bage. High values of Vitamin C were found in the tissues of 2 of these animals which had shown but a slight reaction, adrenals 0.77-0.68, liver 0.24-0.11, pancreas 0.27-0.20. In 5 other guinea pigs having shown a severe reaction a lowered content was found, adrenals, 0.13-0.47, liver 0.04-0.15.

Three guinea pigs dying from a spontaneous infection, (marked lesions in lungs and liver) gave low values, even though the diet contained excess vitamin C, adrenals 0.08-0.10, liver 0.07-0.05.

For purposes of record we may also note the ascorbic acid content found in the tissues of 2 rhesus monkeys infected with poliomyelitis‡ (paralyzed and killed), adrenals 0.45 and 0.23, liver, 0.18 and 0.11. With silver nitrate the reaction was slow and incomplete.

Thus, in the tissues of laboratory animals we have found a reduction in the ascorbic acid content in many infections and intoxications.

Recently Yavorsky, Almaden and King[3] studied quantitatively ascorbic acid in tissues of humans having died of various causes. These authors note a diminution of vitamin C in the majority of cases of general infection.

Worringer and Sala[4] reported that, among other infections, diphtheria gave rise to infantile scurvy. They also cite 4 cases of whooping cough in children, followed by scurvy, and cured by the juice of fresh fruits.

7804 P

Action of Thallium in Experimental Animals.*

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A number of investigators of thallium poisoning have attributed some of the changes in poisoned animals to disturbance in function of the endocrine glands and the sympathetic nervous system. In support of this relationship Buschke and his associates[1] have re-

‡ These were kindly supplied to us by Dr. Brodie.

[3] Yavorsky, M., Almaden, P., and King, C. G., *J. Biol. Chem.*, 1934, **106**, 525.

[4] Worringer, J., and Sala, A., *Rev. Franc. de Pediat.*, 1928, **33**, 809.

* Supported in part by a grant from the Rockefeller Fluid Research Fund.

[1] Buschke, A., and Berman, L., *Münch. Med. Wchnschr.*, 1927, **74**, 969. Buschke, A., Zondek, B., and Berman, L., *Klin. Wchnschr.*, 1927, **6**, 683. Bickel, L., and Buschke, A., *Klin. Wchnschr.*, 1932, **11**, 679.

ported cessation of the estrual cycle in mice after thallium acetate administration. Wu and Hu[2] reported a temporary fall in the basal metabolic rate of rats after single injections of thallium acetate. Further study of the effect of thallium on the estrual cycle in rats and the basal metabolic rate in guinea pigs was undertaken by us in an attempt to demonstrate changes which might be due to alteration of endocrine function.

Thallium acetate was injected subcutaneously into 20 female white rats in doses ranging from 0.2 to 5 mg. of the metal per kg. body weight 3 times per week over periods up to 9 weeks in length. The animals given the larger amounts showed signs of thallium intoxication, and those receiving doses of 5 mg. per kg. died about 9 days after the first injection. There were no changes in the estrual cycle as measured by the vaginal smear method of Long and Evans.[3] Histological studies of the vagina, uterus, and ovaries showed no constant differences from control organs.

Subcutaneous injection of the same compound into 4 young adult male guinea pigs in doses of 3 mg. thallium per kg. body weight 3 times per week produced no demonstrable changes in basal metabolic rate over periods of 3 to 6 months. The determinations were made from measurements of oxygen consumption during intervals of inactivity after preliminary 16-hour starvation periods. Injections of 6 mg. thallium per kg. 3 times per week in the same manner produced death of 6 male guinea pigs in about 8 days. Metabolism determinations on these animals showed no deviation from the control level until within 24 hours of death when there was a pronounced decrease in oxygen consumption associated with signs of severe intoxication: apathy, salivation, diarrhea, loosening of the hair, and a fall in body temperature to as low as 31°C. The rate of oxygen consumption in one animal fell to a point 75% below the control level, and that of another to 62% below the average control value. In view of the absence of any change in oxygen consumption until shortly before death, and the extent of the decrease when it occurred, it is probable that the effect is not a specific result of the action of thallium upon the endocrine glands. Kaiwa[4] and others have reported decreases in basal metabolism of 25 to 35% in completely thyroidectomized animals, and decreases only up to

[2] Wu, J., and Hu, C., PROC. SOC. EXP. BIOL. AND MED., 1930, **27**, 251.

[3] Long, J. A., and Evans, H. N., *Univ. of Calif. Publication*, 1922, vi.

[4] Kaiwa, T., *Tohoku J. Exp. Med.*, 1932, **19**, 96.

40% in rabbits after total removal of the thyroid and both adrenal glands.

Conclusion. White rats given large or small quantities of thallium over periods up to 9 weeks in length showed no abnormality of the estrual cycle or of the reproductive organs. The basal metabolic rate of guinea pigs did not change during administration of small or large doses of thallium, except for a rapid decrease shortly preceding death. These findings fail to support previous claims that thallium intoxication is characterized by alteration of endocrine function.

7805 C

Hemorrhagic Changes in Suprarenal Cortex of Adult Rats Following Pituitarectomy.

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Smith and many other investigators have demonstrated that removal of the pituitary gland in tadpoles and rats is followed by atrophy of the suprarenal cortex,[1-8] as well as atrophy of the gonads, thyroid and parathyroid. Similar changes have been described in the rabbit[9, 10] and dog.[11]* In humans, in conditions associated with hypofunction of the pituitary and in Simmond's disease the adrenal

[1] Smith, P. E., *Am. Anat. Mem.*, 1920, **11**, 151.

[2] Atwell, W. J., PROC. SOC. EXP. BIOL. AND MED., 1932, **29**, 621.

[3] Smith, P. E., *Anat. Rec.*, 1926, **32**, 221.

[4] Smith, P. E., *J. Am. Med. Assn.*, 1927, **88**, 158.

[5] Smith, P. E., *Am. J. Anat.*, 1930, **45**, 205,

[6] Richter, C. P., and Wislocki, G. B., *Am. J. Physiol.*, 1930, **95**, 481.

[7] Evans, H. K., Meyer, M. E., Simpson, *et al.*, *Mem. Univ. Cal.*, 1933, **2**.

[8] Collip, J. B., Selye, H., and Thompson, D., *Nature*, 1933, **131**, 56.

[9] Ikeda, M., *Jap. J. Obst. and Gynecol.*, 1932, **15**, 213.

[10] Kusonoki, J., *Folio Endocrinol.*, Japan, 1927, **3**, 34.

[11] Houssay, B. A., and Sammartino, R., *Compt. rend. Soc. de Biol.*, 1933, **114**, 717.

* The atrophy of the suprarenal cortex in pituitarectomized rats may be repaired by daily homotransplants of pituitary gland,[5] by injection of potent extracts of growth hormone,[7] or by the adrenotropic hormone.[16] The administration of cortin in pituitarectomized rats does not prevent or repair this atrophy of the cortex.[17]

[16] Anderson, E. M., Thomson, D. L., and Collip, J. B., *Lancet*, 1933, **225**, 347.

[17] Shumacker, H. B., and Firor, W. M., *Endocrin.*, 1934, **18**, 676.