rate is a function of the absorption coefficient but the function is not a linear one. The concentrations employed are dilute (below 0.0006 M) at which the concentrations are expected to be about equal to activities.

The azure B which penetrates the vacuole is capable of raising the pH value of the sap, and has the same absorption spectrum as the azure B outside.

The importance of these results is in showing that if the dye base has a high enough absorption coefficient and if it is capable of being changed into the dye salt by the sap, it will pass into the acid vacuolar sap rapidly in spite of the fact that the dye is strongly basic. These results support the author's theory of multiple absorption coefficients.[1]

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Influence of Carbon Dioxide upon Hydrogen Ion Concentration of Frog's Skeletal Muscle.

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The anterior tibial muscles of *Rana pipiens* were removed, sprinkled with powdered quinhydrone, and mounted between a platinum plate electrode and an agar-KCl bridge connected with a saturated KCl-calomel half-cell.[1] The muscle and electrodes were inserted in a glass chamber through which known gas mixtures could be flushed. The potential differences were read in the usual way by means of a Type K potentiometer and galvanometer.

After the initial rapid acid shift, muscle macerated with quinhydrone slowly became more and more acid in 5% CO_2 in O_2. Intact muscle in 5% CO_2 in O_2 shifts rapidly acid in the first few minutes' exposure. This reaction is followed by a small alkaline drift, succeeded by a plateau which is maintained for 20 to 40 minutes. The secondary alkaline drift is attributed to the mobilization of base which is presumably a less rapid process than the inward diffusion of CO_2. The plateau usually terminated in an acid drift.

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[1] Benson, C. C., *J. Biol. Chem.*, 1928, **78**, 583.

If the plateau values are assumed to be the pH of the tissue at definite CO_2 tensions and if these are compared with the hydrogen ion concentrations calculated from CO_2 combining power data,[2] the agreement is found to be good between 36 and 100 mm. Hg. CO_2 tensions. Above this range the electrometric method gives readings 0.1 to 0.2 pH higher. Below 36 mm. Hg. CO_2 tension, plateau values were not obtained in one hour.

In the presence of tank N_2 or tank O_2 the pH of resting muscle became progressively more acid at a decreasingly rapid rate. Apparently at alkaline reactions (pH 7.3 to 8.0) pure O_2 cannot prevent acid production, although the tissue reaction is maintained at a constant level in the presence of 5% CO_2 in O_2. The acid shift in the presence of O_2 could be delayed and markedly decreased although it is not absent in muscles poisoned with iodoacetic acid. The lactic acid relations of these muscles are being investigated.

In the presence of tank CO_2 the initial rapid acid shift was succeeded by a prolonged alkaline drift which is probably due to phosphagen destruction.[3]

Muscles exposed to 150 mm. Hg. CO_2 tension for 5 hours showed a more alkaline plateau than the matched muscles exposed to the same CO_2 tension for 1 hour. This is in agreement with the CO_2 dissociation data obtained in this laboratory.[2]

Up to at least 45 minutes the pH of muscles in CO_2/O_2 gas mixtures could usually be reversed to or near the original level by flushing O_2 through the chamber.

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Nuclear Configuration of Thalamus of Macacus Rhesus.

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The thalamic nuclei of the rat, armadillo, Tupaia, Carnivora, *Lemur catta,* and Cercopithecus have been identified from cell stained preparations by various authors. These studies are of interest because they form a basis for a comparative study of the thalamus, because a knowledge of the nuclei is necessary for an

[2] Root, W. S., *J. Cell. and Comp. Physiol.*, 1933, **3**, 101.

[3] Lipmann, F., and Meyerhof, O., *Biochem. Z.*, 1930, **227**, 84.