WHEREAS absolute war necessity and shortage of wheat for export has required that, in the exchange milling of his own wheat, the farmer be restricted to a supply of flour equal to his household needs and those of his farm employees for 30 days; and

WHEREAS the present crop prospect seems to make this necessity less acute, be it

Resolved, That the Food Administration be requested to remove this restriction as early as conditions will allow.

12. The committee was of the opinion that groundrock phosphate and acid phosphate should have the same freight classification as agricultural lime, taking an increased freight rate of one cent a hundred pounds, instead of an increase of 25 per cent., as applied to general commodities, and it was directed that request be made to the Director General of Railroads that the desired classification be granted.

13 Resolutions were passed by the committee favoring:

(1) Regulation of the use of mill feeds by the mixers of proprietary feeds, so as to secure to the dairyman the benefits of the efforts of the Food Administration to lower the price of mill feeds.

(2) Regulation of the manufactories of mixed feeds.

(3) Equitable distribution of mill feeds.

(4) Use of sugar substitutes in ice cream manufactories.

(5) The disallowance of sugar to manufacturers of ice cream failing to comply with reasonable standards of butter fat and solids not fat.

(6) Purchase of dairy products by Army and Navy.

(7) Expression of appreciation to the Food Administration for the publicity given to the economic value of milk.

(8) Recommendation to the government to extend the standardization of dairy and other agricultural products.

(9) Commendation to the market report service by the Bureau of Markets.

The subcommittee on dairy products presented to the tariff department of the Railroad Administration an explanation of the hardship upon the small shipper of milk and cream, because of the minimum charge of 50 cents on any individual shipment.

The regulation was promptly modified so as to nullify the application of a minimum charge.

SPECIAL ARTICLES

THE RELATION OF THE RATE OF BLOOD FLOW THROUGH THE MEDULLA OBLONGATA TO THE AMPLITUDE AND FREQUENCY OF RESPIRATORY MOVEMENTS

ALTHOUGH the relation to respiratory movements of the changing concentrations of carbon dioxide in the blood, and of afferent nerve impulses from the lungs to the medulla oblongata has long been recognized, a third factor entering into the equation, *i. e.*, the rate of blood flow through the medulla oblongata, has received but little consideration. Haldane[1] mentions the rate of blood flow as one of the factors, but the emphasis, as is natural in pathology, is placed mainly on the general disturbances of the circulation.

Some years ago I repeated Sir Astley Cooper's old experiment of ligating permanently both common carotid and both vertebral arteries close to their origin in dogs. The experiments were done aseptically and the animals allowed to live. The chemical analyses of the brains of these animals were published by Waldemar Kock and S. A. Mann.[2] The general results of the ligation were similar in all essential respects to those noted by Leonard Hill.[3] Hill remarks that in one dog, there was preliminary acceleration of the respiration following the ligation of the four arteries.

I noticed respiratory disturbances in some dogs, and one in particular attracted my at-

[1] "Text Book of General Pathology," edited by M. S. Pembrey and James Ritchie, London and New York, 1913, chapter on Respiration; Organism and Environment as Illustrated by the Physiology of Breathing, New Haven, 1917, pp. 5–6.

[2] Mott's "Archives of Neurology and Psychiatry from the Pathological Laboratory of the London County Asylums," London, 1909, IV., pp. 211–12; Studies from the Rockefeller Institute for Medical Research, X., 1910, p. 38 of the reprint.

[3] "Physiology and Pathology of the Cerebral Circulation," London, 1896, p. 123.

tention. When lying quietly at rest, there was no apparent change in the respiration. No graphic records or measurements of the minute volume were taken. But when the dog was urged to rise and walk about, it at once began to pant violently. On lying down again, the panting ceased. Other dogs with normal cerebral circulation did not pant except after much greater exertion.

Hill states that none of his dogs died after ligation of the four cerebral arteries, but he does not mention the age of his dogs. I have found that vigorous, full-grown dogs survive the ligation indefinitely, but half-grown pups and old dogs usually succumb within twenty-four hours. I have seen half-grown pups lie unconscious for several hours, sometimes panting violently, and sometimes making ineffectual movements of locomotion with the fore limbs. Attempts to rouse them from this state were unsuccessful, and they were usually found dead the next morning.

Hill remarks that there must be a certain blood pressure resulting in the flow of a certain amount of blood through the medulla oblongata in order to provoke respiration. My experience tends to confirm Hill's conclusion. It is a striking thing to see an animal with failing respiration at a low blood pressure improve rapidly when the pressure is artificially increased.

In the dogs with restricted cerebral circulation, there was no apparent deficiency in the rest of the systemic circulation in those which recovered. Nor is there any reason to suppose that there was any change in the blood which would decrease its power of carrying either oxygen or carbon dioxide. It does not seem improbable that, in the dog with the marked respiratory disturbance, one would have found a somewhat greater concentration of oxygen and a somewhat lower concentration of carbon dioxide in the blood than in dogs with normal circulation. The condition in the medullary center itself, in which carbon dioxide might tend to accumulate in somewhat greater concentration than usual, would seem sufficient to account for the dyspnœa on moving about. A lower concentration of carbon dioxide in the blood would be the natural result of the forced respiration. In cases of shock resulting from abdominal wounds on the battle field, in which there was no deficiency of the systemic circulation prior to the wound, it does not seem necessary to assume the production of any large quantities of acid in the body to account for the lower concentration of carbon dioxide in the blood of such patients. It seems sufficient to suppose that, as the systemic blood pressure falls progressively lower, there would be a deficient blood supply to the respiratory mechanism in the medulla oblongata. The natural result would be an increase in the volume of respiration, and a decrease in the concentration of carbon dioxide in the blood. This would not in itself be a sufficient reason for postulating acidosis as a causative factor in the early stages of shock. Whatever acid might accumulate in the tissues might result, as Haldane[4] suggests, from the deficient supply of oxygen to the tissues.

F. H. Pike

The Department of Physiology,
Columbia University

On the Hydrolysis of Proteins in the Presence of Extraneous Materials and on the Origin and Nature of the "Humin" of a Protein Hydrolysate

In a recent paper McHargue[1] attempts to show that the nitrogen distribution of casein is not appreciably altered when hydrolyzed in the presence of five times its weight of starch providing that the hydrolysis is continued for only 12–15 hours. McHargue reaches a conclusion which is decidedly at variance with that reached by myself[2] and by Hart and Sure,[3] *i. e.*, that the presence of carbohydrates seriously vitiates the nitrogen distributions of a Van Slyke analysis and he explains the difference in the findings by his shorter hydrolysis. However, he makes several astonishing

[1] J. S. McHargue, *J. Agr. Res.*, Vol. 12, pp. 1–7 (1918).

[2] R. A. Gortner, *J. Biol. Chem.*, Vol. 26, pp. 177–204 (1916).

[3] E. B. Hart and B. Sure, *J. Biol. Chem.*, Vol. 28, pp. 241–49 (1916).

[4] *Loc. cit.*