Australian tribes reported to have numeral words up to 15 or 20. But the point raised is well worth attention. The statement as to tribes in various districts having no distinct numeral words above three, and only struggling on to four and five by saying "two-two," &c., rests on the authority of Europeans who have studied the native languages, sometimes well enough to write grammars of them. Are we to think that the natives generally had words for large numbers, and yet the Europeans failed to discover them? Or, rather, is it not easy to suppose that some tribes raised themselves (possibly since contact with the white man) above this low level of arithmetic, making, out of their counting on the fingers, numeral words even as high as the words here given for 100? It would be interesting if it could be shown etymologically that the terms here given for 20 and 100 had originally a material meaning, like the word for 5, which still means "hand."

One of the greatest difficulties in studying savages is to know how far to trust or distrust their assurances that what they tell is really their own, and not picked up from foreigners. From this point of view it is worth while to look closely at the story of the lost Pleiad, which here appears among the native myths of the "black-fellows." The author's friends naturally doubted its genuineness, but on further inquiry it was found to be widely known. The tradition is that the Pleiades were a chiefess called Gneecangar and her six attendants; Waa, the Crow (the star Canopus), fell in love with her, and finding that she and her women were going in search of white grubs, he turned himself into one, and bored into the trunk of a tree, where they were sure to find him. The women, one after another, poked their little wooden hooks into his hole, but he broke the points, till at last his love put in her beautiful bone hook, and he let her draw him out, whereupon he turned into a giant and ran away with her; since then only six Pleiads—the serving-women—have been left. Now between this story and our classical myths there is a difference. Ovid's version seems to carry its origin on its face, agreeing with the fact that only six of the stars in the cluster are bright and plain to common eyes, so the myth tells of a hidden or faint seventh. She is Merope hiding herself for shame at marrying a mortal, or Electra putting her hand before her eyes, not to see the ruin of Troy. But in the Australian tale the vanished star, being the queen, ought of course to be the brightest; so that there is little sense in the story, unless Mr. Dawson is prepared to maintain that the Australians remember a time when there was a Pleiad brighter than the rest, which has now vanished. It would be easier, if more commonplace, to guess that the natives got the idea of a lost Pleiad from some Englishman who had heard the story at home, but missed the point of it.

The anthropological work done by Mr. Dawson and Mrs. Taylor hardly needs praising. It is enough to point out how carefully, not relying on books, they have made their own inquiries on every subject, and recorded them as scientific material. It is to be hoped that they will not cease their researches, for there must still be much valuable evidence to be gleaned in their district, if it is done without delay.

EDWARD B. TYLOR

OUR BOOK SHELF

A Dictionary of Chemistry and Allied Sciences. By H. Watts, F.R.S. Third Supplement. Part II. (London: Longmans, 1881.)

WE have no publication in English strictly corresponding to *Liebig's Annalen* or the *Annales de Chimie et Physique*, and were it not for this now gigantic dictionary of chemistry by Mr. Watts many, both advanced and elementary students of our science, would find their labours considerably increased by the necessity of having to hunt up a great number of facts and records of work done in foreign journals. The chemical record in this volume includes discoveries made in 1880, and in addition a number of exhaustive articles by Professors Armstrong, on Isomerism; G. C. Foster, on Thermodynamics; Schuster, on the Spectrum; Thorpe, on Specific Volumes; and others. This part commences with G, the first large articles being Gallium and Gases, the latter being very complete and up to date. A long section is devoted to Heat, which, with the article on Thermodynamics, is very valuable. In the portion on Isomerism we are very glad to notice a slight but still important definition, or rather restriction of the term isomeric. That is, bodies should only be classed as isomeric when their reactions indicate that they are of the same type of structure. This article is of some length, and contains the main points of the hypotheses brought forward by Van L'Hoff and Le Bel and others. We thoroughly agree with the concluding paragraph of the article, and venture to add that probably when we do know a little about the loss or gain in energy in the case of reacting molecules the terms saturated and unsaturated atoms will cease to be employed. The article dovetails into the one on Light, and together they form an important fraction of the book. The greater part of the volume is of course taken up by "organic" and physical chemistry, a considerable number of mineral substances being however described, the section on the metals allied to yttrium being very interesting. The references to the original papers attached to each article render the work even more valuable to those chemists and physicists to whom a few languages is no difficulty. Although a dictionary, it is very thick, and probably an index would facilitate the search after any particular description; but the want is a minor one.

