ment of the subject embraces the molecular properties of liquids. The kinematics of harmonic motion is reproduced by an extensive collection of typical cases, after which follows a very full treatment of the graphics of acoustics. The information which is here brought together is extraordinarily rich.

Thermal phenomena are now so extensively known that the graphic method seems almost necessary for their classification. Particularly in the broad subject of solution such a method seems to be the only one adequately available and Auerbach has made full use of it.

The diagrams in electricity are as a rule more familiar, though Auerbach has not failed to introduce much of the recent progress, as in radiology, for instance. Finally, in the section of optics he has had the advantage of long residence in Jena. Throughout the book, in fact, the charts relating to the properties of the Jena glasses are very satisfactory. At the same time the progress there made in optical theory is fully recorded.

The book contains 213 pages and on the average three or four graphs to the page. It concludes with a brief description of the charts together with the necessary bibliographical notes and an index. The charts are throughout up to date, both in their theoretical and experimental references. In looking them over one obtains, perhaps, a more vivid impression of the noble accomplishments of modern physics than can be given by any other method.

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How to Use the Microscope, a Guide for the Novice. By the Rev. CHARLES A. HALL. 25 text-figures and 20 full-page plates. London, Adam & Charles Black; New York, The Macmillan Company. 75 cents net.

The purpose of this book is well expressed by the author when he says: "It is a guide for the novice, and I have not presumed to offer advice to the expert microscopist." The seven chapters of the book limit themselves to what the novice can really do to start with in microscopic work. Once fairly started, the world is all before him.

In Chapter I. the simple microscope, its advantages and use, are described, and what is said is wholly commendable. In the second chapter there is a discussion of the compound microscope, and the author tells from his own experience how any one can construct a compound microscope. In the third chapter is a general discussion of the use of the compound microscope and the excellent advice given to learn the advantages of low powers. The fourth chapter tells of some important accessories like the substage condenser and the polariscope and the stage micrometer. Coming to the fifth chapter, the real work begins with some common objects for microscopic study. The student is shown where to find them in ponds and ditches, in rock pools of the sea, in the flower pots of the home, in the garden and fields and in the great insect world. He is directed how to prepare and study the things collected, and good books are mentioned which will give fuller information.

In the sixth chapter directions are given for preparing objects and mounting them permanently. This includes mounting objects dry, mounting insects whole in balsam, making sections of plant tissues, staining and mounting them; and finally the making and mounting of rock sections. The seventh and last chapter deals with the method of making photographs of microscopic objects, and the examples of photomicrographs by the author which illustrate his book furnish excellent models.

A critical reading of the book shows that it is unusually free from errors. Its advice is good and one feels sure that it comes from one who has been over the ground many times and has learned the good ways. It seems admirably adapted for the beginner in England. For the beginner in any other country it is not so well adapted, as it tells only of the optical goods, etc., to be had of the London opticians, and the beginner would naturally suppose that he must have the identical things mentioned, at any rate he would know of no

others, and the book gives information of no other place for getting them. The American novice, for example, would have no information concerning the excellent optical houses in his own country which supply exactly what is needed; and all worry about the British "methylated spirits" might easily be avoided by explaining that ordinary alcohol or "denatured" alcohol would answer equally well.

It would be so easy to adapt a fundamentally good book of this kind to the country where it is to be introduced that it seems incomprehensible why publishers are not more awake to the advantages of such adaptation.

These suggestions are made in the most friendly spirit, and with the hope that future editions will be made the most useful possible in the new environment; for certainly no one at all familiar with the subject could read these 86 delightful pages, so full of helpful suggestions to the beginner, and so full of enthusiasm for the beautiful world which the microscope reveals, without a feeling of gratitude to the author for making so plain the way into this new realm, for uncovering a road which has no end and which has new beauties for each advancing step.

S. H. G.

The Polynesian Wanderings. Tracks of the Migration Deduced from an Examination of the Proto-Samoan Content of Efate and other Languages of Melanesia. By William Churchill. The Carnegie Institution of Washington. 1911. Pp. 516, 2 maps.

The wanderings of the Polynesians have long been a fascinating crux in ethnology. The peopling of an inconceivably vast area sprinkled with islands appeals to our wonder more than the settling of continents, and from the time of the earliest explorers in the Pacific attempts have been made to hit upon some clew to the dissemination of oceanic peoples. It early appeared that language afforded the best means of tracing these movements and in the gross this index has been used since the time of Hale by students of the Pacific insular races.

Philology has made great strides both materially and scientifically in recent years, however, and Mr. Churchill is foremost among those who have applied the analysis of the content of a language to the solution of the historical problems connected with the migratory movements of peoples, his method in this case being to ascertain the percentage of Proto-Samoan loan words in the Melanesian languages over the area in question and to chart the lines of migrations of the Polynesians along the lines of greatest percentage. The method thus establishes a definite quantitative basis of language research, the results of which are very gratifying.

Mr. Churchill has shown by his percentage measure that the Proto-Samoans emerged from the East Indies, passed out into the Pacific, and with various Melanesian landfalls, reached Samoa, regarded as the primary distributing focus of Polynesians, thence by diverse routes, populating other islands, and in turn streaming from several foci, completing the population of the islands where we now find Polynesians. The earliest movement, according to Mr. Churchill, appears to have taken place about 1,500 years ago.

Among its other valuable qualifications the work is a remarkable analysis of an archaic language which Mr Churchill hopes will supply the data for the genesis of speech. This, Mr. Churchill modestly puts forward as the feature of his monumental book which will give it a continued and wide influence.

The Carnegie Institution is to be congratulated on the publication.

Two maps accompany the work, the one showing the tracks of Polynesian migration and the other the migration tracks through Melanesia.

There are three appendices, one containing data and notes, two, the southern gateway, and three, a bibliography. An adequate index is supplied.

Walter Hough

CHANGES IN THE GERMAN UNIVERSITIES

The former student returning to Germany finds many changes. In the development of the new Germany from the old, much that was familiar has disappeared or has been replaced