

with a membership of 3,373, and an income of about nine thousand pounds sterling.

There remain still two chapters to which we hope later to call attention in special notices, — one by Egli of Zurich on the present condition of geographic onomatology, or the study of names; the other, by the editor, on the development of the study and method of teaching of geography, a matter discussed with much seriousness in Germany, though receiving small attention here.

In concluding the present notice, it may be said, that while the *Geographisches Jahrbuch*, like other works of its class, by no means serves the purpose of final reference, it is of the greatest value as an aid in all geographic studies; and the special feature of arrangement according to place makes it a most valuable supplement to other bibliographic works in which the classification is according to subjects.

#### MASCART'S ELECTRICITY AND MAGNETISM.

*Leçons sur l'électricité et le magnétisme.* Par E. MASCART et J. JOUBERT. vol. i. Paris, 1882. 8°. *A treatise on electricity and magnetism.* By the same; translated by E. ATKINSON. vol. i. London, De la Rue, 1883. 662 pp. 8°.

ONE feels, in reading Maxwell's treatise on electricity and magnetism, that the author had a grip upon the subject which has only been approximately attained by other writers. Although the style is obscure, and the arrangement often merits the word 'atrocious,' — for equations are taken for granted which are afterwards proved, and other equations are referred to in general without particular specification; so that the student who comes to the book with mediocre preparation, and is determined to master it, cannot fail to have a feeling allied to bitterness with the author who has led him over such a corduroy road to a promised land, — nevertheless, the grip is there, and one always feels it; and each paragraph is full of suggestion.

The treatise of Mascart and Joubert is Maxwell's treatise very much simplified. It has the Gallic flow, but it has not the Scottish grip. It is Cummings's admirable little elementary treatise on electricity, treated by the calculus, and amplified with some of the harder portions of Maxwell. It has the appearance of a collection of excellent professorial notes on Maxwell's book.

The volume now printed contains the mechanical theory of electricity; and a second

volume on the phenomena and electrical apparatus is promised. The portion on thermo-electricity is more extended than the chapter on the same subject in Maxwell's treatise; although, curiously enough, Tait's ingenious method of measuring thermo-electric relations is not given. Much space is devoted to the propagation of what are termed, for convenience, 'electrical waves;' and the action of the telephone is theoretically considered. In the treatment of electro-dynamics the principle of symmetry is often employed in a clear manner. It is noticeable throughout the work that the authors are patriotic, and the special investigations of Frenchmen are often alluded to. We miss, however, full notices of contemporaneous investigations by Germans and by Americans. Perhaps these will appear in the following volume. The chapters on magnetism are very suggestive, and in them the various theories are presented in a clear manner. Thomson's papers on magnetism are given at considerable length, mainly as they are contained in his 'Papers on electro-statics and electro-magnetism.' The view that diamagnetism is merely the difference between the magnetic character of the medium in which the small diamagnetic substance is suspended, and the magnetic character of the substance itself, is popularized by presenting the analogy between this phenomenon of magnetism and the action of bodies floating in fluids of different specific gravities. This hypothesis makes the ether of space a magnetic medium, with a greater coefficient of magnetization than that of any known diamagnetic substance. The analytic processes of the authors are, in general, simple. Laplace's and Legendre's coefficients are used only in a limited way in the subject of magnetism. Perhaps this may be regarded as an advantage in the treatment. What is needed at present is an extended treatise on the application of spherical harmonics to practical problems in electricity and magnetism, and to problems of attracting forces in general, in order to show the availability of this method of analysis.

The authors treat the subject of electro-magnetic induction in a clear way. The retarding effect of induction on the swing of a galvanometer needle is clearly set forth, and the work of electrical motors receives some attention. More will probably be given in the next volume. Hall's phenomenon is treated in a far-off manner. The authors state that "Hall's phenomenon would seem to be in contradiction with the opinion generally adopted, that in electro-magnetic phenomena the action

is exerted on the *supports* of the currents, and not on the currents themselves. But, however we may explain the experiment, it follows that a magnetic field in the stationary state develops an electromotive force which tends to move electricity in the direction of the electro-magnetic action; that is, to the left of an observer placed in the current, and who is looking in the direction of the magnetic force." Perhaps one cannot do more than make the above statement in the present state of our knowledge; but the fact that the phenomenon in question is different in different metals shows the influence of the *supports*. In general, we like the arrangements of the topics treated better than that of Maxwell; and we hope that this book marks the revival of a period of graceful and lucid treatises on mathematical physics which we have a right to expect from Frenchmen.

