Review: Practical Astronomy

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Yellowstone Park and the basalts of the Snake river, Idaho. The volume is thoroughly up to date, as it concludes with a few photographs of scenes in St. Vincent, West Indies, taken by Dr. Tempest Anderson during last summer, and a fine picture of Montagne Pelée in full eruption on the afternoon of July 9, 1902.

J. S. F.

GILBERT'S 'DE MAGNETE.'

William Gilbert, of Colchester, Physician of London. 'On the Magnet . . . a new Physiology.' London, 1900. Notes on the 'De Magnete' of Dr. William Gilbert. London: Privately printed. 1901.

The first of these volumes is a new and careful translation of Gilbert's famous work on the magnet, published under the auspices of the Gilbert club. The translation follows, page for page, the original Latin edition of 1600, the general style of the latter being also retained as far as possible. It is printed at the Chiswick Press, and the whole "get-up" of the volume is most tasteful. The volume of explanatory notes, got together mainly through the energy and zeal of Prof. Silvanus Thompson, is a most valuable addition to the text, and bears witness to an extraordinary amount of research and an unusually extensive acquaintance with the literature both of Gilbert's time and the century preceding it. The allusions and references in the text are elucidated with great thoroughness, and though the greater part of the notes naturally have to do with questions of magnetic theory, there are various points of more strictly geographical interest on which much light is thrown. Thus the history of the so-called "loadstone-rock" in literature and cartography is fully dealt with, reference being made to the legends in Ruysch's map, the supposed northern voyage of Nicholas de Linna as mentioned by Hakluyt, and to Peter Plancius' location of the rock on his lost map described by Blundeville. References are given to the extensive literature on amber and the amber industry, and there are useful notes on various points connected with the compass and its use, the history of "wind-roses," and the various designations of the points of the compass. The term for the north-west used by Gilbert—*Borrholybicus*—is rarely met with, though one or two authorities for its use are cited. To these might be added a couple of still earlier instances, viz. the chart of the coast of Sweden from Waghenae's 'Speculum Nauticum' of 1585, which is reproduced by Nordenskiöld in his 'Periplus,' and the treatise on the winds by Fabritius Paduanus (1601). The name is also given by Coronelli in his 'Epitome Cosmografica' of 1693 as the Græco-Latin term for the north-west wind.

PRACTICAL ASTRONOMY.

'Grundzüge der Astronomisch-geographischen Ortsbestimmung auf Forschungsreisen und die Entwicklung der hierfür Massgebenden mathematisch-geometrischen Begriffe.' Von Prof. Dr. Paul Güssfeldt. Mit 95 eingedruckten Abbildungen. Braunschweig: Druck und Verlag von Friedrich Vieweg und Sohn. 1902.

There are few men whose training and experience would render them better fitted to deal with the subject of practical astronomy for travellers than Prof. Paul Güssfeldt. His name has for years past been held in high esteem as that of a traveller and explorer of exceptional ability. His surveys in the Andes, West Africa, and elsewhere possess a scientific value and precision far in excess of those of the ordinary explorer, whilst his long experience as a university lecturer on mathematics has given him an insight into the methods of instruction most suitable to the requirements of the student who is likely to become a geographical surveyor. The work which he has recently published is, therefore, worthy of special attention, and will doubtless be read with interest by many.

It will at once be seen that it differs considerably in design and arrangement

from most others dealing with the same subject, which, however useful and important they may be in their place as text-books, giving formulæ and examples of computations, are often unsuited for purposes of instruction from the fact that they assume too much knowledge on the part of the student, and fail to give satisfactory explanations of the development of the formulæ employed. Prof. Güssfeldt, in his 'Grundzüge,' begins at the beginning, and from treating of the simplest relations that exist between numbers and quantities has endeavoured to follow up the mathematical investigations upon which the subject of practical astronomy is based step by step until he arrives at the conclusions sought and the rules and formulæ employed in fixing positions by astronomical observations. The book, in fact, treats the whole subject as connected and complete, and gives an outline of its development and growth from its foundations in elementary mathematics and geometry to its more complex computations and deductions. As its title indicates, it does not attempt to give anything more than an outline of the subject, and as the ground covered is decidedly large, it is not surprising to find that some matters appear to be too summarily dismissed. More than half of the book is taken up with preliminary matter, and this has rendered it necessary for the author to condense the latter and practical part, which after all is what the surveyor would find more useful. The actual fixing of positions by astronomical observations only forms one part of the duties of a properly qualified surveyor in little-known regions, and Prof. Güssfeldt would have added considerably to the value of his book if he had dealt also with triangulation, and topographic methods best suited to travellers, which, since the days of the pioneer explorer are almost over, are of ever-increasing importance.

The work is divided into twelve general sections, in each of which a definite branch of the subject is dealt with. The first is an introductory section treating of the elements of mathematics, logarithms, etc.; the second deals with geometry and plane trigonometry; the third with the foundations and facts of practical astronomy, such as the figure of the earth, axis of rotation, circles of the heavens, parallax, spherical co-ordinates, etc.; the fourth with time and time measurements; and the fifth with spherical trigonometry. After these follow sections six to twelve, which deal with the practical side of the subject, and show the application of the information imparted in the previous section to the various formulæ employed in fixing positions, adjustments of instruments, etc.

Although treating of the elements of the subject, in many respects Prof. Güssfeldt's book is far from an elementary work, yet it could not in any sense be considered to supersede the exhaustive and excellent treatises on Practical Astronomy that already exist, for there are many matters that are not dealt with at all in these pages; nevertheless, according to the author's avowed design and purpose, it deserves to occupy an important place as a good introduction to the whole subject, and as such it will doubtless be found useful by many. In future editions it would be well if some of the chapters could be amplified, and if its scope could be extended to render it better suited to the present requirements of the surveyor in imperfectly known regions.

CARTOGRAPHY.

FRENCH MILITARY SURVEYORS.

'Les Ingénieurs Géographes Militaires, 1624-1831.' *Étude Historique*, par Le Colonel Berthaut, Chef de la Section de Cartographie. Paris, 1902. Imprimerie du Service Géographique.

This book is a sister work to that previously published by the same author, 'La Carte de France.' The earlier issue dealt with the history of map-making in