mastitis[4] suggests that the oral secretions of cattle are the important source of this common infection.

Associated with the hemolytic streptococci in tonsils of cow, hog and sheep were frequently *B. coli,* staphylococci, and occasionally non-hemolytic streptococci.

Conclusions. (1) Hemolytic streptococci are frequently found in the crypts of the tonsils of cow (84%), hog (96%), and sheep (74%). They constitute part of the normal flora of the lymphoid tissue of the oropharynx of these animals. (2) The streptococci conform to the animal type and differ from the human type and the *Streptococcus epidemicus* of bovine mastitis and epidemic septic sore throat.

8572 P

Restoration of Blood Pressure and Peripheral Resistance in Sympathectomized Dogs.

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The recent treatment of hypertension by types of sympathetic surgery has created a new interest in the extent and duration of the vascular relaxation following sympathetic ganglionectomy. There has been little experimental study of the blood pressure of completely sympathectomized animals over a long period of time. Bradford Cannon[1] reported by cuff sphygmomanometer a moderate temporary fall in blood pressure immediately after complete sympathetic ganglionectomy with a final return to normal, but the time interval is not stated.

Further investigation of this problem has been made upon 15 dogs, 5 of them controls. The right thoracic chain was removed first, the left next, and the abdominal chains last at intervals of 10 days to a month. Dummy operations were done in the same order for controls. Blood pressures were measured every few days following each operation and at longer intervals later by the arterial puncture method.

The 5 control animals, 2 of which were submitted to dummy

[4] Gibson, H. J., and Muir, R. O., *J. Hygiene,* 1935, **35**, 238.

[1] Cannon, B., *Am. J. Phys.,* 1931, **97**, 592.

operations, have shown during intervals of from 199 to 215 days no significant change in their blood pressures. Ten dogs were put through the 3 stage sympathectomy in from 30 to 75 days. They uniformly showed no major blood pressure alteration after the first operation, a marked reduction after the second, and little additional reduction after the third. The first 4 were sacrificed after about a month of reduced blood pressure and no remnants of sympathetic chain were found. The next 6 were kept over a longer period of time and a gradual blood pressure restoration was noticed that was complete in 4 after 94 to 225 days and partial in 2 after 110 and 145 days. These dogs will be observed for a longer time.

In an attempt to explain this restoration, the essential factors that normally regulate blood pressure and also the possibility of the development of some hypertensive disease in these experimental animals have been considered. Circulating blood volumes of the 4 animals whose blood pressure was completely restored were measured by the Congo red plasma dye method and found approximately normal. Blood viscosities as measured by the Oswald viscosimeter were also within normal range. Since the pulse rate in these 4 sympathectomized animals averaged 14 points less than that of the control dogs, and since X-ray measurements showed no increase in heart size, it is reasonable to assume that cardiac output has not been greatly increased during the months following the last operation. Direct cardiac output determinations using the Fick formula and heart puncture were studied on 3 dogs with restored blood pressure and found to be within the normal range established in 5 control dogs. Also urine analysis and blood chemistry determinations revealed no evidence of kidney damage in the animals postoperatively. From this study it seems unlikely that there is an increase of blood volume, blood viscosity, or cardiac output to explain the restoration of blood pressure but rather that there is a restoration of the peripheral resistance. This is confirmed by the observation that these old sympathectomized animals maintain their body temperature equally as well as normal dogs when exposed to cold, while the recently sympathectomized animals had their temperatures lowered rapidly. Final consideration of the possible mechanism of restoration of peripheral resistance in these completely sympathectomized dogs will be reported at a later date.

Since the rationale of sympathetic surgery for hypertension depends more upon an elimination or lessening of vaso-pressor response to peripheral stimuli than upon a direct effect by vascular relaxation, these recovery dogs have been tested as follows: With-

out anæsthesia a needle connected to a recording mercury manometer was inserted into the femoral artery. Ether at 7°C. was dashed onto the opposite limb and an electric fan allowed to blow upon it. The responses in the 4 oldest completely sympathectomized animals and in 4 of the controls were compared. All 8 showed an elevation of blood pressure and heart rate together with surprise and struggle. The average increase of blood pressure over readings taken before and after the stimulus in the control dogs was 32 mm., and in the sympathectomized dogs 16 mm. Hg. The mechanism of this rise in blood pressure is not determined.

From these experiments it seems fair to assume that even a complete sympathectomy will not permanently alter the blood pressure or the peripheral resistance of normal dogs longer than 94 to 225 days.

8573 P

Characteristics of Small Colony Variants of *Shigella paradysenteriæ* Sonne and *Staphylococcus aureus*.

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A number of small-colony variants of the G-type were isolated from plates streaked with 2- to 5-month cultures of *S. paradysenteriæ* Sonne. These variants occurred irregularly and infrequently —to the extent of one per cent of the colonies counted. Cells possessing the potentiality of developing G-colonies were not encountered in 18- to 24-hour cultures. The variants produced colonies from 0.04 mm. to 0.20 mm. in diameter. In microculture the normal cell divided by a process similar to budding while the variant divided by simple transverse fission. The minimal reproductive time of the normal was about 36 minutes and that of the variants from one hour and 45 minutes to 3 hours and 54 minutes.

Reversion of the variants to the large-colony or normal form was brought about by cultivating in serum-enriched media, incubation for 5 days or by 15 to 20 serial transfers in nutrient or veal-infusion-broth. After reversion, normal biochemical, serological and cultural characteristics were reëstablished. Some strains, while believed to be true variants, could not be made to revert completely to the normal colonial size.