On the basis of this experience we have given 0.1 to 0.2 gm. of calcium chloride each day for two to six days to three patients on six occasions. It was found that no definite change in the urinary output took place, although in one patient (F) it had been found repeatedly that when calcium chloride was given by mouth diuresis occurred. At this time the difference between the effects obtained by administration by mouth and by the intravenous method is not discussed but is reserved for a future occasion. A short time after calcium chloride was injected the radial pulse usually became more forcible. Calcium chloride in these doses did not produce any change in the form of the electrocardiogram. In the patient (F) mentioned above, 0.5 gm. of digitalis was given by mouth on the day following the last intravenous calcium chloride injection, and then the output increased and remained elevated until the patient was free of edema. With this the pulse rate slowed and the electrocardiogram showed changes in the T-wave. Before this the patient had many times been given much larger doses of digitalis, but these had never been followed by a diuretic effect which continued long enough to free the patient of edema as has followed this small amount (0.5 gm.) of digitalis when combined with calcium.

It appears then that diuresis can be obtained by the administration of calcium chloride by mouth although the amount is small. It appears also that when combined with digitalis the amount of this drug required to bring on diuresis may be reduced.

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A method for obtaining samples of mixed venous blood in intact dogs.

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In order to estimate the oxygen and carbon dioxide in mixed venous blood in intact dogs two methods are in use: (1) a tonometer method in which alveolar air and pulmonary venous blood

*Introduced by Alfred E. Cohn.

are allowed to come into equilibrium; the air is then analyzed. (2) A method of direct puncture of the right auricle or ventricle in order to obtain venous blood. A third method is possible and is now described.

We devised a cannula which can be inserted into the right ventricle through the right external jugular vein. Through this samples of mixed venous blood can be withdrawn from the right heart. The cannula is a hollow metal tube 2.5 mm. in diameter and 30 cm. long, having an obturator which is bullet shaped closing its distal end. The obturator can be withdrawn and the proximal opening closed by a small stopcock. Below the stopcock is an outlet to which a piece of rubber tubing is attached Before use the air in the cannula is replaced by sterile albolene.

The operation is carried out aseptically. The skin and subcutaneous tissue along the line of incision are anesthetized with 1 to 2 per cent novocaine. The right external jugular vein can now be exposed by blunt dissection without discomfort to the dog. The distal end of the vein is ligated. A small opening is made into the vein below the ligature and the cannula inserted and tied in place. The cannula with the obturator in place is pushed into the innominate vein, superior vena cava, and then into the right heart. At first the operations were carried out under the guidance of the fluoroscope, but this was soon found to be unnecessary because by turning the dog slightly on his left side the line along the external jugular vein to the heart becomes practically straight and the cannula can be made to enter the heart easily. When in place the cannula can be felt to move with each systole. When the obturator is withdrawn and the stopcock closed blood flows from the outlet. The blood is collected by placing the rubber tubing under albolene or by using an air free syringe attached to the rubber tubing.

After a satisfactory sample has been obtained, the obturator is returned, the cannula removed, and the vein ligated below the point of entry. The skin is closed with a silk suture and protected with a dry dressing. The procedure requires less than a half hour. By inserting the cannula as high in the neck as possible the first time, the operation can be repeated many times, each time inserting the cannula below the point of the previous ligation. The vein remains patent below, but in time is obliterated above the point of ligation. When it is no longer possible

to use the external jugular vein, the internal jugular vein can be used in a similar manner. The left external jugular vein is more difficult to use because of the angle at which the vein enters the innominate vein.

Samples of blood from the left heart may be obtained from the right carotid artery at the time the external jugular vein is exposed or may be obtained more easily from a femoral artery. The femoral artery in the dog is quite superficial and an arterial puncture is easily and quickly done without any discomfort and with safety if pressure is applied over the artery for a few minutes after the puncture.

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The rôle of the liver in pancreatic secretion.

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Secretin, when injected into dogs under amytal or ether anesthesia, proved far less effective in exciting the pancreatic flow when introduced by the portal vein than when administered by way of the femoral vein, thus confirming an earlier observation.[1] It was likewise found that with extremely potent secretin solutions, the difference in effect by the portal and systemic routes is much less marked than with weaker preparations.

In view of the fact that the secretin when injected by the portal system must first pass through the liver, it may be suggested that this organ in some way is responsible for the different behavior noted above. In order to further investigate this, secretin solutions were injected at a slow rate over a long period of time by each of these routes. When injected at the rate of one-half

[1] Deuel, H. J., Jr., and Cowgill, G. R., presented at the XIth International Physiological Congress, Edinburgh, 1923.