

## XVII. NEUROPHYSIOLOGY\*

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### A. MEMBRANE PROPERTIES

As we indicated in the Quarterly Progress Report of April 15, 1957, page 142, we have devised several species of operational amplifier for examining the nonlinear elements in nerve membrane of vertebrates, where the technical problem of isolating a patch of membrane is very great. We have learned, since submitting a paper to Nature, that Dr. Tasaki has succeeded, probably earlier and with more extensive records, in doing the same experiment that we tried. Nonetheless, we have approached the problem with a bias different from his and our results reflect the difference. It now seems that the active inward current observed on clamping a node of Ranvier to some level of depolarization is turned off extremely sharply by a process that is related to the integral of that current, as well as to the voltage change in the membrane. Furthermore, this active inward-current transient, which lasts no longer than the rising phase of the action potential, may not be followed by an active outward current, suggesting that the membrane comes to its original impedance but at a new potential. This unique observation upholds Hodgkin and Huxley on the independence of the elements responsible for active inward and outward current flows – but indicates that the "inactivation," or switching off, of the inward current is strongly coupled to that current itself. We are not ready for a quantitative statement yet.

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