

the typical forms are thereby necessarily increased. In order to preserve the just proportions of the subject, and out of the whole make a fair selection, I have treated most of the forms in less detail than the Vertebrates." With the above statement no objection could be found; as to the method of carrying it out, we notice that while four out of the sixteen plates are devoted to illustrations of the group of Protozoa, there is not even a single figure given of the Sponges, nor of the Hydrozoa, nor of the Actinozoa, and for their absence we can find no other excuse than what is given in the above quotation. As to the plates of Protozoa, we perceive that there is no exact indication of the size of the forms figured, unless indeed in a footnote, which states that the forms figured "are all *microscopic*, with the exception of the Nummulites." Now if there is one thing more than another that a student requires to be reminded of while studying "microscopic" forms, it is that they vary immensely among themselves as to size, and it is surely necessary that he should have some definite ideas as to those sizes beyond the range of unassisted vision, such as he may be presumed to have of those objects within this range. Neither has the author been to our mind happy in his selection of forms of the Protozoa "from standard works on the subject." His Atlas is meant for students in this country, and where are they to get specimens to work with of such genera as *Protogenes*, *Vampyrella*, *Myxastrum*, *Protomonas*, *Proto-myxa*, *Lieberkühnia*, and the like. The student interested in "pond-life" may possibly admire the exquisite and artistic delineations of their old favourites, *Paramecium*, *Daphnia*, *Cyclops*, &c., given in the Atlas. The festooned surface of *Paramecium*, the appendages of *Daphnia* and *Cyclops* are certainly figured as they have never been heretofore. It is really refreshing to turn from the old and well-worn figures to the bold originality of these plates; in them the author has courageously followed the theory of zoological representation laid down by the celebrated German artist with reference to *Camelus*, sp., but is scarcely to be congratulated on the wonderful results he has achieved. Some of the diagrams are acknowledged as from the originals of Huxley and Gegenbaur; these are good.

The Student's Handbook of Chemistry. With Tables and Chemical Calculations. By H. Leicester Greville, F.I.C., F.C.S. (Edinburgh: E. and S. Livingstone, 1881.)

"In the presence of so many good manuals on chemistry, the appearance of another may seem unnecessary," says the author in his preface. For "may seem" read "is," and the sentence expresses a truism. The author's book can, however, scarcely be classed amongst "good manuals." The statements of individual chemical facts are on the whole correct; the general arrangement of the book is clear; yet, considered as a manual of chemistry, the work must be pronounced a failure.

Attempts are made to explain the expressions "atomic weight," "molecular weight," "valency," &c., but without success. Atoms are confused with molecules; the ordinary definitions of these terms are certainly stated, but definitions taken by themselves are, as Hunter said, "Of all things on the face of this earth the most cursed."

Avogadro's law is stated on p. 26, but the conclusion deduced therefrom, viz. "the densities of all the elementary bodies in the gaseous condition are the same as their respective atomic weights, or, the atoms of all the elements in the gaseous state occupy the same space," is untrue, and does not follow from the generalisation of Avogadro.

The Daltonian atomic theory is stated much in the terms which might have been employed before the molecular theory of matter had been propounded. Such statements as that on p. 15, that oxides are called monoxides, dioxides, &c., according "as the compounds contain one, two, three, &c., atoms of oxygen respectively"; or

that on p. 13, "that acids are spoken of as monobasic, &c., according as they contain one, two, &c., atoms of hydrogen replaceable by a base," show that the author has failed to grasp the teachings of the molecular theory.

The term "valency," we are told on p. 159, is used to express "the comparative saturating power of the different elements, taking hydrogen as the unit." Such a loose statement as this naturally prepares the way for the full acceptance of the "bond" view of valency, with all its inconsistencies and apparent, but unreal, explanations of facts; so that one need not be surprised to find (p. 160) the expression, hard to be understood by the uninitiated, "the affinity of these bonds."

A sentence on p. 161 may be quoted as a type of the kind of writing to be found in the works of those who are bound by the trammels of this pernicious system. "The disappearance of the active atomicity by twos, which is found to be always the case, has led Dr. Frankland to suggest that the bonds of union so disappearing are engaged in satisfying each other."

That part of the chapter on "The Higher Principles of Chemical Philosophy" which deals with compound radicles is equally unsatisfactory. Sulphuric acid may be assumed to contain the radicle SO_2 . "The group SO_2 may be traced all through the compounds of sulphuric acid, thus: $\text{SO}_2(\text{OK})_2$, $\text{SO}_2(\text{ONa})_2$, SO_2CuO_2 ." Such a statement is harmful, and only harmful, to the student; in what light other than as an amusing plaything can he regard this conception of compound radicle? Why should he not trace the group SO_3 , or the group SO , or the group SO_4 "all through the compounds of sulphuric acid"? Give him pen and paper, and if he have a little fancy he will trace you a most varied and pleasing number of groups "all through" as many compounds as you please.

