MEMBRANE POTENTIALS AND COLLOIDAL BEHAVIOR.

REPLY TO THE NOTE BY PROFESSOR A. V. HILL.

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There is no real point of conflict between our views and those expressed by Professor Hill. The mere agreement of the figures for P.D., considered abstractly and apart from experimental conditions, is not a proof of the existence of a Donnan equilibrium. For example, in an experiment in which the protein were omitted altogether there would also be agreement of the P.D. values, for each would be zero; but no one would think of calling this agreement in itself a proof of the existence of a Donnan equilibrium.

The statement to which Hill has objected was not intended to be taken out of its context and used alone as a complete argument. The proof of the agreement of the P.D. values was a necessary step in testing the theory. It shows, as Hill has admitted, that the systems studied were in equilibrium. The fact that they could be in equilibrium, and still have different hydrogen or chloride ion concentrations on the opposite sides of the membrane, was by no means obvious, and required explanation. Donnan’s theory furnished this explanation; and it has been pointed out that the experiments are quantitatively in accord with other deductions from the theory.

Since Donnan’s theory does explain the facts, and no other theory has been proposed which can explain them in the same quantitative manner, it seems necessary to retain Loeb’s original conclusion that his data have proved the applicability of Donnan’s theory to these experiments with proteins.