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## reviews

Savile Bradbury

## **Development of preparative techniques**

A History of Microtechnique. By B. Bracegirdle. Pp. 359. (Heinemann: London, 1978.) £22.50.

STUDENTS of the history of biological science have devoted considerable attention to the microscope, both to the mechanical development of the stand and to consideration of the resolving power of the optics. Very little by comparison has been written about the equally important topic of the preparation of material for examination. This is an essential part of microscopy, just as much as interpretation of the image produced by the instrument. A knowledge of the development of preparative techniques throughout the period in which the microscope has been in use is, therefore, desirable. Such information, amply provided in this book, helps the historian decide to what extent the performance of the actual microscope was a limiting factor in the acquisition of data, whether there was a conceptual barrier in the mind of the observer or, as may prove likely, it was a combination of these allied to poor and limited preparative procedures. For example, some early techniques for preparing soft tissues such as striated muscle fibres involved their immersion directly in hot balsam resin. As Dr Bracegirdle vividly illustrates, such a preparation dated from 1869 shows little recognisable detail even when viewed by a modern instrument, whereas a microscope of 1826 gives a clear and detailed image of a modern stained preparation of striated muscle. This practical approach characterises the book, whose author examined over 40,000 slide preparations (some 3,500 in detail) during the course of its preparation; in addition he studied microtomes and other instruments in various collections in this country and abroad, and indeed succeeded in operating many of them in accordance with the instructions provided by their inventors.

Although there is clear evidence that microscopes were used to examine biological material from the middle of the seventeenth century onwards, few details of the preparative approaches used at that time survive. This may perhaps be attributed to the fact that very little in the way of specimen preparation was attempted, most observers being content to examine with incident light the surfaces of objects or to study fine dissections at low magnifications. The author considers the early efforts at tissue preparation

taking the early period as extending up to 1830. Only sporadic advances such as the invention of clearing agents, the mounting of thin sections of objects between talc covers in wood sliders and methods of micro-injection are to be found during this period. Obviously very few workers were taking microtechnique seriously and although the microtome, one of our most useful preparative tools in microtechnique, had been invented, only three examples (those of Custance, Hill and Adams) are recorded. This early period was, as the author comments, devoted to "specific advances of varying worth, not assimilated into an armoury of techniques generally in use"; some advances of great significance were however made, such as the introduction of the thin glass coverslip in 1789.

The century following the development of the achromatic microscope in 1826 was a time of great experimentation in microtechnique. Many and various reagents were tried, together with a host of embedding media. Some of these proved suitable—for example, paraffin wax and celloidin—and have survived into current use, whereas others—such as shellac, pulped paper, copal varnish and even tinfoil—have proved totally unusable and have disappeared from current practice.

Dr Bracegirdle devotes a long chapter to a discussion of the development of instrumentation in the nineteenth century. This chapter is largely an account of the microtome in its many and various phases and represents fascinating reading for a modern histologist.

The development of suitable chemicals and instruments for specimen preparation naturally led to the production of a large literature, much of it in German, during the nineteenth century. In his survey of this aspect of the subject, the author makes a very interesting comparison between the attitudes in England and on the continent of Europe between 1830 and 1910. In this country it was clear that the gifted amateur reigned supreme in the use of the microscope, pursuing the ultimate in resolution. The perfection of mounts (usually of diatoms) which allowed this seemed to be the aim. On the continent, especially in Germany, the value of the microscope was appreciated for the help that it could provide in elucidating the structure of both normal and diseased tissues. This was reflected in the rapid development of microscopic histology in the medical schools on the continent and by the contributions of workers such as Purkinie, Henle, Kölliker and Virchow.

This is a fascinating book, not only for the historian of science but also for the general histologist. It uses the history of microtechnique, as it developed in the nineteenth century, to pose the question whether many of the workers were not in danger of developing sheer technique and procedure at the expense of careful observation and experiment. Such a question is still relevant today.

The book is well produced and contains both name and subject indices, together with citations of over 1,000 original books and articles. The illustrations are all by the author; many are of material from his own extensive collection and are of a high standard, although some may find the placing of all the plates together in two adjacent signatures irritating.

Here we have a work which is sure to remain the standard reference in this field for many years to come.  $\hfill\square$ 

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## **Implications of artificial intelligence**

Computer Revolution in Philosophy: Philosophy, Science and Models of Mind. By A. Sloman. Pp.304. (Harvester: Brighton, UK, 1978.) Hardback £12.50; paperback £5.50.

THIS is an untidy, un-pompous, exciting, iconoclastic and exasperating book. The author, a professional philosopher as well as a research worker in artificial intelligence, is scathing about much of the prevailing methodologies of science, especially psychology and the social sciences generally, but his approach is perhaps best indicated by the following quotation in regard to philosophy:

"I am prepared to go so far as to say that within a few years, if there remain any philosophers who are not familiar with some of the main developments in artificial intelligence, it will be fair to accuse them of professional incompetence, and that to teach courses in philosophy of mind, epistemology, aesthetics, metaphysics, and other main areas of philosophy, without discussing the relevant aspects of artificial intelligence will be as irresponsible as giving a degree course in physics which includes no quantum theory."