

common with the savages than with us, or may have been specially prominent in those selected for experiment.

Gildown, February 16

J. RAND CAPRON

### Erosion of Glass

SOME time in the end of 1882 Surgeon-Major Biden, writing from Madras, related in NATURE that certain glass vases on which white-ant mud had been deposited had been eroded over the area of deposit in such a way as to suggest that an acid having, like hydrofluoric acid, a power of dissolving glass, was present in the "mud." On reading this I was reminded of the observations of my teacher, Mr. George Rainey, recently deceased.

Mr. Rainey, in the course of his observations on molecular coalescence, had shown that when carbonate of lime was deposited in spherical forms on the surface of a glass slide in the presence of a strong solution of gum, the glass was eroded at every point of contact of a sphere. He explained the phenomenon, as I believe rightly, by the principle of molecular coalescence. In the embrace of the colloid gum, the molecules of the glass adjoining the spheres were drawn into the spheres, and a little cup corresponded to each sphere-contact. There was certainly no question of the action of an acid, the solutions used being distinctly alkaline.

Inspection of the bottles in which the substances have been kept will show that carbonate of lime, moist or dry, carbonate of potash, moist or dry, chloride of calcium, moist or dry, do not in the absence of colloids erode glass. It appeared to me probable that the white-ant mud must consist of a mixture of some colloid with carbonate of lime or some other salt capable of taking spherical form. I wrote to Surgeon-Major Biden stating the possibility as it appeared to me, and suggesting that the mud should be examined as regarded colloid and earthy matter. He replied most courteously that the mud was not at the time to be obtained, but sent some of the earth which formed its basis.

Experimenting with this earth alone, I was not able to etch glass. But in view of some interesting speculations which this episode started for me, I have since made some experiments directly bearing on the possibility of the erosion of glass surfaces by saline matters of alkaline reaction deposited on them within a colloid bed or matrix.

I inclose for your inspection a glass slide which has been so treated. More than a year ago this slide was coated with a layer of paraffin, melted on. The word "Ant" was drawn on the side with a wood point, in the expectation that etching might be effected where the paraffin was removed, the wood point being incapable of scratching the glass. The expectation was not entirely fulfilled. The paraffin, not being sticky enough, scaled off in sheets so as to leave the whole surface ultimately exposed. This whole surface is now seen to be etched. At first sight the glass looks as if it were covered with a semi-opaque deposit. But it has been boiled in hydrochloric acid and in water, without any change becoming evident, and under the microscope the appearance rendered is clearly an appearance of erosion.

The details of the experiment were as follows: a strong solution of gum arabic in distilled water was made and filtered. It was divided into two portions. To one was added a small quantity of chloride of calcium, to the other a small quantity of carbonate of potash. A wide-mouthed bottle, three inches in height, was half filled with the first solution, and the second solution was slowly poured on the top of the first, so as to avoid mixture of the two. The slide, prepared, as already described, was placed vertically in the bottle, so that the middle region of the slide corresponded to the level of the meeting of the two solutions.

The slide was found, at the end of a twelvemonth, denuded of its paraffin, and coated with an incrustation of carbonate of lime most dense at and near the meeting level of the two solutions.

Under the microscope the surface of the slide presents many kinds of erosion—spherical, linear, and intermediate. But in proportion as higher and higher objectives are used, all the appearances are shown to be of circular form, the lines, for instance, being resolved into lines of circular pits.

I dare not make this letter too long, and therefore include in it only so much as bears on Surgeon-Major Biden's most interesting communication. It suffices, at the moment, to indicate that the surface of a glass slide may be eroded in a way to suggest the action of an acid, such as hydrofluoric acid, when no free acid is present; and that erosion may occur when the

glass is brought in contact with alkaline fluid, a colloid, and crystalline substances capable of assuming, in the presence of a colloid, spheroidal form.

I propose to state the results of this and other experiments, and some speculations suggested thereby, before the Royal Microscopical Society.

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### Echium Crossing

THE gardens of Madeira are remarkable for the neglect of native plants. This is due in part to indigenous indifference, and also to a preference for familiar forms amongst people who migrate hither from various regions, though chiefly to the temptation to test the facilities of growth and naturalisation in a moist and equable sub-tropical climate. Hence it is often easier to import species peculiar to Madeira than to find them in their native place; but none the less do these rocks abound with conspicuous examples of interesting genera.

I have cultivated for many years two large *echiums* upon the terraces of the Quinta do Valle, 300 feet above the sea, namely, *E. fastuosum*, the Madeiran littoral species, a perennial shrub 3 or 4 feet high, with hairy light green leaves and branching stems crowded with scorpioid racemes of light-blue flowers with white stamens. And secondly, *E. simplex*, the giant Canarian species maturing in Madeira in the second year. This remarkable plant has large, smooth, silvery leaves, and terminates its growth in one unbranched stem densely packed with folded flower-stalks bearing pure white blossoms, and forming a pyramid reaching sometimes 14 feet in height. *E. simplex* dies after flowering. The flowers in both species last from three to five weeks, and the unfolded flower-stalks measure 2 to 3 inches in length.

Until 1882 the two *echiums*, though growing together and having their scentless flowers freely visited by bees and insects for their abundant nectar, had remained distinct; but, in 1883, after introducing a swarm of Ligurian bees from England, I found that a cross-fertilisation had been effected, which has left me very few examples of *E. simplex*.

The hybrid *Echium* possesses the leaves of the giant plant, and the stem merely bifurcates or branches sparingly. The flowers are tinged light blue, and the perennial habit of *E. fastuosum* is expressed by a continual growth of the flower racemes, which, after flowering for two years, measure 26 inches in length, and are still unfolding. The seeds of this hybrid have not germinated.

I am now preparing to effect a cross between *E. simplex* and the handsome mountain *E. caudicans* of this island at my country residence, 2000 feet above the sea.

*E. caudicans* and *E. fastuosum* have frequently blended, producing plants less new in structure than in habit; but such hybrids have been quickly lost, either in sterility or reversion.

Madeira, January 26

MICHAEL GRABHAM

[This is an interesting case of the spontaneous appearance of a hybrid between two very distinct species. The occurrence of such hybrids is frequent in some genera, such as *Verbascum* and *Primula*, and gives systematic botanists much trouble. There is a striking picture of *Echium simplex* at Teneriffe, in the North Gallery at Kew, No. 23.—ED.]

### The Iridescent Clouds

THE coloured fringes and bows described by Mr. N. in Prof. C. Piazza Smyth's communication (p. 316) are clearly of a totally different character from the iridescent clouds that were so widely remarked in December. I take the "fringes and bows in circles" mentioned by him to be simply the same phenomenon of coloured circles that is so often seen around the moon, which goes by the name of a "corona"; and the reason why it is not easily seen around the sun, except by reflection in glass or water, is that the sun is too dazzling to look at directly. There is another phenomenon of coloured clouds which is probably also alluded to by Mr. N., and that is when thin clouds, usually cirrus, show interference colours, often very vividly; the positions of these colours evidently depending on the structure of the clouds, and being quite irregular with reference to the sun. The iridescent clouds recently observed no doubt owe their colour to the same cause, but the kind of cloud was evidently different, and the colours produced were much more striking. The clouds themselves were quite recognisable as