The tabulation of facts concerning groups of elements and compounds is a good feature in this book, and likely to prove very useful to the student. The chapters dealing with organic chemistry are clear and succinct: had the author contented himself with recording leading facts, and left the "principles of chemical philosophy" alone, he would have produced a book of some merit, although not of merit sufficient to warrant him in adding another "Manual of Chemistry" to the list which is already so much too long.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

The "Eira" Arctic Expedition

THOSE who advocate the despatch of a Government vessel in search of Mr. B. Leigh Smith's expedition betray only a partial acquaintance with the circumstances of the case. His having failed to return this season is no evidence whatsoever of his having met with disaster; for previous to his departure from England, certain people well understood that he was prepared to spend the present winter far north if he found it worth while to do so. It was this which prevented me from going with him (natural history work on hand precluding my absence from London for upwards of a year); for as I had collected plants and animals with him on a former expedition in Spitzbergen, he invited me to accompany him on his present trip to Franz-Josef Land. The *Eira* was well-provisioned for upwards of eighteen months, and in summer time fresh meat in abundance can be secured, which, hung up in the rigging, will keep good for almost an indefinitely long period. Thus the expedition has provisions enough for at least another year and a half from the present time, and there would be no need for them to starve two years hence. It is therefore rather

early to begin to feel uneasy about their safety on account of provisions.

The detention of the *Eira* in the north is more probably due to her being "beset" than to her having been "nipped" or run aground. Unless she has foundered before stores could be got out of her (when nothing could be done by any search-expedition towards enabling the crew to survive the winter), Mr. Smith and his men are doubtless having a fine time of it up there, in one sense of the words. If it came to the worst they would not be obliged to abandon the ship simply on account of her being hopelessly "beset," until the spring of 1883, because they could afford to wait for the chance of her being liberated next summer or autumn. Then, if she were clearly inextricable, they would do what is done by the crews of whalers under similar circumstances—haul boats or sledges, laden with provisions, over the ice to some place where, in the ordinary course of events, they could not fail to fall in with walrus-hunters, or from whence they might take a departure in their own boats to the most convenient country. Mr. Smith, to my personal knowledge, always counted upon being able to effect a safe retreat by these means, without unusual difficulty, if he should lose his ship: the despatch of an expedition from England in search of him never entered into his calculations. This will amply account for his not naming a *rendezvous*. In the Arctic regions it is best not to be tied down beforehand to any one *route* where there is a choice of several, lest if emergency arise it prove to be *pro tem*, precisely the most difficult of all.

In view of the above facts it appears premature to demand the equipment of a vessel to rescue the *Eira* as a matter of immediate urgency, although, if nothing be heard of her by this time next year, an expedition during the season of 1883 might be a reasonable precaution by no means uncalled for. If people want a ship to be sent out next year, why should not the agitation be an honest one for an Arctic expedition pure and simple?

Thorncombe Vicarage, Chard, Dec. 3 A. E. EATON

Helophyton Williamsonis

AT the late York meeting of the British Association two of my indefatigable auxiliaries in the work of Carboniferous investigation, Mr. Wm. Cash, F.G.S., of Halifax, and Mr. Thomas Hick, M.A., B.Sc., of Harrogate, described, under the name of *Hymenophylloides Williamsonis*, a new stem of a plant, which they had obtained from the Halifax beds. This plant is an extremely interesting one, since its cortical layer exhibits the large, open, longitudinal lacunæ, formed by dissociation, so common amongst aquatic plants. It is still more interesting since the septa separating the large lacunæ are rotate, each one consisting of a single layer of cells, and the whole combining to constitute a network with vertically elongated meshes. This arrangement approaches too closely to that seen in the living Marsileaceæ, to be overlooked in considering the possible affinities which it may indicate. The structure of the central vascular bundle as well as of its component vessels differs decidedly from that of the recent Marsileæ and their allies. But it differs still more widely from *Myriophyllum*, with which the generic name given to it by my two friends associates it. This circumstance alone makes it important to change the name. As yet we have found no trace of an angiospermous phanerogam in the Carboniferous beds, and any name suggesting the probability of the existence of such is apt to be misleading. But apart from this suggestion of improbable affinities a second reason exists for changing the name. Unger has already adopted that of *Myriophyllites* for a genus of Tertiary plants, and the two names approach too nearly to make it desirable that both should be retained. One point appears to be indisputable:—The structure of the bark already referred to indicates either a marsh or an aquatic plant—an interesting fact, since it is the first example of such a plant from the palæozoic rocks that has hitherto come under my notice. We have numerous so-called aquatic roots described by various authors—and possibly they may be what they are affirmed to be, though we have no proof that such is the case; but I think that no such doubts can exist in reference to our new plant. Under these circumstances I propose for this plant the generic name of *Helophyton*, a name which involves no foregone conclusions as to its botanical affinities. Detailed figures of it will appear in the next (12th) part of my memoirs "On the Organisation of the Plants of the Coal-measures.

