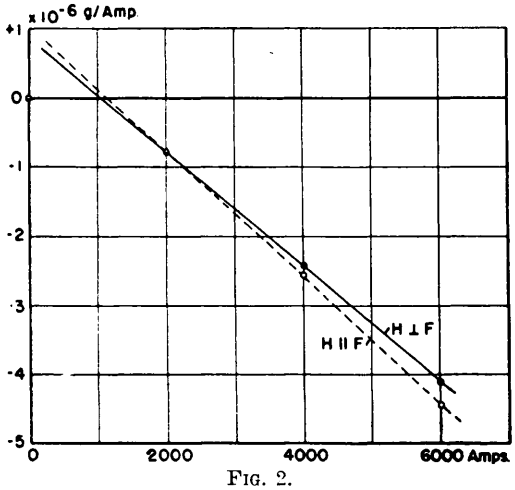

FIG. 2.
Explanation see text.

$$f = m \cdot \chi \cdot H \cdot \frac{\delta H}{\delta x}$$

where m is the mass, χ the susceptibility, H the strength of the magnetic field, and $\delta H/\delta x$ the inhomogeneity of the field in a vertical direction in the region occupied by the tendon.

H could be varied from 0-36,000 Gauss by varying the current from 0-6,000 Amps.

Fig. 2 illustrates the results obtained. All measured points at field strengths above 6,000 Gauss show a deflection to the negative side, indicating that beef tendon is *diamagnetic.* The numerical value† of the susceptibility was found to be $-0.80_7 \cdot 10^{-6}$ parallel to the fiber axis, and $-0.85 \cdot 10^{-6}$ perpendicular to the fiber axis. The fiber is therefore *negatively diamagnetic.* The presence of traces of iron is assumed from the fact that the line connecting the measured points does not pass through the origin. It seems probable that Wöhlisch's anomalous result was due to a similar cause.

† Unfortunately only 2 experiments could be performed before the magnet was required for other purposes. The data are, therefore, not sufficient to establish accurately the absolute value of the susceptibility. However, the purpose of the work was to explain the anomalous results of Wöhlisch rather than to determine the numerical value of the susceptibility which, in itself, is not particularly significant.

14084

Response of Human Pregnant Uterus to Pitocin Tannate in Oil.*

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The posterior pituitary hormone was fractionated by Kamm and his associates[1] into the pressor-antidiuretic fraction (Pitressin) and the oxytocic fraction (Pitocin). Two years ago a preparation of Pitressin tannate in oil (a tannic acid precipitate of the Pitressin fraction resuspended in peanut oil) was utilized in the treatment of diabetes insipidus[2] because of its prolonged action. At this time a similar preparation of the Pitocin fraction was prepared† for clinical trial in the induction of labor and for uterine inertia. It was hoped that a more slowly absorbed oxytocic would produce a more physiologic response than the rapidly acting aqueous posterior pituitary hormone.

Methods. Injections of Pitocin tannate in oil were given to 22 women for the induction of labor at term and to 10 women whose labors were complicated by primary uterine inertia. In many instances a graphic record of the response was obtained by means of the Lorand

* Aided by a grant from the John and Mary Markle Foundation.

1 Kamm, O., Aldrich, T. B., Grote, I. W., Rowe, L. W., and Bugbee, E. P., *J. Am. Chem. Soc.,* 1928, **50**, 573.

2 Greene, J. A., and January, L. E., *J. A. M. A.,* 1940, **115**, 1183.

† The Pitocin tannate in oil was prepared and donated by Doctors Oliver Kamm and E. A. Sharp of Parke, Davis and Company.

tocograph.[3] The responses were classified as clonic, incomplete tetanic or tetanic according to the descriptions of Murphy.[4] An attempt was made to study (a) the latent period between the time of injection and onset of response, (b) the dosage ratio between Pitocin tannate in oil and Pitocin, (c) the comparative duration of action of the two preparations, and (d) the qualitative nature of the uterine response. In each case, the minimal effective dose of Pitocin (10 units per cc) was determined before administering Pitocin tannate in oil (8 units per cc). Pitocin was diluted 10 times and the initial dose of 0.25 unit was doubled every 20 to 30 minutes until the first painful uterine contractions were noted. After this dosage was determined, twice the amount of Pitocin tannate in oil was injected intramuscularly in the lower third of the upper arm and repeated every 20 minutes until the same uterine response was noted. The depot was placed in the lower portion of the arm so that a blood pressure cuff above could stop further absorption in the event of stormy or tetanic responses. Such a tourniquet was necessary and proved valuable in one case of uterine inertia in which too large an amount of the hormone in oil was administered. The cuff was intermittently inflated above systolic pressure for periods of 10 minutes until the tetanic types of responses decreased.

Results. The latent period between the time of injection of Pitocin tannate in oil and the onset of response was usually 8 to 10 minutes (extremes of 5 to 16 minutes), or about twice as long as the latent period for Pitocin.

The ratio of minimal effective dose of Pitocin tannate in oil to Pitocin varied from 2 to 6, usually 4 times the number of units. In other words, 0.1 cc (1 unit) of Pitocin was equivalent to about 0.5 cc (4 units) of the preparation in oil. Variations in the uterine threshold from time to time in the same woman prevents a more exact determination of the dosage ratio.

