proximately normal term, were sacrificed within 12 to 18 hours postpartum. In 2 of them a small amount of milk could be expressed from the mammary glands. From the nipple of a third pig, a watery-like secretion but no milk could be expressed. The 5 remaining mothers were allowed to remain with their litters for about 10 days, but in no case were the young suckled. The guinea pig, therefore, may show as do the rat and mouse[4, 5] a slight postpartum secretion of milk.

At necropsy of the 3 pigs referred to above, it was seen that the mammary glands were considerably smaller than those of a normal postpartum animal. Microscopic examination of the glands showed that the galactophore system of the hypophysectomized animals had not attained their maximum development. Small quantities of milk could be detected in the ducts, but the picture of generalized lobular and alveolar distension typical of the normal lactating animal was lacking.

A comparison of the ovaries of the hypophysectomized animals shortly after parturition with those removed from a normal postpartum guinea pig, revealed that the ovaries of the operated animals had suffered extensive regression. This was especially brought out in the condition of the corpus luteum, which had undergone marked atrophy and showed few lipoid staining granules.

Of considerable interest also was the fact that relaxation of the pubic ligaments occurred normally in the absence of a well developed corpus luteum.

7470

Response of the Left Ventricle to Changes in Output.

PAUL GREELEY AND JAY PALMER. (Introduced by D. R. Drury.)

From the Laboratory of Physiology, School of Medicine, University of Southern California.

Previous studies on the mammalian heart have demonstrated that both the diastolic and systolic volumes increase with an increase in total output, mean arterial pressure remaining constant. (Patterson, Piper and Starling,[1] Wiggers and Katz[2]). Kozawa,[3] working with

[1] Patterson, Piper, and Starling, *J. Physiol.*, 1914, **48**, 465.

[2] Wigger, C. S., and Katz, L. N., *Am. J. Physiol.*, 1922, **58**, 439.

[3] Kozawa, S., *J. Physiol.*, 1914, **49**, 233.

the turtle's heart found that only the diastolic volume varied.

The present study was made on dogs using the modified heart lung preparation of Dusser de Barenne[4] in conjunction with an apparatus designed to maintain physical conditions as constant as possible regardless of variations in output.

A cannula of large diameter was inserted into the aorta. The pulmonary artery was cannulated twice, one cannula toward the right ventricle and the other toward the lungs. The right ventricle pumped only blood flowing from the coronary system, while the left ventricle that which was allowed to return from the venous reservoir.

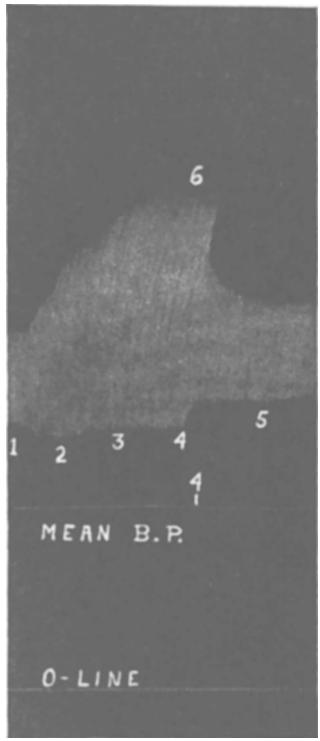

Fig. 1 shows the result obtained by rapidly increasing the input to the left ventricle. The changes in volume of the ventricles, were recorded so that systole produced a downward movement of the piston-recorder lever. Prior to (1) no blood was returning to the left ventricle from the venous reservoir, the right ventricle pumping only the coronary blood flow. At (1) blood from the venous reser-

[4] Dusser de Barenne, *Pfluger's Arch.*, 1921, **188**, 281.

voir was allowed to return to the left ventricle by way of the lungs. The diastolic volume rapidly increased to a plateau at (6). The systolic volume decreased with one exception to (2). From (3) to (4) the output of the left ventricle was about 1000 cc. per minute. The venous return to the left ventricle was blocked at (4). At (5) the volume changes of the heart were again approximately the same as at (1). Heart rate was constant and mean blood pressure increased only about one mm. Hg. during the peak of the flow, as indicated at (4).

Records of increased output obtained by allowing the blood to return to the heart by way of the superior vena cava (before cannulating the pulmonary artery) showed marked increases in both the systolic and diastolic levels, the systolic rising well above that present when the heart was taking care of the coronary flow alone. Whether changes in pressure in the pulmonary artery or a combination of factors accounts for the results obtained requires further experimentation.

A paper presenting other experimental results and a detailed description of the apparatus is now in the process of preparation.

7471 P

Does Methylene Blue Form Methemoglobin?

MATILDA MOLDENHAUER BROOKS.

From the Department of Zoology, University of California, Berkeley.

These experiments were done to help clear up the present confusion as to the action of methylene blue on hemoglobin.

Barron and Harrop[1] and Warburg, Kubowitz and Christian[2] were the first to make any quantitative studies involving the interpretation of the action of methylene blue on hemoglobin. The latter state that methemoglobin does not accumulate during methylene blue catalysis when rabbit erythrocytes are placed in a saline-PO_4-glucose solution, but that it disappears as fast as formed, is reformed, disappears again and so on in a continuous cycle. The *presence of glucose* is necessary for demonstrating this catalytic effect of methy-

[1] Barron, E. S. G., and Harrop, G. A., *J. Exp. Med.*, 1928, **48**, 207; *J. Biol. Chem.*, 1928, **79**, 65; 1929, **81**, 445; 1929, **84**, 83.

[2] Warburg, O. F., Kubowitz, F., and Christian, W., *Biochem. Z.*, 1930, **227**, 245.