WM. C. WILLIAMSON

Victoria University, Manchester, December 3

The Pronunciation of Deaf-mutes who have been Taught to Articulate

My attention has just been drawn to the remarkable statement of M. Hément (*C. R.*, xciii, p. 754), that deaf-mutes who have been taught to articulate speak with the accent of their native district; and to the equally remarkable letter of Mr. Wm. E. A. Axon, published in *NATURE* (vol. xxv. p. 101), in support of the same proposition.

I may say in this connection that I have during the past few years examined the pronunciation of at least 400 deaf-mutes who have been taught to speak, without remarking any such tendency as that referred to above. It is true that in a few cases dialectic pronunciations are heard, but it always turns out upon investigation that such children could talk *before they became deaf*. The peculiarity is undoubtedly due to unconscious recollection of former speech, and cannot correctly be attributed to heredity.

M. Emile Blanchard (*C. R.*, xciii, p. 755) has directed attention to the harsh and disagreeable character of the utterance of many deaf-mutes who have been taught to articulate, but it has been found in America that this can be overcome by suitable instruction. I am happy to be able to say that I have heard from congenitally deaf children perfectly distinct and agreeable articulation.

The mouths of deaf children are in no way different from our own.¹ Deaf-mutes do not naturally speak the language of their country for the same reason that we do not talk Chinese—they *have never heard the language*. They are dumb simply because they are deaf; and I see no reason to doubt that all deaf-mutes may be taught to use their vocal organs so as to speak at least *intelligibly*, if not as perfectly as those who hear.

In most, if not in all, of our American Institutions for the deaf and dumb, articulation is now taught as a special branch of education; and in many of our schools all instruction is given by word of mouth, as it has been found that large numbers of deaf children can be taught to understand spoken words by watching the movements of the speaker's mouth.

So successful has articulation-teaching proved in America and in Europe, that dumbness will soon be universally recognised as a mark of neglected education.

ALEXANDER GRAHAM BELL, Ph.D.

(Nat. Col. for Deaf Mutes, Washington)

London, December 5

The Function of the Ears, or the Perception of Direction

ISEE the above to-day in *NATURE* (vol. xxiv. p. 499) as a matter brought before the British Association at York, and as I can forward some results of experience, I beg to send the following:—In the cold season of 1868 I had to cut a straight line through dense forest half a mile long, between two given mounds, and availed myself of the known capability of Asamese in telling direction in such cases. Placing a man on one mound to shout now and then, a party of us went to the other mound and listened. On hearing the shouts I placed a long thin bamboo on the ground pointing from a peg in the direction of the shouts. While the men were clearing a space around I put another small peg in the ground, marking where the point of the bamboo fell. I took the bamboo up, and made the head man relay it himself, which he soon did, almost exactly where I had pegged it; thence we cut a true straight line, setting up peeled rods at every 50 yards, and eventually came out at 24 feet from the mound, in a distance of 45 chains. The jungle was dense, and we could never see more than about 12 or 14 yards in front. Lately having moved to a place where there are five tea-gardens in a semicircle around me, at distances of 5, 6, 4, 4½, and 4¼ miles distant, I have heard several gongs in the early morning, and taking the bearing of the most audible, plotted it on the Government map, when it came out exactly among the houses in the "station" of the one at 4 miles; a repetition on other mornings confirms the direction. Distance does not seem any drawback, provided the sounds are loud enough; for in the great

¹ I have examined the vocal organs of several hundred deaf-mutes, and while I have observed the most extraordinary differences in the size and shape of the palate, and in the appearance of the tongue, I have observed the same peculiarities in the mouths of hearing children, who talk perfectly well. The proportion of malformation of the vocal organs among deaf-mutes is certainly not greater than among hearing children. We occasionally meet with cases of cleft-palate, of double rows of teeth, and of tongue-tie, but such cases are altogether exceptional, and the vast majority of deaf-mutes have vocal organs as perfect as our own.