100 mg of sulfanilamide daily. Treatment was started 2 hours after inoculation. The other 3 guinea pigs, used as controls, were not treated. After 30 days the 12 animals were killed, the gross lesions noted and cultures made from livers and spleens.

The spleens of the untreated guinea pigs were, in most cases, large and nodular. The spleens of the 6 treated animals appeared normal on gross examination and their average weight was 0.87 g. The average weight of 5 normal guinea pigs' spleens was 0.98 g. The average weight of the spleens from the 6 untreated guinea pigs was 1.54 g. During the 30-day period the loss of weight of the untreated animals was somewhat greater than that of the treated animals. Cultures from the spleen and liver of the treated guinea pigs were negative while cultures of Brucella were obtained from all of the untreated animals.

From these results it is apparent that the oral treatment of Brucella infections in guinea pigs with *p*-aminobenzene sulfonamide is effective in preventing a generalized infection when treatment is begun immediately after infection. It appears from these experiments that most or all of the organisms are destroyed before any extensive invasion can take place or that the sulfanilamide inhibits the multiplication of the organisms in the tissues.

The therapeutic effect of *p*-aminobenzene sulfonamide in Brucella-infected guinea pigs is under investigation.

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Effect of Sodium Citrate and Sodium Bicarbonate on Ethyl Alcohol Acidosis.

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It has been shown by Himwich, *et al.*,[1] that an acidosis follows the ingestion of large quantities of ethyl alcohol. This paper reports the action of sodium citrate and sodium bicarbonate on the changes in alkaline reserve and blood lactic acid resulting from large doses of ethyl alcohol in dogs.

[1] Himwich, H. E., Nahum, L. H., Rakieten, N., Fazekas, J. F., DuBois, D., and Gildes, E. F., *J. Am. Med. Assn.*, 1933, **100**, 651.

The dogs were given orally 5 g per kg of ethyl alcohol diluted to 20% with water. In 12 control experiments, determinations of alcohol,[2] carbon dioxide combining capacity,[3] and lactic acid[4] were carried out on arterial blood before and at 2-hour intervals for 10 to 16 hours, and in 4 experiments at the end of 24 hours after the alcohol administration. Similar blood analysis on the dogs to receive the alkalizing salts were carried out for 6-10 hours after the alcohol administration, at which time sodium citrate or sodium bicarbonate was given. The observations were then continued for the subsequent 4 to 8 hours, and at the end of 24 hours. In 5 experiments, sodium citrate was given orally in a dosage of 0.15 g per kg, and in 2 experiments sodium bicarbonate 0.45 g per kg.

A significant degree of acidosis was observed. It was noted that 6-10 hours following the alcohol ingestion, the carbon dioxide capacity was decreased on the average by 4-5 volumes %, but returned to the original level after 24 hours. Blood lactic acid increased during the same time interval by an average of 8 mg % or approximately 50%; even after 24 hours it was still 3.5 mg % above the average starting value. The blood alcohol had decreased during this period from about 0.6% to approximately 0.1%. Alkalizing salts strikingly reduced the elevated blood lactic acid. Within 2-4 hours after sodium citrate was given, the lactic acid decreased to or below its original value and so continued during the remainder of the experiment. The effect of sodium bicarbonate was more prompt and marked, the lactic acid decreasing within 4 hours to 10 mg % below the average control level. After 24 hours it was still 8 mg % below the average control level for animals receiving alcohol but no sodium bicarbonate. The blood alcohol was approximately 0.45% at the time the sodium bicarbonate was given. The reduced carbon dioxide capacity was elevated within 1 to 2 hours by the sodium citrate and sodium bicarbonate to approximately the original level or slightly above. (The effect of sodium citrate is summarized in Fig. 1) Sodium citrate and sodium bicarbonate had no influence upon the rate of disappearance of ethyl alcohol from the blood.

The effect of alkalizing salts in restoring the normal blood lactic acid is particularly significant. It seems probable that this may be accomplished by facilitating the conversion of lactic acid to glycogen by the liver. Since an alkalosis will itself cause a rise in blood

[2] Harger, R. N., *J. Lab. and Clin. Med.*, 1935, **20**, 746.

[3] Van Slyke, D. D., and Neill, J. M., *J. Biol. Chem.*, 1924, **61**, 523.

[4] Friedmann, T. E., Cotonio, M., Shaffer, P. A., *J. Biol. Chem.*, 1927, **73**, 335.

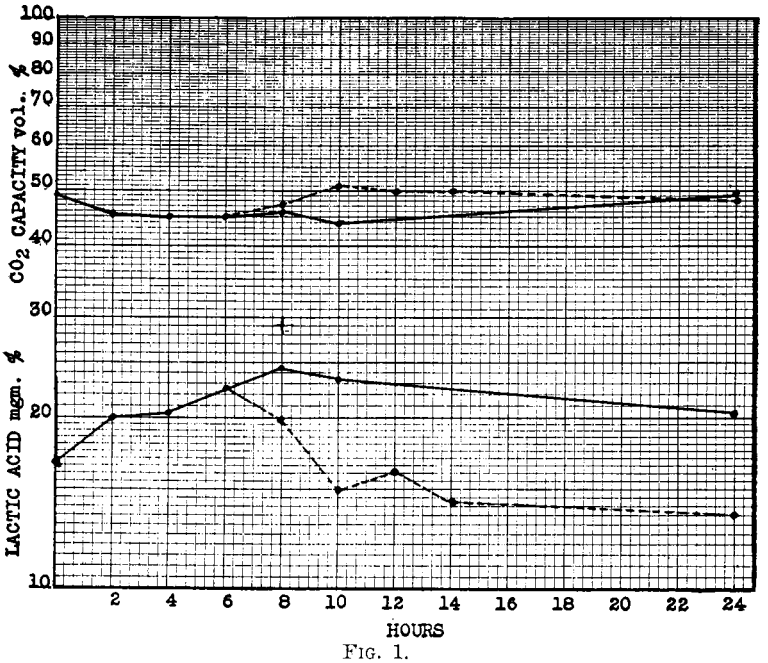

FIG. 1.

Effect of Sodium Citrate on Alcohol Acidosis.

Changes in blood lactic acid and plasma CO_2 capacity are plotted on semi-logarithmic paper.

———— Effect of alcohol 5 g per kg. Average of 12 experiments for 6-10 hr and 4 experiments at 24 hr.

- - - - - - - Effect of sodium citrate 0.15 g per kg on the alcohol acidosis. Average of 5 experiments.

lactic acid,[5] only minimal amounts of alkali were given. The alkaline reserve was promptly increased. After prolonged alcoholic intoxication with some depletion of body base, this would be even more important. Thus the administration of sodium citrate or sodium bicarbonate in the treatment of the acidosis following large amounts of alcohol is a rational procedure.

Summary. Alcohol given in doses of 5 g per kg to dogs resulted in a decrease in carbon dioxide-combining capacity, and a prolonged elevation of blood lactic acid. Sodium citrate or sodium bicarbonate in the dosages used restored the alkaline reserve to approximately the normal level, and lowered the blood lactic acid below its initial value even in the presence of a moderately high blood alcohol concentration. Sodium citrate and sodium bicarbonate had no effect upon the rate of disappearance of alcohol from the blood.

[5] Macleod, J. J. R., and Knapp, H. J., *Am. J. Physiol.*, 1918, **47**, 189; Anrep, G. V., and Cannan, R. K., *J. Physiol.*, 1923-24, **58**, 244.