

third of these cannot both be satisfied everywhere, the scheme adopted is based mainly on (b). In some cases values of the cotangent to more decimals than are tabulated or to more than can be easily interpolated, are required, and to meet this need there is an auxiliary table containing the function $\tau = x^{\circ} \cot x^{\circ}$ to three decimals, for every second of time up to 30m. Eight significant figures can be obtained from this table by simple interpolation, and the cotangent or tangent can then be derived to seven significant figures by simple division. In both tables the greatest and least differences in any column are given at the head and foot of each column, no interlinear differences

being given, and this arrangement enables the complete difference to be obtained from an inspection of the end figures.

The table is naturally intended for use with a computing machine, and computers are recommended to utilize the methods of direct and inverse interpolation which have been explained very fully in the "Nautical Almanac" for 1937, and reprinted in "Interpolation and Allied Tables" (H.M. Stationery Office, 1936). It should be added that the printing and reading of the proofs have been carried out under the direction of the present Superintendent of the Nautical Almanac Office.

M. D.

VIRUS RESEARCH

Methoden der Virusforschung

Von Prof. Dr. Henrique da Rocha-Lima, Dr. José Reis und Dr. Karl Silberschmidt. Pp. viii + 384. (Berlin und Wien: Urban und Schwarzenberg, 1939.)

FOR years the study of viruses was closely linked with bacteriology and mycology, descriptions of viruses occupying only minor parts of books devoted mainly to bacteria and fungi. This followed inevitably from the widely held belief that viruses differed essentially from other recognized pathogens only in size, and from the fact that they were investigated almost exclusively by a few enterprising bacteriologists and mycologists. Recently, however, the outlook has changed. A growing appreciation of the economic importance and scientific interest of viruses has attracted workers in other fields, and the need for separating viruses from other pathogens has become more and more obvious. One result of this has been the increased production of books dealing exclusively with viruses, of which that under review is the fifth to appear within two years.

In many ways this book differs from those previously published. One advantage it has is that the subject is treated as a whole. No gross distinctions are made between viruses attacking animals, plants and bacteria, all of which are dealt with under the same general headings, the book being kept to a reasonably small size by the omission of details of disease symptoms. A disadvantage is that the authors neither discuss controversial points nor criticize the work they describe. However, it is more than the description of techniques suggested by the title, for full details of the results obtained are also given, and, with one qualification, it is fairly described as a good, impersonal

summary of experimental work on viruses. The gathering together of so much work published in a large number of apparently unrelated journals will be useful to most workers, but will probably be of greatest value to those who have not ready access to good library facilities.

The book is divided into three main sections, dealing respectively with viruses in diseased organisms, infection methods, and the properties of viruses *in vitro*, of which the last occupies about two thirds of the whole. The techniques described range from the construction of insect-proof glass-houses and the culturing of insect vectors, through such subjects as transmission, ultra-microscopy, ultra-filtration, centrifugation, cataphoresis, and serology to tissue culture and the culturing of viruses in developing eggs. Nevertheless, in spite of the variety of methods described, all those used in work on viruses are not included. This is, no doubt, a direct reflection of this book's greatest fault, which is that it is already out of date. Except for a short supplement containing references to a few papers published in 1938, the last papers referred to were published early in 1937. As a result, not only are the many advances made in the last three years excluded, but often undue prominence is given to methods that would no longer be used.

The illustrations are all line drawings and, although some of these may be an aid to the text, it is difficult to see what is gained from the inclusion of others, such as Figs. 1, 31, and 51. As the book is presumably meant as a laboratory handbook rather than one to be read, it is a pity it is not better bound, for it is unlikely that the flimsy paper cover and the loose stitching will withstand much handling.

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