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Some Experimental Modifications of the Protoplasmic Surface.

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Experiments on *Nitella* carried out by one or both of us show a variety of changes in the protoplasmic surface.

Placed in distilled water for 2 or 3 days cells of *Nitella* lose their ability to produce action currents, apparently because something, which may for convenience be called *R*, is dissolved out.*

Pinching the cell and thereby forcing sap into the surface can restore irritability as can an electric current passing from the sap into the surface.

What is said of irritability applies in general to the potassium effect,† but with some differences: distilled water can remove the potassium effect before irritability is lost and the potassium effect may then be restored by an action current.

The water in which cells have been standing contains substances which, when concentrated by appropriate methods, can restore irritability and the potassium effect, or the potassium effect alone, according to the method of concentration.

A number of solutions can restore irritability, or the potassium effect or both, *e. g.*, NH_3 , NH_4Cl , tetraethyl ammonium chloride, guanidine, adrenaline, ephedrine, Solution A,‡ white of egg, milk, the blood of calves and of sheep, also human blood,** saliva, and urine.††

Where both effects are secured one is usually restored before the other and in some cases only one effect is obtainable. This indicates that irritability and the potassium effect are due to somewhat different causes.

Among the substances which have no restorative action are: urea, strychnine, brucine, codeine, veratrine, yohimbine, acetyl choline, aniline, toluidine, acetic acid, glycine, and guaiacol.

* For experiments with a chloroform-water emulsion see Hill, S. E., *Proc. Soc. Exp. Biol. and Med.*, 1934, **32**, 413.

† *i. e.*, the large P. D. observed on leading off from 0.01 M KCl to 0.01 M NaCl. *Cf.*, Osterhout, W. J. V., *J. Gen. Physiol.*, 1930, **13**, 715.

‡ For the composition of this see Osterhout, W. J. V., and Hill, S. E., *J. Gen. Physiol.*, 1933, **17**, 90.

** We employed the serum diluted 5 times with distilled water and containing enough oxalate to precipitate the calcium.

†† Used within 15 minutes after voiding.