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<i>The American Association for the Advancement of Science:</i>	
<i>The Stimulus-Neural Control of Behavior During and After Learning:</i> PROFESSOR WALTER S. HUNTER .....	145
<i>The Biology of Heavy Water:</i> PROFESSOR GILBERT N. LEWIS .....	151
<i>Scientific Events:</i>	
<i>The Emergency Committee in Aid of Displaced German Scholars; Chemical Abstracts; The American Academy of Tropical Medicine. Recent Deaths</i> .....	153
<i>Scientific Notes and News</i> .....	156
<i>Discussion:</i>	
<i>The Biochemistry of Anesthesia:</i> DR. F. F. NORD. <i>Naming Hydrogen Isotopes:</i> WILLIS A. BOUGHTON. <i>The Neutron:</i> DR. ARTHUR BRAMLEY. <i>Oxygen as an Accelerator in the Growth of Empusa on Flies:</i> PROFESSOR WM. A. HESTAND. <i>The Stimulative Action of Yeast Extract in the Respiration of Rhizobium:</i> DR. R. H. WALKER .....	159
<i>Societies and Meetings:</i>	
<i>The International Geographical Congress of 1934:</i> W. L. G. JOERG .....	161

<i>Scientific Apparatus and Laboratory Methods:</i>	
<i>The Demonstration of Nervous Systems by Maceration of Whole Animals:</i> WILLIAM S. CORNWELL. <i>The Absorption of Methylene Blue by the Nephridium of the Earthworm:</i> PROFESSOR ELBERT C. COLE .....	162
<i>Special Articles:</i>	
<i>Alternating Current Conductance and Direct Current Excitation of Nerve:</i> DR. KENNETH S. COLE. <i>The Effects of Cigarette Smoking upon the Blood Sugar:</i> PROFESSOR HOWARD W. HAGGARD and LEON A. GREENBERG .....	164
<i>Science News</i> .....	6

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## THE STIMULUS-NEURAL CONTROL OF BEHAVIOR DURING AND AFTER LEARNING<sup>1</sup>

By Professor WALTER S. HUNTER

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IN the present paper I wish to discuss two classical psychological theories dealing with certain aspects of the learning process and to evaluate them in terms of experimentation. The first of these theories is to the effect that "consciousness" gradually disappears during learning, so that the completely learned response is made automatically and "unconsciously." An individual, for example, is said to be acutely aware of his piano playing in the beginning of the formation of this habit; but as learning proceeds, the playing is done more and more automatically until finally the subject can play all but "unconsciously," while giving his attention to other things and while simultaneously engaging in other activities. The second theory that

I wish to discuss also deals with changes that are alleged to go on during the process of habit-formation. If we may continue to use the illustration of piano playing, this theory holds that originally such a serial action is controlled partly by visual and auditory stimuli, but that after playing has become perfected the stimulus control is turned over to proprioception. At this stage the stimuli from one arm-finger movement are adequate to produce the next arm-finger movement which produces new proprioceptive stimuli to arouse the next response, and so on. Thus the theory holds that the control of a perfected serial action is proprioceptive and that the process of the formation of such a habit involves, among other things, a shift from exteroceptive to proprioceptive control, making possible the automatic character of the final response. We shall first discuss the theory

<sup>1</sup> Address of the vice-president and chairman of Section I—Psychology, American Association for the Advancement of Science, Boston, December 29, 1933.

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