tal violet (1 per cent of each in 50 per cent alcohol), which we have found to be highly antagonistic to *B. acidophilus* (inhibitory in dilutions of 10 to 15 million), we were able to decrease materially the overgrowth of this organism and to improve greatly the hygienic condition of the mouth. From clinical evidence so far obtained it appears that this procedure may be of considerable practical value in the control of dental caries.

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Continuous recording changes in hydrogen ion concentration of circulating blood: The relation to respiration.

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In the study of the chemical regulation of respiration a need for a continuous method of recording changes in the hydrogen ion concentration of the circulating arterial and venous blood was felt. Such a method has been developed.

By means of a specially devised electrode vessel, a manganese dioxide electrode was placed in the circulating blood. The chain was closed with a non-polarizable electrode, and the E. M. F. recorded potentiometrically on smoked paper by means of a writing point attached to the hard rubber drum of a Leeds and Northrup type K potentiometer.

The continuity of the method, the facility of recording changes in C_{H+}, the amount of data obtainable from single animals, and the possibility of recording synchronous changes in C_{H+} in the arterial and venous blood along with changes in pulmonary ventilation, oxygen consumption, blood pressure, etc., are advantages which make the method extremely valuable. In experiments so far performed the method has shown characteristic changes in the C_{H+} of the blood with various procedures.

The administration of CO_2 eliciting increased pulmonary ventilation was accompanied by a sharp rise in the C_{H+} of the arterial blood, followed by a slower fall in C_{H+} during recovery.

The intravenous injection of $NaHCO_3$ produced a sudden fall in the C_{H+} of the arterial blood, followed by a slow return to normal. Though the changes in C_{H+} were large they were unaccompanied by changes in pulmonary ventilation. See Figure 1.

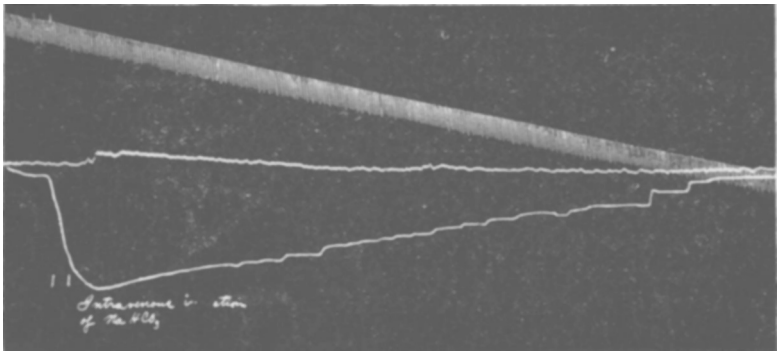

FIG. 1.

Occlusion and de-occlusion of the trachea produced typical changes in blood pressure and respiration. The C_{H+} record resembled in detail the form of the blood pressure record. A record of such an experiment is shown in Figure 2.

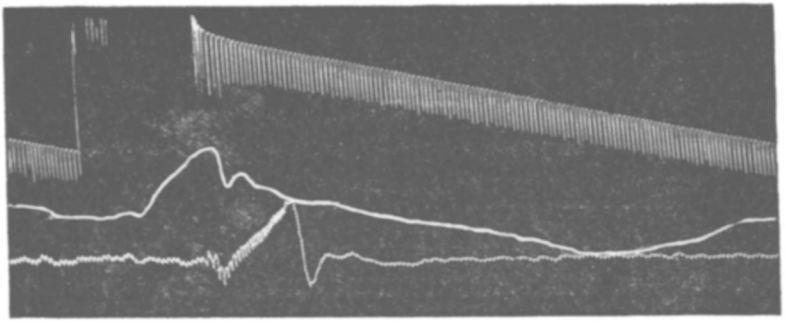

FIG. 2.

The administration of rarefied air eliciting increased pulmonary ventilation was accompanied by a decrease in the C_{H+} of the arterial blood. Subsequent administration of room air was followed by a further short but sudden decrease in C_{H+}, giving way to an increased C_{H+}.

Spontaneously occurring periodic respiration associated with

periodic changes in blood pressure was accompanied by periodic changes in the C_{H+} of the arterial blood. See Figure 3.

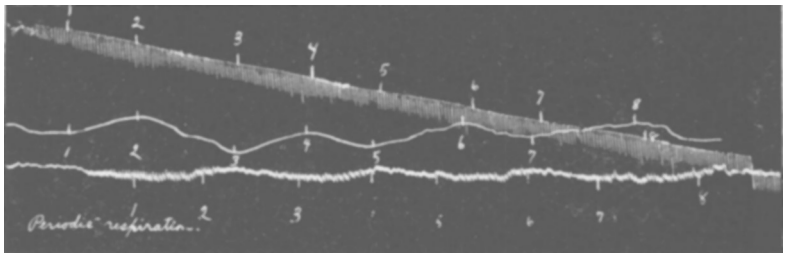

FIG. 3.

The intravenous injection of NaCN produced a decrease, an increase, a decrease and a final increase in the C_{H+} of the arterial blood associated respectively with an increase, a decrease, an increase and a decrease in pulmonary ventilation.

Moderate hemorrhage elicited a decreased C_{H+} accompanied by an increased pulmonary ventilation. Subsequent injection of gum-saline solution decreased pulmonary ventilation and increased the C_{H+} of the blood.

Severe hemorrhage elicited a primary decrease in C_{H+} which suddenly gave way to an increasing C_{H+}. Injection of gum-saline solution during the increasing C_{H+} resulted in a decreased pulmonary ventilation and a decrease in C_{H+} to normal values.

Though the injection of gum-saline solution following severe hemorrhage eventually led to a lowering of the C_{H+} of the blood, it was followed for a minute or more by an increasing C_{H+} produced by the preceding anemia. Such an increasing C_{H+} was associated with a reduction, almost a cessation of pulmonary ventilation. It seems highly probable that the tissues were turning alkaline while the blood was still turning acid.

Simultaneous records of C_{H+} changes in the arterial and venous blood showed more abrupt but longer and greater changes in the arterial than in the venous blood.

The results uphold in general our view that there is no constant relation between the composition of the blood and pulmonary ventilation; that the metabolism of the respiratory center itself is an important factor controlling pulmonary ventilation. This is indicated by changes in pulmonary ventilation, accompanying changes in the volume flow of blood independent of change or direction of change in the composition of the blood.