The duration of action is difficult to determine in most instances because spontaneous labor may supervene. An estimate of the duration is therefore based upon 10 cases whose labor pains did not continue, and the cessation of painful uterine contractions was assumed to coincide with the cessation of pharmacologic response. The shortest response was 28 minutes and the longest 150 minutes, the duration of action in 6 of the 10 cases being between 45 and 90 minutes, or 3 to 4 times as long as with ordinary Pitocin. Tracings of 2 tocograph records on the same woman, made one hour apart during the induction of labor at term, illustrate the differences in latent period and duration of response resulting from the two preparations. In both instances an incomplete tetanic response resulted. (See Fig. 1.)

Dieckmann and Kharasch[5] recently described similar experiences with a solution of posterior pituitary sulfonate, prepared by precipitating the hormone with anthra-quinone 2·6 disulphonic acid and resuspending in acid solution. Free posterior pituitary hormone is liberated slowly when it becomes alkaline, as with intramuscular injection. They concluded that the "Pit Sulphonate" differed from the usual solution in that there was little if any likelihood of tetanic contractions even though a large dose is given and that the preparation may be used with comparative safety to both mother and fetus.

It is difficult to see how modifying the rate of absorption of an oxytocic can eliminate the dangers resulting from overdosage. With both Pitocin tannate in oil and ordinary Pitocin the same frequency of clonic, incomplete and complete tetanic responses were encountered with equivalent doses. After the limited experiences described above the writer hesitates to use the suspension in oil in preference to Pitocin for uterine inertia because any untoward effects from overdosage are unduly prolonged. The most physiologic responses in severe primary uterine inertia have actually been obtained by giving an intravenous infusion of normal saline containing either 10 or 20 units of Pitocin to the liter. By constant observation and controlling the number of

[3] Lorand, S., *Monatschr. f. Geburtsh. u. Gynäk.*, 1936, **103**, 137.

[4] Murphy, D. P., *Am. J. Obst. and Gynec.*, 1941, **41**, 274.

[5] Dieckmann, W. J., and Kharasch, M. S., *Am. J. Obst. and Gynec.*, 1942, **44**, 820.

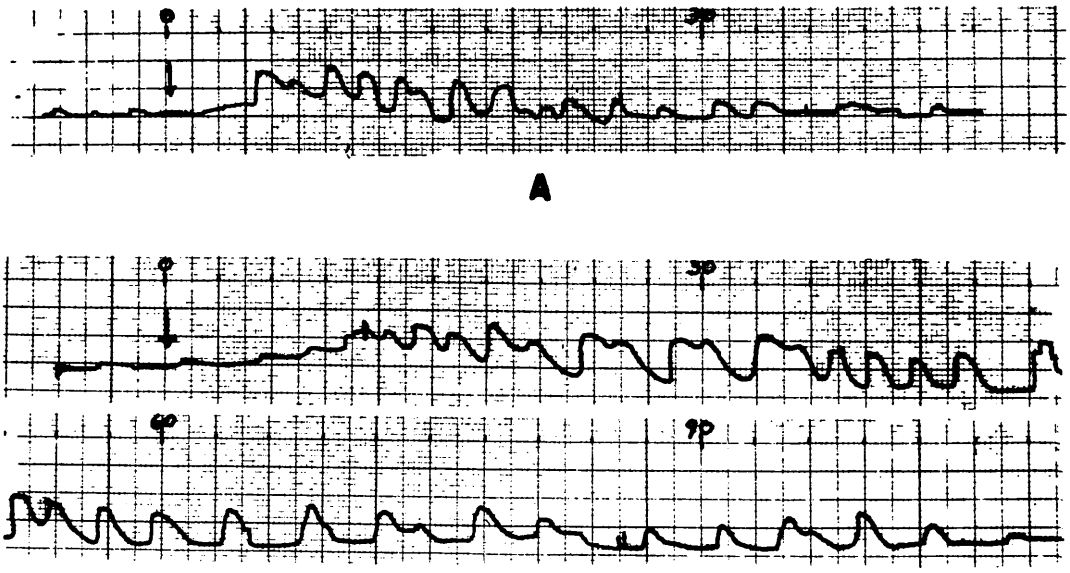

FIG. 1.

Tracings of tocograph records made on the same patient at term, not in labor, showing (A) the uterine response to 2 units of Pitocin and (B) the response one hour later to 7 units of Pitocin tannate in oil. Time in 3-minute intervals.

drops per minute, the obstetrician may control the character and amplitude of contractions quite adequately. The latter technic deserves further trial in selected cases of marked uterine inertia.

Conclusions. Pitocin tannate in oil, in comparison with Pitocin, requires 3 to 4 times the dosage to elicit a comparable response; the latent period after injection is twice as long; the duration of action 3 to 4 times as long. The preparation may be used when a longer acting oxytocic is desirable but possesses the same inherent dangers of ordinary posterior pituitary hormone.

14085 P

Differentiation Between *Brucella melitensis* and *Brucella abortus* by Precipitin Reaction.

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The precipitin reaction has been used in an attempt to develop a simple and rapid method by which strains of *Brucella melitensis* can be differentiated from those of *Brucella abortus*. Strains utilized for the immunization of rabbits were *B. melitensis* 428 and *B. abortus* 456 obtained from the National Institute of Health at Washington, and *B. suis* 1529, isolated by Huddleson in 1931 from the supramammary gland of a hog.

The organisms were grown for 48 hours on freshly prepared tryptose agar slants and the growth suspended in 0.9% saline, the opacity adjusted to match barium sulphate standard No. 3. One-tenth of a cc of this living suspension was then injected into the ear vein of