

tary of our greatest Society to throw cold water on any suggestion made for the good of agriculture, especially in these sad times; but alas for the frosts of June, July, August, and September, which most of our years carry in their bosoms! Gardeners and farmers know them and dread them. Our summers are not to be relied upon, or we should grow tobacco—ay, and grapes!

JOHN WRIGHTSON

Madagascar: an Historical and Descriptive Account of the Island and its Former Dependencies. Compiled by Samuel Pasfield Oliver, late Captain R.A. Two vols. (London: Macmillan and Co., 1886.)

CAPT. OLIVER has made a useful compilation of information on Madagascar in all its aspects. The compilation consists largely of extracts from previous writers. Capt. Oliver himself visited Madagascar a good many years ago, and has naturally taken much interest in the island and its people ever since. It is evident these two volumes must have cost him much labour, which will no doubt be appreciated by those in search of information on Madagascar in a handy form. After an historical sketch, the first volume is devoted to geography, topography, climatology, geology, and natural history. These, in the second volume, are followed by chapters on natural and agricultural products, ethnology, manufactures, administration, trade and finance, bibliography and cartography, and a very long chapter, with appendixes, on the Franco-Malagasy war. The work, we should say, is exceedingly well supplied with maps and plans, of which there are nineteen altogether.

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 insure the appearance even of communications containing interesting and novel facts.]

An Ice Period in the Altai Mountains

M. B. VON COTTA, who once visited the Altai Mountains, is decidedly of opinion that there are no traces of the Ice period on this range. But at the southern part of the Altai, where there are some large glaciers and many ridges covered with eternal snows, there are undoubted traces of a mighty spreading of ancient glaciers. At least this is the conviction I brought back in 1870 from a rapid examination of nearly the same localities as those which have been recently visited by Mr. Bialoveski.

The deposits of ancient glaciers may be observed, far more to the south, on the ranges of Tarbagatay and Saoor, the southern limits of the basin of the Irtysh. There are not now any glaciers on Tarbagatay, but some sporadic snow-spots. As to the range of Saoor, it attains to the height of 12,500 feet above the level of the sea, and snow always lies there in large masses. But there are no glaciers, properly so called.

Along the northern declivities of these mountains there are at many places large deposits of boulder- or cobble-stones, in great part composed of granite, which forms the crest of both ridges. The boulders are of various rocks and of different sizes, from an inch to some feet in diameter; and they are mingled together in complete confusion, the small boulders being generally well rounded, the large ones more angular, and the intervals being crammed with clay and sand without any traces of layer or assortment. The relation of these deposits to the neighbouring defiles is in most cases incomprehensible. Only at the sources of the River Kenderlik the boulders lie as if the ice which had carried them down had but lately melted. Here, instead of the sections of defiles in the form of the letter V, we find, beginning from the elevation of nearly 3000 feet above the level of the sea, a broad defile with transverse section in the form of the letter U. The walls (or cheeks, as the Russians call them) of this

defile are composed of inclined layers of sandstone and limestone (probably Tertiary deposits), replaced, nearer to the crests, at first by diorite and subsequently by granite. The bottom of the defile is filled up with a close layer of boulder-stones, many of which reach some 10 feet in diameter, the greater number being of gray granite with dark ellipsoidal inclusions. Just the same granite forms the crests of Saoor. To the height of 8500 feet the defile rises steeply enough; but after this limit the inclination becomes more faint. Higher up, the defile grows broader, and at the height of 10,000 feet it is stopped up by two deep valleys crammed with close snow, and surrounded by steep snowy peaks. The full length of the layer of boulders reaches some ten English miles, with a direction from south to north.

The Saoor chain is a post-Tertiary elevation, but the Altai range certainly arose at a most remote time. It must have formed dry land since the Cretaceous formation at least. Here might be found the solution of the question whether there was on the earth an ice period more ancient than that of which we have evidence in the ice-deposits of Europe and North America. Some facts observed by myself seem to me to show that the question must be answered in the affirmative. E. MICHAELIS

Oostkamenogorsk, November 3

How to make Colourless Specimens of Plants to be preserved in Alcohol

MANY plants assume a brown colour when placed in alcohol for preservation. The colouring-matter is partly soluble in the alcohol, partly not, and is the product of the oxidation of colourless substances of the cell-sap. This unpleasant change may be prevented in a very easy manner by using acid alcohol. To 100 parts of common strong alcohol add 2 parts of the ordinary concentrated solution of hydrochloric acid of the shops. Parts of plants brought into this liquid while yet living will become absolutely colourless, or nearly so, after the alcohol has been sufficiently often renewed. Such parts as already had a brown colour before, being brought into the mixture, usually retain this character.

By this method colourless specimens may be made of such plants as *Orobancha* and *Monotropa*, which, when treated in the ordinary manner, always become of a dark-brown tint. There are only some species with coriaceous leaves that cannot be treated with success with the acid alcohol; colourless specimens of these must be made by plunging them into boiling alcohol.

The acidity of the mixture here recommended is nearly 0.2 Aeq. A greater quantity of acid is neither noxious, nor does it improve the effect. A lesser quantity was in many cases found not to be sufficiently efficacious. The specimens may remain for months, perhaps for ever, in the acid alcohol without any injury.

If the alcohol, after having been used, is to be decolourised by distillation, the acid should be neutralised by a previously-determined quantity of ammonia or carbonate of soda.

Old specimens, which have become brown in consequence of being treated in the ordinary manner, cannot, as a rule, be decolourised by using the acid alcohol. This, however, may often be done by adding to the alcohol some chlorate of potassa and some sulphuric acid. HUGO DE VRIES

University of Amsterdam, December 1

Virtual Velocities

DE MORGAN in his "Differential and Integral Calculus," p. 501, says:—

"The principle of virtual velocities, like all other fundamental theorems, has had no proof given of it in the admission of which all writers agree. From its universality and simplicity it may be supposed to be rather the expression of some axiomatic truth than the proper consequence of first principles by means of a long course of regular deduction."

Would you kindly allow me to submit to your readers the following attempt to base the principle of virtual velocities and D'Alembert's principle on easily admitted axioms?

(1) The power of a force imparted to any molecule is (or is measured by) the product of the force itself, and the effective component in the line of the force, of the velocity of the molecule to which the force is imparted, and is positive or negative accordingly as the force and the effective component of the velocity are in the same or opposite directions.

(2) The power of a system of forces, whether imparted to the