as neutrality is approached. Study of the stability of the protein molecule with the analytical ultracentrifuge demonstrates that it fragments at the same pH (10.1-10.2) at which immediate inactivation is observed. This molecular disintegration is more complete than the one seen in strongly acid solutions; the largest piece of the original protein that can be photographed in strong alkali has a sedimentation constant of only $S_{20}^{\circ} = \text{ca } 30 \times 10^{-13}$.

Below pH 10 the sedimentation constant of the papilloma protein molecule is not measurably changed nor is the molecular homogeneity visibly diminished even when solutions are kept until all virus activity has been lost. These solutions thus contain non-infectious protein material consisting of only slightly altered papilloma protein molecules. The biological properties of such non-infectious derivatives of the papilloma virus protein are being studied.

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Static and Kinetic Conditioned Reactions.*

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Former experiments of Spiegel[1, 2] and his coworkers (Aronson,[3] Price[4] and Spiegel) indicated that labyrinthine impulses may reach the cerebral cortex.

In order to investigate what part the connections of the labyrinth with higher centers play in the perception of position and motion, the study of conditioned reactions seemed promising. A special position table was built allowing dogs to be brought into any desired position. The dogs were slowly rotated from a sloping position through the horizontal plane into another oblique position. When the horizontal plane was passed, an electric shock (unconditioned stimulus) was applied to a leg, during the motion in one direction only; the defense reaction and the change in respiration were recorded. First, only conditioned reactions upon the horizontal position appeared. Later the animals learned also to differentiate be-

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1 Spiegel, E., *J. Nerv. and Ment. Dis.*, 1932, **75**, 504.

2 Spiegel, E., *Arch. Neur. and Psych.*, 1934, **31**, 469.

3 Aronson, L., *J. Nerv. and Ment. Dis.*, 1933, **78**, 250.

4 Price, J., and Spiegel, E. In press.

tween the direction of the motion accompanied by the unconditioned stimulus in the horizontal position (up or downwards) and the motion in the opposite direction during which the unconditioned stimulus was omitted. Thus static as well as kinetic conditioned reactions could be developed. These reactions appeared in the majority of our observations before the horizontal position was reached; in other words, they were mainly anticipatory in nature. In these cases the first appearance of conditioned reactions could be observed without omitting the unconditioned stimulus. Conditioned reactions in exactly the horizontal position were, however, also observed. The inference that we have here to do with conditioned reactions is based upon the fact that these reactions did not exist before the animals were trained, and that they showed typical characteristics of conditioned reactions, such as inhibition by fortuitous external stimuli, or extinction after repeated application of the conditioned stimulus without reinforcement by the unconditioned one. The strength of these conditioned reactions may sometimes exceed that of the unconditioned defense reflexes.

The effect of various peripheral and central lesions (elimination of labyrinthine and other afferent impulses, destruction of cortical areas) upon these conditioned reactions will be reported later.

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Sugar Alcohols VIII. The Oxidative Specificity of *Acetobacter Suboxydans.*

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Neuberg and Hoffmann[1] have observed that cultures of *Acetobacter suboxydans* in killed yeast medium containing 1% of glycerin will quantitatively oxidize the glycerin to dihydroxyacetone. In our studies[2] on the relationship between chemical constitution and utilization by bacteria of the sugar alcohols we became interested in determining whether the *Acetobacter suboxydans* oxidized specifically the secondary alcohol group in glycerin or, if its oxidative power was general for secondary alcohols.

1 Neuberg, C., and Hoffmann, E., *Biochem. Z.*, 1935, **279**, 318.

2 Dozois, K. P., Hachtel, F., Carr, C. J., and Krantz, J. C., Jr., *J. Bact.*, 1935, **30**, 190.