

A SIMPLE METHOD FOR DETERMINING VARIATIONS IN
THE HYDROGEN-ION CONCENTRATION OF
THE BLOOD *

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Human blood, as it exists in the body, is faintly alkaline in reaction: that is, it has a hydrogen-ion concentration only slightly less than that of pure water, and this degree of alkalinity tends to be maintained even when considerable quantities of acid are produced within the body, or are introduced from without.

To a relative increase in the acid content of the body, the term "acidosis" is applied. Acidosis, conceivably, may be brought about in other ways than those just mentioned—for example, by decreased excretion of acid or by loss of bases from the body. The condition has been recognized in a variety of ways, such as increase in the ammonia coefficient of the urine, decrease of carbon dioxide tension in the alveolar air, the finding of abnormal acids in the blood and urine, by increased alkali tolerance and by diminished titratable alkalinity of the blood serum, by changes in the hemoglobin dissociation curve and by actual determination of the hydrogen-ion concentration of the blood. Production of ammonia, lowering of carbon dioxide tension in the alveolar air and in the blood, and excretion of acids are all part of the compensatory mechanism of the body, and it is only when this mechanism becomes overtaxed that appreciable changes in the hydrogen-ion concentration of the blood occur. The blood itself, owing chiefly to the "buffer" action of the carbonates of the plasma and phosphates of the corpuscles, can take up considerable amounts of acid or alkali without much change in its reaction. It is principally due to the work of L. J. Henderson¹ and his collaborators that we have a clear conception of the mode of action of these "buffers." An appreciable change in the hydrogen ion concentration of the blood indicates a failure of the protective mechanism and the presence of a significant acidosis. Herein lies the peculiar value of a determination of the hydrogen-ion concentration of the blood.

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1. For a full discussion, see Henderson, L. J.: *Ergebn. d. Physiol.*, 1909, viii, 298.