

extinction of plague is one of enormous difficulty. The materials for such a history must be sought for high and low; chance allusions in private letters or municipal records will supply links in the chain of evidence for which the writings of the medical authorities of the time may be searched in vain, if indeed there be any medical authorities; and Dr. Creighton found that for his purposes "medical books proper are hardly available . . . until the end of the Elizabethan period, . . . and do not begin to be really important . . . until shortly before the date at which" his present labours end. When such evidence as can be found has been found and sifted, there still remains the most intricate problem of all—that of tracing the epidemics recorded to their origin, accounting for their spread, and in some cases explaining why a country should in modern times be spared diseases which scourged it in the Middle Ages.

No better illustration of these difficulties could be found than is supplied by chapter ii., "Leprosy in Mediæval Britain." The first point that Dr. Creighton has to make clear is that all the so-called lepers were not really lepers. In extreme cases the word "leprosus" may have been used simply as meaning "beggar or common tramp"; elsewhere it may have been applied to victims of syphilis, lupus, and so forth. For the sufferers special provision was no doubt made, on a scale due in part to a morbid or mistaken religious sentiment; but examination of the charters and other documents relating to these charities suggests that, of the supposed foundations for lepers, some were merely refuges for sick and infirm poor, in others provision was made for three or four times as many non-leprous as leprous inmates, while from others, towards the end of the thirteenth century, the lepers were disappearing or getting displaced. Finally, the author concludes that the prevalence of true leprosy at any time in England was probably not so great as in the worst provinces of India at the present day; but, however justifiable scepticism as to its supposed ravages may be, that the disease really did prevail can hardly be doubted, and the reasons for doubt are lessened, if a *vera causa* for its presence can be found. Such a *vera causa*, compatible with its subsequent disappearance, may be discovered, not in "importation," e.g. by Crusaders—a suggestion Dr. Creighton does not consider worth thinking about—but in the staple diet of the times, a semi-putrid or toxic character of animal food combining with other depressing influences to give rise to leprosy, just as a similar character of bread or porridge gives rise to pellagra.

We have given the arguments of this chapter somewhat in detail, because the criticism which obviously applies to them, applies elsewhere. Considering the uncertainty which surrounds the facts, it is clear that the traditions of the leprosy of the past cannot very materially assist, though they may be explained by, the study of modern leprosy. Similarly, in the case of the plague, to which naturally Dr. Creighton devotes much of his book, to say nothing of that old question, the value of the evidence of the Bills of Mortality, the inquirer is met at once by the great difficulty of knowing when "the plague" which is spoken of as invading out-of-the-way places really was the genuine plague—a point of vital importance, as soon as any etiological questions are raised, and we may here observe that Dr. Creighton writes:—

"In concluding the career of the sweat in England, we may pass from it with the remark that it did not cease until other forms of pestilential fever were ready to take its place. The same explanation remains to be given of the total disappearance of the plague from England after 1666: it was superseded by pestilential contagious fever, a disease which was its congener, and had been establishing itself more and more steadily from year to year as the conditions of living in the towns were passing more and more from the mediæval type to the modern."

It would be impossible here to enter into the merits or the reverse of all Dr. Creighton's explanations of the facts he records. In the chapter on small-pox, which is likely to be the one first consulted, we find a passage which disarms criticism: "It has been the fate of small-pox as an epidemiological subject to be invested with bigotry and intolerance." Yellow fever has as yet hardly sunk to that deplorable level; and as Dr. Creighton's theory appears to be that "the dysenteric matters of the negroes" carried on the slave ships "had themselves in turn bred an infection of yellow fever for the whites," it may be asked whether the alleged protection of Africans of pure blood from the infection of yellow fever "in all circumstances ashore or afloat, . . . not by acclimatization but by some strange privilege of their race," is either supported by all recent authorities, or not capable of the explanation that in infancy they may pass through some disease too slight to be recognized as yellow fever, but which serves to confer immunity.

The general impression left upon the mind by this history is that it would have been a wise policy to make two books instead of one out of the materials collected—in one simply to bring together such facts as Dr. Creighton's industry has gleaned from the authorities, and in the other to enter upon the questions of etiology, which are bound to give rise to interminable discussion.

Besides those we have mentioned, gaol fevers, influenzas, "the French pox," and scurvy in early voyages, are the principal diseases treated of in this volume. In dealing with influenza Dr. Creighton draws attention to the relation in point of time between the outbreaks in the latter half of the sixteenth century and great epidemics of plague, and a somewhat similar relation between fever and influenza and exceptional climatic conditions in the years 1657-59.

OUR BOOK SHELF.

Mineralogy. By Frederick H. Hatch, Ph.D., F.G.S., of the Geological Survey of England and Wales. (London: Whittaker and Co., 1892.)

DR. HATCH has followed up the publication of his excellent "Introduction to the Study of Petrology," recently noticed in these pages, by a little book on mineralogy, which will, we think, be of equal service to students. He has recognized the fact that for one person who desires to enter upon a systematic study of mineralogy, regarded as a natural-history science, there are twenty who need only such an amount of mineralogical information as will enable them to profitably commence the study of geology. We think, therefore, that the prominent place given to the feldspars, the pyroxenes, the amphiboles, the micas, and similar common rock-forming species in this work, is fully justified; and not less so the unsystematic but convenient grouping of other minerals as "ores and veinstones," "salts and other useful minerals," and "gems or precious stones." De Lap-

parent has indeed shown how a classification of minerals according to their mode of occurrence may be employed even in a systematic treatise; but Dr. Hatch's more humble attempt is not open to the criticism to which an ambitious work on the same lines would obviously be liable. It is clear that in a book of this kind there is not much scope for originality of treatment, but Dr. Hatch has admirably united brevity and clearness in his treatment of the crystallographical and physical characters of minerals. His method of giving the names and commonly employed reference letters to the crystal-combinations which he figures is well adapted to prepare the student for consulting larger treatises on the subject. So, too, the reference to the use of symbols, though it must evidently be very slight in a work of the dimensions of that before us, is eminently judicious. A short table of symbols of the chief forms belonging to each system, according to Miller and Naumann, will enable the beginner to recognize the meaning of all the very commonly occurring combinations; and it is clearly inexpedient to attempt more than this in such a very elementary work. We can confidently recommend the book as an excellent summary of mineralogical science, adapted to the wants of the geological student; and we believe the perusal of this small work may even be of advantage to those who desire to enter upon the more systematic study of the science of mineralogy.

