smaller capsules is shifted. In Twitty's study of the eye muscles after heteroplastic transplantation of the eye, hypertrophy or atrophy was marked.[2]

The studies of Detwiler,[6] Burr,[7] Twitty,[2] Schwind,[3] and others have established the fact that hyperplasia in nerve centers occurs when the peripheral sensory load is increased, and that hypoplasia results when it is diminished. Cell counts of the acoustico-facial ganglion, which probably arises from the graft, show it to be larger on the side of the tigrinum transplant, and smaller with the reciprocal graft from punctatum. In the gray matter of the area acoustica of the medulla in the punctatum host, there is a 15 to 20% increase in the number of cells on the side of the operation, and a decrease of approximately 10% in the corresponding region on tigrinum.

Mauthner's cell is not obviously altered as to the arrangement of its dendrites by the entrance of a larger or smaller nerve. No response can be detected in the cerebellum, to which a few of the eighth nerve fibres probably run.[8, 9] The effects produced in the area acoustica, however, are in agreement with conclusions from morphological studies that it is the chief center in the brain of urodeles for the endings of the acoustico-lateralis system of nerves.[9]

5642

A Method for Demonstrating Prepituitary Maturity Hormone in the Blood of Non-Pregnant Women.

ROBERT T. FRANK, MORRIS A. GOLDBERGER AND FRANK SPIELMAN.

From the Gynecological Service and Laboratories of the Mount Sinai Hospital, New York City.

Since the prepituitary maturity hormone has been shown to produce puberty, follicle ripening and corpus luteum formation[1, 2] and since this hormone has been demonstrated in the blood serum and urine of pregnant women and female castrates,[2, 3, 4] it ap-

[6] Detwiler, S. R., *Proc. Nat. Acad. Sci.*, 1920, **6**, 96; *J. Exp. Zool.*, 1926, **45**, 399; *Quar. Rev. Biol.*, 1926, **1**, 61.

[7] Burr, H. S., *J. Exp. Zool.*, 1916, **20**, 27; *J. Comp. Neur.*, 1924, **37**, 455.

[8] Larsell, O., *J. Comp. Neur.*, 1920, **31**, 259.

[9] Herrick, C. J., *J. Comp. Neur.*, 1914, **24**, 343.

[1] Smith, P. E., *Am. J. Physiol.*, 1927, **80**, 114.

[2] Zondek, B., and Aschheim, S., *Arch. f. Gynäk.*, 1927, **130**, 1.

[3] Aschheim, S., and Zondek, B., *Klin. Wchnschr.*, 1928, **7**, 1401.

[4] Fluhmann, C. F., *J. Am. Med. Assn.*, 1929, **93**, 672.

peared logical to expect its presence in the blood of women during the menstrual cycle. Aschheim and Zondek[2] have determined 3 types of action exerted by the maturity factor, follicle ripening (A P R I), blood spots (A P R II) and corpus luteum formation (A P R III). They ascribe these results to 2 distinct hormones which they call Prolan A producing A P R I, and Prolan B causing A P R II and III, but have been unable to devise an exact method for separating these factors.

We have attempted to devise a method for demonstrating the presence of either or both Prolan A and B in the blood of non-pregnant women. A convenient material for control is supplied by the serum of pregnant women of which 0.2-0.5 cc. contains a M. U. or R. U. The untreated serum could therefore be used and equivalent amounts of the extracts of the same serum compared with this.

The following technique was employed: a. Blood serum obtained from women at various phases of the cycle, from 1 to 22 cc. in amount, was injected into immature mice and rats without conclusive results. b. The proteins of the blood serum were precipitated with acid alcohol (one part serum, 3 parts 95% alcohol). After dilution to 50% the supernatant was separated by centrifugalization and concentrated to a volume of 6-8 cc. by means of an air current at room temperature. No physiological effect was noted although pregnancy blood similarly treated and used as a control showed that the extraction method was effective, with minimal loss of potency. The method finally adopted, by which the presence of the A P R I reaction was demonstrated, is as follows: 40 cc. of blood is rubbed with 30 gm. of anhydrous Na_2SO_4, powdered and extracted thrice in a separating funnel with ether (each time 100 cc.). The ethereal extract may be used for our female sex hormone test.[5] The residual sludge is dried by evaporation, repowdered and shaken for 10 minutes with 200 cc. of 60% ethyl alcohol. The mixture is centrifuged and the supernatant fluid placed in an evaporating dish before an electric fan. When the volume has been reduced to approximately half, a scum forms, which is removed by recentrifugalization. The residual dry substance finally obtained by complete evaporation is dissolved in 6 cc. of water and injected into immature rats.

Sixty per cent alcohol was chosen because only small amounts of Na_2SO_4 are dissolved in it and yet the hormone is fully soluble at this concentration.

[5] Frank, R. T., and Goldberger, M. A., *J. Am. Med. Assn.*, 1926, **87**, 1719.

The total extract is injected in 6 doses over a period of 3 days. The rats are killed 100 hours after the first injection. Their ovaries are cut in serial section.

Results. 1. A P R I is noted throughout the cycle to a varying degree. 2. The reaction appears strongest from 6 to 9 days from the onset of the preceding menstruation. 3. From the 6th to 9th day an indication of lutein change is noted. It is too faint to be interpreted as a full A P R III. 4. These results signify that approximately 25 M. U. L. is the maximum amount of Prolan A occurring in the circulation of the non-pregnant woman.

5643

Calcification of Tubercles by Administration of Calcium Chloride.

VALY MENKIN.

From the Department of Pathology, Harvard Medical School.

In previous communications[1, 2] it was shown that a vital dye, trypan blue, or a metal in the form of its salt, ferric chloride, when injected into the circulating blood stream rapidly accumulates in an area of inflammation, where the substance is fixed and fails to drain to the tributary lymph nodes. Subsequently it was shown in infected rabbits[3, 4] that repeated daily intravenous injections of ferric chloride are followed by an accumulation of iron in the caseous center of tuberculous areas.

The object of this study was to determine whether calcium would likewise penetrate from the blood stream into tuberculous foci. Such evidence might offer a reasonable explanation for the origin of this element in calcified tubercles. The literature fails to reveal any agreement on the effect of calcium in experimental tuberculosis. Michelazzi[5] found calcification of lesions in tuberculous rabbits treated with calcium. Hoyle,[6] who maintained that these earlier experiments were unsatisfactory, found no appreciable difference in the

[1] Menkin, V., *J. Exp. Med.*, 1929, **50**, 171.

[2] Menkin, V., *J. Exp. Med.*, 1930, **51**, 879.

[3] Menkin, V., PROC. SOC. EXP. BIOL. AND MED., 1930, **27**, 1020.

[4] Menkin, V., and Menkin, M. F., *J. Exp. Med.*, 1931, **53**, 919.

[5] Michelazzi, *Gaz. d. Ospedali*, Milano, 1904, **25**, 425; abst. *Rev. de la Tuberc.*, 1904, **1**, 421.

[6] Hoyle, J. C., *Quart. J. Med.*, 1929, **22**, 451.