an explanation in some measure correct, clear skies are not so unknown in Europe and America (nor indeed in England) that the illumination of the atmosphere can be broadly said to "completely overpower" that which "in an ordinary instrument" is by no means overpowered in India in ordinary states of the sky.

The erroneous notion to which I refer has been promulgated again and again. It is unnecessary that I should specify the various passages—in lectures and elsewhere—and ultimately in Mr. Proctor's work on the Sun*: but having now found it so distinctly enunciated in the above cited passage, and elsewhere, in "Schellen," the time seemed to have come when it ought no longer to pass unnoticed; the more so as I have never been able to understand the real reason why the momentous discovery was not made earlier. It has been said that *knowing where to look*, the main difficulty was overcome. But two days after my first experience of these three known lines, I recognised the presence of three more hitherto unknown ones—and subsequently of a seventh. From that time to this however I have not seen any others, with the same dispersive power.

If asked how it was that, with the very same power at command, I had not myself seen them before; I need only reply that I had small leisure by day, and was under the impression that the experiment had been fruitless in more experienced hands—the identical reason which P. Secchi has given for a like remissness, in this very matter.

Bangalore, Aug. 25 J. HERSCHEL

Botanical Terminology

I VENTURE, as no one else has done so, to make a few remarks on Mr. Kitchener's letter.

I suppose the necessity will not be denied of employing some technical terms in studying subjects which do not fall under ordinary observation, and for the discussion of which ordinary language is consequently insufficient. When these technical terms are first devised, it is natural, indeed unavoidable, that they should reflect the scientific ideas current at the time. But inasmuch as knowledge progresses, we find ourselves, sooner or later in every branch of science, in the predicament of having to give effect to new views in terms which are an inheritance from old ones. We are able to do this because things themselves remain the same though our ideas about them change, and the names they once received with an intelligible meaning have now become purely arbitrary. No man bearing the name of, say, Baker, would probably change his name because he did not make bread. Nor do chemists discard the term oxygen because there are acids of which it is not a constituent. In the same way the morphological analogy implied in the use of the term "ovule," in the case of plants, is undoubtedly incorrect, but any one must have a singularly tender conscience who would object to it on that ground.

To save, therefore, confusion, and preserve uniformity in scientific literature, there is a tacit convention to treat in a great many cases as arbitrary terms words which once implied acquiescence in a theory. That a word in common use belongs to "a pre-Adamite stage of botanical knowledge," as Mr. Kitchener calls it, is not, I take it, sufficient ground for replacing it with another if there is no ambiguity in its application.

Next I would remark that Mr. Kitchener appears to me to have an exaggerated notion of the copiousness of botanical terminology. The number of terms really indispensable is not large. For example, he speaks of the troop of words ending in "tropous." Was this particular noun of multitude suggested by the termination? because as a matter of fact the troop consists of three. Prof. Henslow found no difficulty in teaching the terms contained in Prof. Oliver's Lessons in Elementary Botany to girls in a village school. Surely the Rugby boys cannot be less apt.

That Professor Henslow succeeded seems to dispose of the objection that a knowledge of Greek is "a necessary *open sesame* to the correct remembering and spelling of botanical terms." To teach these terms as "unintelligible gibberish" is only what in any case must be done with whole hosts of words not very different in form. Why should it be insuperably difficult for a boy, even if ignorant of Greek, to remember spell and apply the term hypogonous when he cannot possibly evade sometime or other having to face hypothesis, hypochondria, and hypocrisy, to say nothing of hydrostatics, hydraulics, hydrogen, and hydrocephalus?

* See particularly p. 286, footnote.

I can see no reason why, as Prof. Henslow was in the habit of doing, technical terms carefully reduced to the smallest number absolutely required (and text-books bristle with unnecessary ones) should not be taught to boys as mere arbitrary names. Syngenesious, as a mere matter of taste, seems to me preferable to "united by dust-pouches."

If this be done, Mr. Kitchener's further difficulty as to "gamogenetic analogy" disappears.

The teacher, of course, may himself reasonably exercise some liberty. Thus no one would, I suppose, object to quincuncial being expressed by $\frac{2}{5}$, though quincunx is to be found in any dictionary, and is a word for which botanists are not responsible. Again, the suggestion to express by a fraction the depth of leaf-incision is really commendable, even to technical descriptive botanists.

October 1 W. T. THISELTON DYER

The Hassler Expedition

UNDER this heading in your number for August 29, p. 354, is this sentence, "One lesson I must confess to having learned at Indefatigable Island (Galapagos). I saw there indisputable proof that the surf of the sea is capable of rounding angular fragments of lava into pebbles somewhat resembling in shape (but not at all in polish and grooving) glacial boulders. I had always from boyhood doubted the power of the sea to make angular fragments round. I had supposed that the action of the surf upon such fragments would be simply to pack them into a sort of McAdam's roadway. And even now, having had the proof that under peculiar circumstances the sea can make a tolerable imitation of drift, I am not a whit more ready to believe that the sea made the drift itself. You may prove to me experimentally that flour can be made from wheat with a pestle and mortar, but that will not convince me that the flour markets of the world are thus supplied."

If the countless myriads of tons of beach on the shores of this globe could be passed through the hands of this writer, he would not detect a single "angular fragment" (McAdamised) among them. On the shore each lump of rock is successively worn into a boulder, each boulder into a pebble, and finally each pebble into sand. This is the main source of the sand which lies between the beach and the ooze-bed of the ocean.

But the sea-shore factory of boulders and drift is not the only factory, or even the largest factory of boulders and drift. The rocky gullet is the main boulder factory. Lyell (Principles), speaking of Etna, attributes "the enormous rounded boulders of felspar, porphyry, and basalt, a line of which can be traced from the sea from near Giardini, by Mascali and Zapharana to the Val del Bove" to one flood of melted snow. The valleys of the low part of Teneriffe, away from the Peak and near Santa Cruz, are almost all dry except in rain. The beds of the upper parts of these valleys are sheer rock, the middle parts wear the appearance of torrents of boulders, the lower parts are *alluvial plains* of boulders, and opposite the mouths of these valleys are very commonly deltas and bars of boulders. Behind these bars, after each rain, large deposits of earth and sand are formed which the people collect diligently. Where permanent streams exist, they are usually lost at a considerable distance above the mouths of the valleys. That is, except in rains, they percolate to the sea beneath the plains deltas and bars of boulders.

From the sides, hundreds or thousands of torrents of boulders fall into these rivers of boulders. Sometimes these lateral shoots have formed barriers of boulders across the main valley behind which large beds of boulders and earth have accumulated, again to be cleared out and thrust down to the sea-shore by heavy longitudinal rain floods.

So, in Madeira, who does not know the sea-shore boulders of the Praya-Formosa? and for fresh water boulders, the stream at Funchal brings down such a crop at every flood as to choke the channel through its delta of boulders, and unless the channel is kept clear of them artificially, the lower town is subject to the most disastrous inundations.

I mention Teneriffe and Madeira because, like the Galapagos, they are deep-sea volcanic islands. Their surfaces have been ejected when they were already above the sea, and they have been coated and re-coated thousands of times by floods of melted rock when they had long been *sub dio*. So that I conclude that even Agassiz would not attribute the moulding of their surface to the "Glacial epoch." But leave volcanic islands or volcanic mountains out of the question, there is not a mountain stream or