

the cable; further, the construction of telegraphic signal apparatuses able to utilise the first weak beginnings of the current arriving at the other end of the cable. These ultimately led to the invention of the siphon-recorder—a writing apparatus in which the tube containing the ink does not come into immediate contact with the strips of paper on which it has to write, and is therefore not hindered by friction from moving even under the least electro-magnetic impulse. By electric charges it is brought about that the ink spurts over the paper in a series of fine points.

The conclusion of the second volume is formed by the Bakerian Lecture for 1856, which gathers up the results of the author's investigations into the qualities of metals as displayed under the conduction of electric currents, and under magnetisation, and the changes they undergo in consequence of mechanical, thermal, and magnetic influences.

Let us hope for an early continuation of this interesting collection. There are still nearly thirty years of scientific activity on the part of the author to be accounted for. When we think of that we cannot fail to be astonished at the fruitfulness and unweariedness of his intellect.

HERMANN L. F. HELMHOLTZ

#### OUR BOOK SHELF

*Paradise Found. The Cradle of the Human Race at the North Pole. A Study of the Prehistoric World.* By William F. Warren, S.T.D., LL.D., President of Boston University, &c. (London: Sampson Low and Co.)

IT has come to be an understood thing that when geologists or biologists propound theories as to past stages of life on the earth, and these theories attain to a certain popularity, some theologian shall twist the words of the Book of Genesis into a new interpretation, to show that this was what the inspired author meant all the time. A fresh musician has set Moses to dance to a new scientific tune. Since the publication of well-known modern views as to the diffusion of plants and animals from the Polar Region, it was to be expected that we should have a book proving that man was created in an Arctic Paradise with the Tree of Life at the North Pole; and here the book is. Other ancient cosmologies, such as the Greek and Indian, are made to bear their not always willing testimony. Those who take up the book should notice that the commendatory letters published from Professors Sayce, Tiele, and Whitney do not at all imply that these eminent scholars countenance the Polar Paradise doctrine. The President of Boston University seems to have sent them a paper some years ago on "Ancient Cosmology and Mythical Geography," their acknowledgments of which they are now perhaps hardly delighted to find figuring as certificates in a "Paradise Found."

*Epping Forest.* By Edward North Buxton, Verderer. (London: Stanford, 1885.)

The public generally, and especially the people of London, and those who take some interest in natural history, are to be congratulated on the acquisition of so charmingly complete a little itinerary of Epping Forest as that now issued in a cheaper form by one of the Committee of Conservators, who is a resident on the borders, and an enthusiast as to the attractions of the Forest. It is, as the author observes in his preface, "hardly a desirable state of things" that so small a percentage of the summer visitors to the Forest "ever venture far from the point at which they are set down by train or vehicle;" and, with the choice of a score of

beautiful walks, described in Mr. Buxton's book, and the guidance of his six carefully prepared maps, five of which are on the scale of three inches to the mile, there is no longer any reason for their not venturing into those depths of the Forest in which its chief beauties are to be seen. The chapter on the history of the Forest which the author has wisely prefixed to the itinerary, that visitors may be reminded of the events which secured this magnificent playground for their enjoyment, is most complete, though it is to be regretted that the late City Solicitor, Sir Thomas Nelson, is not mentioned *by name* on p. 22. The practical character of the book may be gauged from the inclusion of railway time-tables, the fact that the distinctive letters of each route have been cut on trees at some points, and from such suggestions as that an east wind is, in Epping Forest, the best for views, because not smoke-laden. Personal experience has convinced the present writer of the skill with which the routes have been selected; the "objects of interest within and around the Forest," and their historical associations, are fully described and illustrated by some excellent drawings, the latter by Mr. Heywood Sumner; but what must render the work peculiarly gratifying to all lovers of nature, is the ample space—more than half the volume—devoted to the fauna and flora of the Forest. The mammals, reptiles, birds; the chief moths and butterflies; the trees, flowering plants, ferns, fungi, and mosses, are all enumerated, with general, *i.e.* not too specific, localities; and the notes on the mammals and birds will be of interest to naturalists in other districts. Such lists can, fortunately, never be complete; insects marked as "rare" are notoriously liable at any time to prove common: even since the publication of this work evidence has been produced suggesting the addition of *Sparganium neglectum* to the list of flowers, and each year's cryptogamic meeting of the Essex Field Club has as yet added several species to the catalogues of the lower plants. There may yet be room for a more pretentious monograph of Epping Forest, and, of course, from the naturalist's stand-point, so rich a collecting-ground affords material for a library of expository literature—the freshwater algae, for example, call for recognition;—but, for its purpose, the present work could hardly have been executed in a manner more creditable both to author and publisher.

G. S. BOULGER

*Traité de Minéralogie appliquée aux Arts, à l'Industrie, au Commerce et à l'Agriculture, &c.* Par Raoul Jagnaux. Avec 468 figures dans le texte. (Paris: Octave Doin, Éditeur, 1885.)

THIS work of 883 pages, as is stated in a title-page of corresponding length, is intended for the use of French students in their preparation for a degree in the subjects of engineering, chemistry, metallurgy, &c. We do not think that in its purely scientific contents it is likely to be of advantage to English students. The first part, devoted to the subject of crystallography, is rather incomplete and unsatisfactory, even if regard be had to the main purpose of the work. As usual, in the figure of Wollaston's goniometer the crystal is represented as adjusted in a way that every practical student is immediately taught to avoid. Nor will the chemical formulæ meet with the favour of English students: though the atomic weights of oxygen and silicon are given as 16 and 28 respectively, silica appears throughout as  $\text{SiO}_3$ , water is still  $\text{HO}$ , while to nitre is assigned the formula  $\text{KO. AzO}_5$ . Further, the ordinary symbols for the atoms are occasionally, as in the forty-nine formulæ of pp. 423-5, used to signify equivalent proportions of the oxides; olivine, for instance, being given as  $(\text{Mg. fe})\text{Si}$ . The classification is likewise ancient; in the description of the species alum stone immediately follows the oriental chrysolite, a precious stone, merely because both substances contain alumina. In its explanation of the uses which have been discovered