W. R. H.

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 Madeira Earth-electric Cloud again

WHAT a valuable paper, Mr. Editor, you have published this week from Mr. J. B. N. Hennessey, with its diagram of the new set of sun-spots which broke out suddenly near the centre of the sun's disk, between 4h. and 5h. p.m., on July 25, as recorded by the photo-heliograph of the Indian Trigonometrical Survey, under his able charge, at Dehra.

His enthusiasm at having localised the appearance of the phenomenon in time, as well as space, is unexceptionable; and his long experience as an observer gives his opinion commanding weight, when he further holds forth on the rarity of such an occurrence, on such a scale and so centrally situated on the sun's disk—whence its probable vast importance for the physics of the earth and the foundations of a new science. All that is admirably true and suggestive for the future; but meanwhile I desire to claim the first fruits of the case as the very thing I have been expecting ever since I left Madeira at midnight on July 29.

And why should I have been expecting such an announcement, do you ask? Well, do you remember my letter to you from

Madeira on June 27 (NATURE, vol. xxiv. p. 212, with a sequence on p. 237) describing the extraordinary cloud that appeared there on June 26, alarming all the inhabitants, the typically "oldest" of whom declared they had never seen such a cloud as that before? It was, too, in very truth a most remarkable affair; and seemed to me only to admit of full explanation as a peculiar case of the earth answering by escape of its interior electricity to the sun; where, according to my own daily solar diagrams, there had just occurred an outburst of solar spots very nearly over the ends of the solar radii that were then pointing towards the earth.

Weeks passed on without anything to interfere with, or undervalue, that explanation; when lo! on July 26 (the very same day, curiously enough, of the next month) another cloud appeared over Madeira, of just the same peculiar physical character as that of June 26. "Why," were inclined many visitors to ask, "is this kind of cloud, in spite of the asseverations of the 'oldest' inhabitants, no very great rarity after all in this part of the world?" There had been certainly thus two cases of it occurring with a very short interval between them; but nevertheless, I was inclined to respect the assertions of the greybeards; and said, "Something unusual must again have happened in the sun; but as my observatory was dismantled on July 23, and the component parts of it packed up ready for shipment on July 25 and 26, I had not then any knowledge of what it might be." Now, however, see how perfectly Mr. Hennesey's Indian solar photographs fulfil all that was required to make this second Madeira cloud phenomenon an exactly similar cosmical case to that of its mensural predecessor; or to testify that an extraordinary, unusual, most sudden outburst of solar spots did take place over the very part of the sun's surface turned towards the earth late on July 25, and within twenty-four hours afterwards the earth-electric cloud made its appearance above Madeira, where it was thus noted in my pocket journal:—

"Tuesday, July 26.—During this afternoon there was a great cloud-structure formed to the west, with all the characteristics of smooth-rimmed lenticular strata under strata, and the topmost visible one breaking out into fringes of cirro-cumuli, that marked the still grander cloud of June 26." This one was however very splendid after sunset, and when the red tints thereof had faded from it they were replaced by the richest and purest browns, of the burnt-umber variety, I have ever beheld in the sky. The cloud was vertical over the lower southern slopes, almost the southern sea-shore of Madeira; not over the high peaks of the island, in so far as once pointing to a different origination from Dr. Muirhead's (of Cambuslang) cloud in NATURE, vol. xxiv. p. 237. That cloud was an affair plainly of the cold of a snow-covered mountain-top in Britain, and is just such an ordinary local production as any one can see for a large part of the year on the South African hills round about Table Mountain and Table Bay—whenever the south-east trade-wind blows over that country. For there, day after day, it produces very clumsy-shaped masses of vapour either on, or vertically over, the tops of the hills, according to their respective absolute elevations. But never once, during ten years, did I see any approach in the arrangement of the constituent particles of those clouds to the neat, refined, peculiar shapes of what formed the most conspicuous characteristic of the two successive Madeiran earth-electric clouds of June 26 and July 26. They had each been preceded by as peculiar, as rare, a central outburst of solar activity, and probably required no less for their due manifestation, as well as the performance of their functions in cosmical electric radiations and exchanges.

PIAZZI SMYTH,

Astronomer-Royal for Scotland

15, Royal Terrace, Edinburgh, September 30

American Cretaceous Flora

I HAVE only just read Prof. Newberry's clear and concise account of the American Cretaceous series (NATURE, vol. xxiv. p. 191). I regret that I am still unable to agree with him that the relative ages of American and European Cretaceous beds are satisfactorily correlated. I should not again venture to insist so strongly on what must seem to Dr. Newberry to be but an individual opinion, except that he seems to expect a reply, and I have further some new evidence to bring forward. Of my opinions the one to which he takes most exception seems to be that "no American or European so-called Cretaceous land flora can be proved to be as old as our White Chalk." It is this statement therefore which I must substantiate.

