older botanists sure to confuse them, as *loculicidal* and *septicidal* and the troop of words which end in *—tropous* ; or they convey a morphologically impossible idea, as *inferior* and *superior* as applied to the ovary. To see how these faults can be avoided, let us inquire why an unusual amount of names are required at all.

(I.) Popular names being vaguely used require to be restricted in their meaning by accurate definition.

(II.) A new name is required for any part to which no name is popularly assigned, either because the thing to be named escapes popular observation, or because two or more things are included in the connotation of the popular term.

(III.) New adjectives, or adjectival-periphrases, are required to express characteristics, or relations of part to part.

Let me briefly suggest some principles, which, while remedying the faults of the old terminology, seem not to clash with these three necessities of the subject.

(*a*) Names for new things to be given in English, *ex. gr.*, the names *calyx* and *corolla* to be taught as *cup* and *crown* : in this we should be only following the German use of Kelch and Krone.

(*b*) Where a part of a thing already named requires a fresh name, the preference to be given to a name framed like the German double words—Kelch-blatt, Staub-blatt—so as to indicate the relation of part to part, thus *cup-leaf, leaf-stalk, flower-stalk* to be taught instead of *sepal, petiole,* and *peduncle.*

(*c*) Short expressions involving English (not Greek) prepositions to be used for adjectives : thus *splitting by mid-ribs, on seed-vessel, united by dust-pouches,* to be used for *loculicidal, epigynous, syngenesious.*

(*d*) Where the definitions of the terms is given in numbers, numbers or fractions be used instead of those terms : thus in æstivation, $\frac{2}{5}$ to be used for quincuncial ; in cutting of leaves the fraction of the leaf cut to be stated instead of *omnia quæ exeunt, in-fid, -sect,* and *-partite.*

But it will be said—how will pupils taught thus get on afterwards? The answer is, either they will do no more of the subject than they do at school, in which case they will have got the idea without the obstructions of the terms ; or they will care to go on further with the subject, in which case they will learn the terms very quickly, being now familiar with the facts and ideas. In neither case will time have been lost, and the scope of botanical subjects which may be treated in the time will have been doubled.

I must apologise for the length to which this letter has run.

FRANK E. KITCHENER

Rugby, September 16

Hutton's Trigonometrical Tables, for Arcs expressed as portions of the Radius

AT the end of the preface of the first edition of Hutton's Mathematical Tables (1785) is the following postscript :—"P.S.—Since my History of Trigonometrical Tables in the following Introduction was printed, there has been published in the 'Philosophical Transactions' for the year 1784, a paper of mine concerning a project for the trigonometrical tables to be constructed on a new plan, namely, in which the arc of the quadrant is divided into aliquot parts of the radius, or according to the real lengths of the arcs, which construction is now in some degree of forwardness, as myself and several assistants have been closely engaged in the execution of it ever since." And in the succeeding editions, down to the sixth, 1822, there occurs on p. 2 of the Introduction the following remark :—"But the complete reformation would be to express all arcs by their real lengths, namely, in equal parts of the radius decimally divided, according to which method I have nearly completed a table of sines and tangents." Hutton died in 1823, and I can find no further reference to the table in question. I feel pretty certain that it has never been published, and there is no other paper on the same subject (except that in the Phil. Trans., 1784) of Hutton's referred to in Watt's "Bibliotheca" or the Royal Society's Catalogue.

The table was intended to give the sines, tangents, &c., of $\frac{1}{100000}$, $\frac{2}{100000}$, &c. (the unit being the arc equal to radius) to seven decimal places, and would be very useful. If it has not been published, perhaps some reader of NATURE might be able to say what has become of the manuscript that was nearly completed.

I may mention that the calculation of such a table was under the consideration of the Tables Committee of the British Association, but it was thought that some other tables were at present more urgently needed.

J. W. L. GLAISHER

Cambridge, Sept. 16

THE "HASSLER" EXPEDITION

WE are indebted to the courtesy of the Editor of the *New York Tribune* for early communication of the following information from Prof. Agassiz's expedition :—

OFF GUATEMALA, July 29, 1872

To Prof. Benjamin Peirce, Superintendent U.S. Coast Survey.

MY DEAR PEIRCE :—Do not be surprised at my few messages. It is about all I can do to take advantage of every opportunity that offers for study and collecting ; but I rarely feel sufficiently collected to do any connected writing. I have another new chapter concerning glacial phenomena, gathered during our land journey from Talcahuano to Santiago, but it is so complicated a story that I do not feel equal now to recording the details in a connected statement, while the whole may be put in a few words.

There is a broad valley between the Andes and the coast range, the Valley of Chillan extending from the Gulf of Ancud, or Port Montt, to Santiago, and farther north. This valley is a continuation, upon somewhat higher level, of the channels which, from the Strait of Magellan to Chiloe, separate the islands from the main land, with the sole interruption of Tres Montes, which gives the clue to the whole, as we have here in miniature a valley between the Andes and the coast range. Now this great valley, extending for more than 25 degrees of latitude, is a continuous glacier bottom, showing plainly that for its whole length the great southern ice-sheet has been moving northwards in it. I could find nowhere any indication that glaciers descending from the Andes had crossed this valley and reached the shores of the Pacific. In a few localities only did I notice Andean, *i.e.*, volcanic erratics upon the loose materials filling the old glacier bottom. Between Currillo and Santiago, however, facing the gorge of Tenon, I saw two distinct lateral moraines, parallel to one another, chiefly composed of volcanic boulders, resting upon the old drift, and indicating by their position the course of a large glacier that once poured down from the Andes of Tenon, and crossed the main valley, without, however, extending beyond the eastern slope of the coast range. These moraines are so well marked that they are known throughout the country as the Cerillos of Tenon ; but nobody suspects their glacial origin ; even the geologists of Santiago assign a volcanic origin to them.

What is difficult to describe in this history are the successive retrograde steps of the great southern ice-field, that, step by step, left to the north of it larger or smaller tracks of the valley free of ice, so that large glacial lakes could be formed, and, in fact, seem always to have existed along the retreating edge of the great southern glacier. The natural consequence is that there are everywhere stratified terraces, without border barriers (as these were formerly the ice that has vanished), resting at successively higher or lower levels, as you move north or south, upon unstratified drift of older date, the northermost end of these terraces being the oldest, while those farther south belong to the latter steps in the waning of the ice-fields. From these data I infer that my suggestion concerning the trend of the striæ upon the polished and glaciated surfaces of the vicinity of Talcahuano, alluded to in the postcript of my last letter, is probably correct.

I was much grieved on reaching Valparaiso to hear of the mishaps of the dredging apparatus. The subsequent departure of Pourtales has been a great loss to us all, for notwithstanding his silent nature, he is a powerful standby.

Our visit to the Galapagos has been full of geological

©1872 Nature Publishing Group