J. W. J.

To the Snows of Tibet through China. By A. E. Pratt, F.R.G.S. (London: Longmans, Green, and Co., 1892.)

THE author of this book says in the preface that he has done his best "to withstand the temptation to generalize from limited experience, to which travellers in China seem peculiarly liable." Yet in his last sentence he expresses the opinion that several incidents he has mentioned "will show what a credulous and cowardly race the Chinese are." It ought surely to have occurred to him, when he set down this harsh and rather foolish judgment, that it was a striking example of the kind of generalization which he had wished to avoid. Fortunately the statement, although it seems to convey Mr. Pratt's final impression of the Chinese people, does not represent the general character of his work, in which scientific readers will find a good deal to interest them. He went to China in 1887 for the purpose of studying the natural history of the country, and remained until 1890, fixing his head-quarters at Ichang, a town on the left bank of the Yang-tze-Kiang, 1110 miles from its mouth. He crossed the frontier of Tibet, and at Tatsien-lu met Mr. Rockhill, whose excellent account of travels in Tibet we lately reviewed. Mr. Pratt worked hard in the various regions he visited, and collected many valuable specimens in several departments of natural history. He has not a very bright or attractive style, but many of his facts are themselves so interesting, and his enthusiasm as a collector is so keen and persistent, that there are few passages which his readers will desire to skip. In an appendix, Dr. Albert Günther gives a list of the species of reptiles and fishes brought by Mr. Pratt from the Upper Yang-tze-Kiang and the province Sze-chuen, with a description of the new species. There are also lists of birds and of Lepidoptera.

LETTERS TO THE EDITOR.

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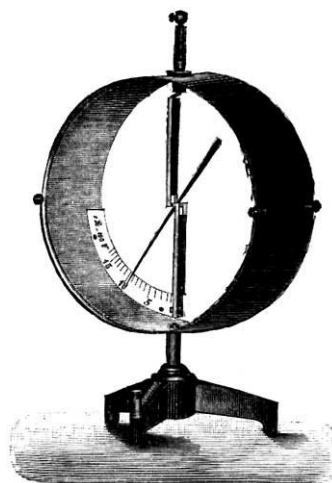
Absolute Electrometer for Lecture Purposes.

I THOUGHT it might be welcome to some of your readers to be made acquainted with the following simple and cheap instru-

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ments which I have now used for some years with advantage in lectures, and also for many scientific purposes. They are electrometers, which are divided directly into volts. The needle, which is made of aluminium, moves about a horizontal axis of hard steel, and is repelled from the vertical brass piece connected with the knob above. The instruments have the advantage that they are much easier of manipulation than the gold-leaf electroscope, while the sensibility is nearly the same, and fully suffices for all lecture purposes. Potentials are read off directly in volts, so that the measurements in the experiments on electrostatics and electrodynamics can all be referred to the same unit, whereby the conception of the student gains in distinctness, and the lecture in simplicity. In consequence of the specially careful workmanship, the needle adjusts itself quickly and with certainty, so that readings may be made to about 10 volts. The back and front consist of glass disks 1 mm. thick, each of which covers a plate of zinc of the same size, out of which are cut two equal and opposite slits, through which the position of the needle on the brass scale is read off. The readings of the instrument are only correct when these plates are in position.

When the instrument is used in the lecture, the two plates are taken away, and the back glass plate covered with tissue paper,



the instrument being illuminated from behind. The deflections are then easily visible in a room for more than a hundred students.

The method of graduation of these instruments I have described in full in *Wiedemann's Annalen*, vol. xlv., 1891, p. 771. They can be procured from the University mechanician here, Herr Albrecht, in three different sizes, 0-1500, 0-4000, and 0-10,000 volts. The first of these is the substitute for a gold-leaf electroscope. Herr Albrecht also makes the instruments for technical purposes.

F. BRAUN.

Physical Laboratory, Tübingen, May 28.

Saturn's Rings.

THE writer of the "Astronomical Column," in your number of June 2, directs attention to some observations of M. Bigourdan on certain peculiarities in the appearance of the following arm of Saturn's Rings observed by him on May 21. He mentions in particular a protuberance situated near Cassini's division. This, I think, is easily accounted for in a quite different manner. At 9h. 6m. p.m., according to Marth's ephemeris, two satellites, Enceladus and Tethys, were in conjunction with the east end of the ring. They were going in apparently opposite directions, Tethys away from Saturn. Their conjunctions with the middle of the Cassini division would, I find, take place at 8h. 36m. p.m. for Tethys, and at 9h. 36m. p.m. for Enceladus. Both satellites would be so close to the ring as to appear inseparable from it. Tethys, moving in an orbit inclined as much as 65° to the plane of the rings, might easily be half superposed in appearance upon the northern boundary of the rings. The following remarks are from my observation-book of date May 21:—