taken to avoid the cystic artery, but also by common duct ligation and by both procedures.

In most of these experiments not only were these bacteria present but marked evidences of cholecystitis were found. Gross specimens of these gall bladders revealed the interesting fact that the infection undoubtedly made its way into the gall bladder not through the bile or the blood stream but by direct extension from the liver. This could be seen by killing the dogs in various stages of the process. In the early stages (1-4 days), the gall bladders presented the picture of a cholecystitis only on the hepatic surfaces. The free peritoneal side at this period is thin, normal in appearance both grossly and histologically. The hepatic surface is thickened, often to 10 times normal and its wall shows edema and infiltration of leucocytes and round cells. Later the inflammation extends around the entire circumference of the viscus. The mucosa generally remains quite normal even in the later stages when the other layers of the wall show marked inflammation.

The work of Dragstedt[2] and later of Andrews[3] on the rich anaerobic flora of the liver has shown that these organisms are constantly present and it now becomes evident that in stasis they may make their way into the gall bladder in large numbers.

The recent clinical experience[4] of finding *B. welchii* in many cases of fulminant cholecystitis makes it seem quite possible that this route of infection may be a common one in the human being.

5185

Ovulation in the Rabbit as a Diagnostic Measure in Early Pregnancy.

P. F. SCHNEIDER. (Introduced by C. A. Dragstedt.)

From the Department of Physiology, Northwestern University.

In a previous communication,[1] a preliminary report of 100 cases has been submitted, demonstrating the production of ovulation in immature female rabbits by the intravenous injection of urine from pregnant women, and its application as a diagnostic measure in early

[2] Ellis, J. C., and Dragstedt, L. R., *Arch. Surg.*, 1930, **20**, 8.

[3] Andrews, E., PROC. SOC. EXP. BIOL. AND MED., 1930, **27**, 987.

[4] Gordon-Taylor, G., and Whitby, L. E., *Brit. J. Surg.*, 1930, **17**, 78.

[1] Schneider, *Surg., Gynec. and Obst.*, in press.

pregnancy. The work of Friedman[2] on ovulation in the rabbit indicated that the principles of the Aschheim-Zondek[3] test for pregnancy might be applied with greater facility by the use of rabbits instead of mice. Of the 100 cases previously reported, 50 were used as controls, the urine being obtained from definitely known pregnant and non-pregnant patients; and in the remaining 50, urine was obtained from women in whom pregnancy was suspected but could not be diagnosed by the usual methods. This was done to determine the value of the test in the diagnosis of early pregnancy, and to attempt to outline its limitations. The results demonstrated a degree of accuracy comparable to that obtainable by the Aschheim-Zondek test, indicating possibilities which stimulated further investigation along these lines. Since that time an additional series of 100 tests have been carried out, and a brief report of the combined result is made.

One female rabbit, 16 weeks of age, is used for each test. From 5 to 7 cc. of a voided first morning specimen of urine is injected into the marginal ear vein. Autopsy is done 30 hours after injection and an immediate diagnosis is possible by macroscopic inspection of the ovaries, depending on the presence or absence of corpora hemorrhagica and corpora lutea. The description of this technique, when compared with a description of the Aschheim-Zondek test, emphasizes its simplicity and practicability.

In the complete series of 200 tests, 50 were carried out as controls, while 150 were used as actual test cases in which pregnancy was suspected but could not be diagnosed by the usual methods. In 25 of the control cases the specimen was obtained from patients late in the pregnancy where a positive diagnosis could be made by other methods. The remaining 25 specimens were obtained from patients who were known not to be pregnant. The known pregnancies all resulted in the occurrence of ovulation in the rabbit, while the negative controls all gave negative results.

Of the 150 test cases there were 61 positive and 89 negative results obtained. Of the positive series, subsequent events proved the test to be correct in all except 2 instances. It appears on repetition of the test that these discrepancies can be accounted for only by an error in the markings of the rabbit in one instance, and improper interpretation of the macroscopic findings in the other instance. Both tests yielded negative results when repeated using the same specimen, and were merely technical errors subject to correction. Of the

[2] Friedman, *Am. J. Physiol.*, 1929, **90**, 617; **89**, 438.

[3] Aschheim, *Am. J. Obs. and Gyn.*, 1930, **19**, 335.

89 negative cases there have been 6 instances in which repetition of the test at later dates gave positive results. This was due to the fact that in these 6 instances, the urine was obtained so early in the pregnancy that the concentration of the hormone in the urine was insufficient to cause a positive reaction, and therefore due to limitations of the test which future investigation may overcome.

The data obtained in these cases indicates that the reaction appears at approximately 18 to 21 days following the intercourse responsible for the pregnancy. If these observations are proved to be correct by subsequent investigation, they will serve as additional evidence to substantiate the theory[4, 5] that the hormone causing the reaction may be dependent on the development of the decidual tissue instead of entirely an anterior pituitary product as was at first maintained.[6] Further evidence supporting this contention is derived from the fact that the only conditions other than pregnancy causing the reaction are hydatidiform mole and chorio-epithelioma. There has been one case in this series of chorio-epithelioma following hydatid mole, which was accompanied by a positive reaction up to one week following complete hysterectomy, and a negative reaction 5 weeks after operation.

Conclusion. The method provides a positive test for pregnancy after the third week, which can be completed in 30 hours, and due to its simplicity does not require extensive laboratory equipment. The factors involved indicate the possibility that by a rapid method of extracting the hormone from the urine and injection of a concentrate of the hormone, the scope of the test may be increased by reducing the time element. There is also the possibility that injection of the hormone in concentrated form would produce positive results at an earlier stage of the pregnancy than is now possible.

[4] Collip, *Canad. Med. Assn. J.*, 1930, **22**, 761.

[5] Zondek, *Endokrinol.*, 1929, **5**, 425.

[6] Aschheim and Zondek, *Arch. Gynakol.*, 1927, **180**, 1.