

to excessive appearance of lactic acid in the blood, samples of blood were taken from the portal vein, hepatic vein, and femoral artery. Two sets of samples were taken at 10 minute intervals to determine the normal acidities, and 2 sets of samples were taken at 10 minute intervals after each injection of sodium cyanide. The blood samples were stored on ice in special pH tubes designed by Dr. Gesell, and analyzed immediately following the experiment by the quinhydrone method.

Constant results on 12 curves showed that: 1. Normally portal blood was more acid than hepatic blood. 2. Normally arterial blood was more acid than hepatic blood. 3. Portal blood became markedly more acid after each injection of sodium cyanide, then slowly returned towards normal again. 4. Arterial blood became more alkaline after each injection of sodium cyanide, then slowly returned towards normal again. 5. Hepatic blood became slowly but steadily more acid through the entire experiment. The absence of a marked rise in acidity of the hepatic blood could not be explained by the increased alkalinity of the arterial blood.

This flattening of the hepatic acidity curve may, therefore, be due to the fact that a portion of the surcharge of lactic acid causing the abrupt acid rise of the portal blood is reconverted by the liver into the precursor state (glycogen), with the liberation of free base. It is, therefore, suggested that the reversion of lactic acid into glycogen by the liver is a factor in the maintenance of the acid-base control of the body.

4543

Effect of Low Oxygen on Muscular Contraction.

R. R. GETTEL AND L. F. KNOEPP. (Introduced by Robert Gesell.)

From the Department of Physiology, University of Michigan.

This study deals with effects of lowered alveolar oxygen on muscular activity of the dog. Twin rebreathing tanks were used containing room air and low oxygen mixtures respectively. Supermaximal stimuli were applied with an automatic stimulator to the peripheral end of the sartorius muscle whose motor nerve was severed to insure direct muscular stimulation. The results of 3-5% mixtures in most animals revealed increased respiration with a corresponding increase of amplitude of muscular response, this passing into a gradual decline to nearly zero with the continuing but de-

clining hyperpnea. The subsequent administration of room air gave a decided rise of muscular activity to a nearly normal level of contraction accompanied by the usual respiratory changes. When the condition of the animal became more critical, post administration level was gradually lowered below previous starting levels. In some animals both the muscular and respiratory responses were well augmented over long periods of administration of low oxygen mixtures. Other animals gave no initial rise in muscular activity. The muscular response gradually decreased until room air was administered though the usual hyperpnea prevailed.

It is suggested that the augmented respiratory movements of lowered alveolar oxygen in most of the observations may be partly accounted for by peripheral chemical changes occurring within the respiratory muscles themselves. In other cases the hyperpnea was maintained despite decreased muscular response to direct stimulation.

4544

Effects of Low Alveolar Oxygen and High Alveolar Carbon Dioxide on Rate of Flow of Cerebro-Spinal Fluid of the Dog.

HAYDEN NICHOLSON. (Introduced by Robert Gesell.)

From the Department of Physiology, University of Michigan.

The fluid was obtained either by placing a cannula in the *cisterna magna* or by lumbar puncture, in most cases the former method being used. The rate of flow was recorded by the drop method.

High percentages of carbon dioxide in room air (8-14%) invariably increased the rate of flow, in one case reaching 1000%. This increase appeared promptly on administration of the gas, rapidly increased to a maximum, and persisted practically undiminished up to the readministration of room air, when the flow quickly returned to the preadministrational rate.

The effects of low oxygen are somewhat more complex. Low oxygen almost invariably caused a decrease in flow, followed, after prolonged administration, by a gradual increase, approaching, but practically never reaching, the preadministrational rate. The initial decrease in flow was usually preceded by a slight and very brief increase. When room air was again administered there was usually a brief but distinct decrease in flow, followed by a marked increase above the rate during administration of low oxygen and approaching the preadministrational rate.