In America the plant-beds of Vancouver's Island contain many Angiosperms, and are said to be of the age of the Gault or Upper Greensand, and the Dakota group, which has yielded one hundred distinct species of Angiosperms, is said to be older than our Chalk. The Colorado group is said to represent not only our Grey and White Chalk, but the Mästricht beds. Even the Laramie group or "Lignite series" is placed in the Cretaceous system. I have unfortunately not the books requisite to re-examine critically the American evidence, and must therefore confine myself to stating that which on this side of the Atlantic tends to show the relative age of the American series to be very considerably overestimated. I would propose, however, to Prof. Newberry an exchange of the more abundant Cretaceous mollusca, in order that they may be compared together; after which I might possibly find myself able to visit some of the American sections. This I should the more like to do, as I happen to be acquainted both with the Cretaceous and Eocene mollusca, and with the floras, of England—the very evidence, in fact, upon which the respective ages of the series is to be decided.

In the first place I am able to assure Prof. Newberry most positively that on plant evidence the Laramie series must be bracketed, if anywhere, with our Middle Eocene. Not only is the facies of the flora identical, but identical species appear in both continents in these series. I cannot yet give a list, but I would particularly point to such highly characteristic species as *Lygodium Kaulfussii*, Heer (syn. *L. neuropteroides*, Lesq.), and *Anemia subcretacea* (Saporta) (syn. *Gymnogramma Haydenii*, Lesq.), which were identified by Lesquereux himself after comparison with actual specimens which I forwarded to him. These are fully described in the Palaeontographical Society's publications, which I hope Prof. Newberry will glance through. We have beyond all question, in the first stage of the great "Lignite series," a common line to work from, and the age of this line is, assuredly, according to the plants, that of our Middle Bagshot series. Below our Middle Bagshot there is, in France and England, a vast series of Eocene deposits containing many distinct floras of most dissimilar types, and about which, in many cases, scarcely anything is known. Even at the base of these we are very far from the age of our Chalk, we have still an obscure series of local deposits which to some extent bridge the gap between our Secondary and Tertiary periods. Some of the most noted of these deposits I have recently visited.

The highest, I believe, of these so-called Cretaceous beds in Europe is the coral deposit of Faxe. Its solitary claim to be considered of Cretaceous age is a *Pleurotomaria*! It has no Cephalopods except *Nautilus* and *Aturia zig-zag*, and not even the persistent *Inoceramus*. Except *Pleurotomaria*, the mollusca are all more of Eocene than Cretaceous type: *Cypræa* are abundant, and there is a *Mitra*, *Triton*, *Voluta*, *Turbinella*, a *Rostellaria* and *Ampullaria*, &c.

In the underlying "Faxelaget" the Cretaceous element is reinforced by *Baculites* and *Scaphites*. In the Greensand of Bornholme, *Belemnites* and *Inoceramus* are added; and finally, in the Chalk of Moen, a smooth *Ammonite*, one or more large *Hamites*, and a variety of other Cretaceous types appear. We have thus a clear passage downward into the Cretaceous series; but even the age of the Moen's Chalk is not quite definitely known, for the supposed *Belemnite*, which apparently fixed its zone, is in reality a *Belemnite*. A few forms, however, seem to link it slightly with the Greensand of Aachen, whose age I shall now consider.

The highest of the Aachenian series is Chalk with flints. In this mollusca are few; but this is of less importance, since the Chalk rests upon Greensand, in which they abound. The fossils are in much the same condition as at Blackdown, and among them are about sixteen apparently Gault and Blackdown species. The greater part of the latter are however carried up into our Grey Chalk, where they cease simply, as far as we know, because the succeeding beds were not fitted to preserve them. These shells are mixed with others, about thirty species, of Tertiary aspect, including *Voluta*, *Murex*, *Turbo*, *Fusus*, *Pyrula*, *Borsonia*, *Bulla*, *Turritella*, *Corbula*, *Tellina*, *Cytherea*, *Lucina*, *Pectunculus*, &c., and *Clavagella*. The presence of *Belemnite* *mucronata* and *B. quadrata*, together with *Baculites*, also point to its being at least younger than the Lower Chalk. Below these are the sands with Dicotyledons. The flora these contain, while mainly unlike that of the Eocene, possesses nevertheless some types of leaves which appear identical with Eocene forms, and is of the highest importance in comparing the American