from that to the north, where the connexions are clearly Mediterranean. Examine, for example, the cultures north of the region where the Western Sahara goes down to the Atlantic and compare them with those lying to the south. The 'feel' is entirely different.

An account of the prehistory of Abyssinia and Somaliland follows, with a chapter on that of East Africa. Here the works of Desmond Clark on Somaliland and of Louis Leakey in Kenya have been of vital importance and are drawn upon, but Glover's discovery of an interesting rock-shelter art in the former area is not mentioned. Something has already been said about the next two regions described, West Africa and the Congo. Students will thank Prof. Alimen for explaining the maddening local names for cultures invented by Cabu that are current in the latter region. Finally, there are chapters on South Africa (including Central Africa), prehistoric man himself, the rock-shelter art, and megaliths. Prof. Alimen cleverly sits on the fence as regards the famous 'White Lady'; after all, she lives in Paris.

The work as a whole has been well worth while. Not everybody can visit those far-off regions, and a balanced account, even if necessarily imperfect in places and liable to be modified when the many problems now under discussion are finally resolved, will be very welcome to students. MILES BURKITT

MICROSCOPY TO-DAY

Modern Methods of Microscopy

Edited by A. E. J. Vickers. (A Series of Papers reprinted from *Research*.) Pp. iii+114. (London: Butterworths Scientific Publications; New York: Interscience Publishers, Inc., 1956.) 15s.

ALTHOUGH the microscope was invented in the seventeenth century, it was little used for scientific research until nearly 200 years later, since when it has become, as A. E. J. Vickers says in his introduction to this book, "the most important single instrument for research—it is indeed the symbol of science". Though this instrument is so widely used, the more recent developments in microscopy may not be so familiar; microscopic interferometry, the reflecting microscope, the X-ray and flying-spot microscopes are all relatively new, and will certainly play an increasing part in modern scientific research.

This book consists of a series of papers, reprinted from *Research*, which deal with many of these newer types of microscope and their use and applications. V. E. Cosslett contributes an account of the very spectacular progress made by the use of the electron

microscope, and he deals with the many advances in the design of instruments and in the methods for preparing the specimens. The reflecting microscope, known since Newton's time, has only recently become important as a research tool. Reflecting objectives have several advantages, including the fact that they can be designed to work at a high numerical aperture, and that they can be made completely achromatic over a wide range of wave-lengths. Two of the papers, by K. P. Norris and E. M. F. Roe, deal with the history, development and possible applications of the reflecting microscope; there is a very good account of microspectroscopy in the ultra-violet and infra-red ranges, a technique which will undoubtedly become a very useful tool of the histochemist.

Until recently, fluorescence microscopy has also been much neglected, and, as J. King points out in his article, the pioneer work of Ellinger, Hirt and others is largely unknown. This method of microscopy is very useful in that it enables various fluorescent substances to be located in plant and animal tissues, and allows certain fluorescent dyes or fluorochromes to be used as specific stains for substances such as nucleic acids. One of the most noteworthy advances in this field was made by Coons and Kaplan, who showed that it is possible to prepare a fluorescent antibody-protein complex, which may be used to locate an antigen in tissue cells, as the site of antibody-antigen precipitate is visible when the preparation is examined with ultra-violet light.

From a biological point of view, the most important discovery in microscopy so far is considered by many people to be that of phase contrast. R. Barer's article gives a clear account of the theory of the method, and describes its advantages for the study of living cells, together with one of its more recent applications—the measurement of the solid content of cells by refractometry. The closely allied technique of interference microscopy, which allows measurements of optical path-difference to be made, is also described in detail. Most cells are virtually colourless, but they can be made to appear coloured under the interference microscope when it is used with white light, as described in the article by F. H. Smith. He explains that this is because the simultaneous presence of different wave-lengths results in a corresponding mixture of phase differences; as intensity of light is a function of phase difference, some wave-lengths are attenuated with respect to others, and colour contrast is thereby obtained, facilitating morphological studies of the cell and its inclusions.

The polarizing microscope is also considered, especially with regard to its usefulness in identifying crystals and in throwing light on the fine structure of biological materials.

Methods of microscopy which may still be said to be in the experimental stage are the flying spot and X-ray microscopes. The article by D. Causley and J. Z. Young gives a clear account of the former, explaining the method and outlining its use in the counting of red blood cells, nerve cells and other biological and metallurgical materials, while W. C. Nixon explains the development and uses of reflexion, contact and projection X-ray microscopy.

The book is very well produced and illustrated, and will, I feel, prove very valuable to research workers and any others who are interested in some of the newer approaches to the use of the microscope; a very valuable feature is the provision of references at the end of each chapter. S. BRADBURY