The English translation of this work by Dr. Atkinson is well executed, and is revised by the authors, who have added certain portions to it which are not contained in the French treatise. We have noticed here and there faults in punctuation which add to the difficulty of comprehending certain relations.

#### LARISON'S TENTING-SCHOOL.

*The tenting-school: a description of the tours taken and the field-work done by the class in geography, in the Academy of science and art at Ringos, N.J., during the year 1882.* By C. W. LARISON, M.D., principal of the academy, etc. Ringos, N.J., Larison, 1883. 292 p. 12°.

THIS is an amazingly queer little book, — so full, indeed, of oddities, that one is at a loss where to begin an account of them. In the first place, the author is evidently one of our orthoepomaniacs. Nearly all the vowels, and many of the consonants, are decorated with diacritical points. The result is, that the pages have a singularly bristling and formidable aspect. But we advise the reader to discipline his eye to this painful amelioration of the written speech, for a reward awaits him. Behind this printed '*chevaux-de-frise*' there is a lot of things worth reading. The first effort of the author is to tell just how he managed for the conveyance and camping of a party of students, boys and girls. Every little detail for the construction and equipment of a wagon and camp for eighteen persons is carefully set forth. The most trifling articles are figured in rude woodcuts. All this, though in its way useful, would be tedious but for the *naïve* though often cumbrous language in which it is given,

and the strangely complicated ways of meeting simple needs. When, for instance, he comes to the making of the camp-fire, which the untutored campaigner accomplishes as best he may, our author tells his very ingenious way. The plan is so altogether good, that we give it in full, unhappily omitting the diacritical accents, which are beyond the resources of an ordinary press.

"To kindle fire, we use a kind of strong iron cup, fastened to an iron handle about three feet long. This cup is very wide at the top and will hold about a quart. In this cup, we place a handful or more of resin, a gill or more of kerosene, and about a table-spoonful of a mixture, consisting of one part of ether and four parts of alcohol. At first thought, this may seem to be a very incompatible mixture; but, of its practical value, we have much evidence. To start a fire in wet wood, during a rainy day, under ordinary circumstances, is not easy; but with the arrangement, and the fuel above named, it is readily effected.

"To ignite resin, in the open air, with an ordinary match, is almost impossible. To ignite kerosene in the open air with a match, is not easy; and to fire alcohol in an open pan, with a match, is not done at every trial. Each of these substances require (*sic*) to be heated up to a certain point, — the kindling point, before they will ignite. To raise the temperature of either of these to the kindling point, requires more heat than is developed by the burning of a match; but, ether is so volatile, that when poured out, its vapor instantly rises. This vapor fires at so low a temperature, that when a burning match is brought in contact with it, it ignites with explosive violence, and continues to burn with vigor until consumed. While burning, the heat generated, evaporates the alcohol, raises the temperature of the alcoholic vapor to the burning point, and ignites it. By the burning of the alcohol, the kerosene vapor is raised to the kindling point, and is ignited. The burning of the kerosene soon develops heat enough to liquify (*sic*) the resin, evaporates it and ignites it. At this juncture, a part of the kerosene and resin begins to be converted into a gas that makes a hotter blaze than that made by burning either kerosene or resin alone; besides, attending this fire is much less smoke than is made by the burning of resin alone.

"The cup of burning kerosene and resin, when placed under a heap of wood that is not too wet, soon raises the fuel to the kindling point, ignites it and gives to the fire such impetuosity that it makes water boil quickly, and butter to fry and sputter furiously.

"With the cup alone, charged as above directed, I have boiled a two gallon tea kettle of water in eight minutes. But, this could not have been done in a windy day.

"It would be criminal to make the above statement, respecting the iron cup and the fuel to be used with it, without informing the tiro that it is very dangerous. Should any one attempt to use it, he cannot be too careful. The act of touching it off with a match, unless circumspectly done, may prove very disastrous. The results of using this mixture without sufficient circumspection we have seen. Suffice it to say, they were terrible."

Unhappily, our author does not give a picture showing the effects of these occasional catastrophes on the camp of innocents; but