$$\frac{\text{conc. hemoglobin}}{\text{conc. oxyhemoglobin}} = \text{const.},$$

which is a uniform result at constant pressure and temperature, obtained by four different methods. It is necessary in closing to call attention to the fact that in all experiments the gas pressures were relatively high and that under these conditions one is working in the neighborhood of maximum saturation of hemoglobin with CO or oxygen.

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The effects of stimulation of the labyrinth of the ear in the living animal. (With demonstration.)

By J. GORDON WILSON and F. H. PIKE.

It may be shown that if one sits in a moving railway train and observes objects out of the window, they may seem to be moving in a direction opposite to that of the train. If one notices the movements of one's eyes in observing these objects, it will be seen that the eyes move slowly backward, opposite to the direction in which the train is going, and more quickly return to the median position, the quick movement of the eye being in the same direction as the movement of the train. We may express this relation between eye-movements and apparent movement of external objects or real passive movement of the one's own body by the statement that the apparent movement of external objects is in the direction of the slow deviation of the eyes, and the real passive movement of one's body is in the direction of the quick movement of the eyes. The otic labyrinth is not involved in these reactions. We may extend this relationship still further and say that under whatever conditions of this kind, with one possible exception,¹ one may be placed the movement, either real or apparent, of external objects is in the direction of the slow deviation of the eyes, and passive movement, either real or apparent, of one's own body is in the direction of the quick movement of the eyes. While many of the facts have long been known, we have not seen any general expression of the relationships in terms of the slow and quick eye movements.

¹ Holt, E. B., *Psychological Review*, 1909, XVI, p. 388.

Stimulation of the otic labyrinth in a number of different ways, including rotation about a particular axis of the head, evokes movements of the eyes, and sensations of apparent movement of external objects or of one's own body, or both. The movement of the eyes is slow to the stimulated side if a weak stimulus is used, and slow to the opposite side if a strong stimulus is applied.¹ Here also the real or apparent movement of external objects is in the direction of the slow deviation of the eyes, and the apparent passive movement of the body, or the real passive movement, if rotation occurs, is in the direction of the quick movement of the eyes, if it occurs. This quick movement of the eyes is lacking in some lower forms, such as the turtle.

When, by any means of labyrinthine stimulation, sensation of apparent (passive) movement of the body is produced in an animal at rest, the active compensatory movement of the animal is opposite in direction to that of the apparent movement of the body, and is in the direction of the slow movement of the eyes. This is the basis of the explanation of the fact, observed clinically, that patients with labyrinthine lesions fall or make other body movements in the direction of the slow deviation of the eyes, a relationship not previously sufficiently emphasized.

In electrical stimulation of the labyrinth by the direct current, the animal (turtle) moves toward the side on which the anode is placed. Reversing the direction of the current changes the direction of movement of the animal.

We may give a description of the passive movements, either real or apparent, and the active or compensatory movements of the body, under these various conditions, in terms of eye movements by the statement that the passive movements are in the direction of the quick movement of the eyes, and the active compensatory movements are in the direction of the slow deviation of the eyes.

¹ Wilson and Pike, *Phil. Trans. Royal Society, London, Series B*, 1912, Vol. 203, p. 135.