

mice were inoculated into the left groin with 0.09 cc. of an emulsion (10 parts saline, 1 part tumor) of fresh mouse sarcoma (No. 180). Measurements of the local growths were made at 6, 12, and 16 days. The ulceration of many tumors after this time precluded further measurements.

For the sake of clarity the mice treated with the preserved carcinoma material and later inoculated with the sarcoma are called the "experimental" mice, and the mice inoculated only with the sarcoma the "control" mice. At 16 days, 16 of 28 experimental mice (57%) had primary tumors which averaged 0.343 cc. in volume. This compared with 22 primary tumors (73%) among the 30 control mice averaging 0.509 cc. The size of the primary tumors per animal inoculated was 0.196 cc. among the experimental mice as compared with 0.373 cc. among the controls. The results, therefore, show no evidence that the sarcoma was enhanced (there is an insignificant suggestion of an inhibition) and are in marked contrast to the previous results in which the preserved mouse carcinoma material showed distinct evidence of enhancement of the same Bashford carcinoma (No. 63) in 10 consecutive experiments.<sup>3</sup> Further experiments designed to detect and differentiate enhancing materials with a view to their specificity should be attempted.

## 6779

### Growth Characteristics of Rough and Smooth Acid Fast Bacteria Living in Microculture.

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While studying the growth of a number of acid fast bacteria in microculture a series of micro motion pictures has been made of a strain of organisms pathogenic to frogs. This mycobacterium, *M. ranae* I, was provided by the Phipps Institute which obtained it several years ago from E. R. Baldwin. Planted at room temperature on the usual media it gives a rich white growth which at first often has the consistency of very thick cream but with age assumes the wrinkled growth more familiar in acid fast bacterial cultures. Both young and old growths are completely acid fast when stained by the Cooper modification<sup>1</sup> of the Ziehl-Neelson technique.

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<sup>1</sup> Cooper, F. B., *Arch. Path. Lab. Med.*, 1926, **2**, 382.

Dissociation was readily brought about by following Petroff's procedure<sup>2</sup> of dilution platings on egg medium containing sodium taurocholate. The rough strain gives the usual wrinkled surface growth on fluid media. Streaked on solid it yields a coarse mealy mass. The smooth strain clouds glycerinated broth and produces a luxuriant mucoid growth on solid media. By transplantation from old Petroff bottles 2 S strains have recently been isolated which differ greatly from one another in their mucosity, one being so fluid that it will almost drip from the surface of an inverted Petri dish.

Micro motion picture records show that these R and S dissociants grow in very different ways. The completely dissociated R organisms lie closely packed together as they multiply. They show little tendency to spread over the medium and commence early to overlie one another, forming thereby a thick tangled mass of bacilli. Micro colonies of the S organisms thus far photographed, on the other hand, strikingly resemble those of highly capsulated pneumococci. Several bacilli placed close together when seeding a micro field will not elongate for the first day or two. Instead, after a brief lag period they begin to move apart, apparently owing to the elaboration of a large volume of highly viscous material. Subsequent elongation and division result in chains of bacteria separate from adjacent chains by several bacterial diameters. When displaced by the crowding that results from continued multiplication, the chains move without touching one another. At this time they often are seen to oscillate in exactly the fashion to be expected of solid particles suspended in a slowly flowing jelly. The refractive index of this substance bathing the bacteria appears to rise as the culture ages because, while the seed organisms are at the outset black and highly refractile, their progeny rapidly become more and more transparent.

These observations together with other phenomena clearly shown in the motion pictures make it evident that the smooth strains of *M. ranae* I produce a voluminous substance which has no counterpart in the growth products of the rough variant. Such a difference between R and S acid fast organisms is not limited to the frog bacillus. Dissociated strains of the turtle bacillus, *M. chelonei*, behave similarly though the S strain thus far obtained is not so fluid, and its individual organisms are separated by distances not so great as those found with *M. ranae* I. Furthermore, preliminary photographs of a smooth culture of avian tubercle bacilli made by K. C. Smithburn

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<sup>2</sup> Petroff, S. A., and Steenken, W., *J. Exp. Med.*, 1930, **51**, 831.

and the writer indicate that a similar material is elaborated by this organism. In view of the established<sup>3</sup> greater pathogenicity of the S than of the R strains of *B. tuberculosis avium*, certain possible implications of these observations are obvious. They are being examined and will be discussed in a later more detailed description of this work.

## 6780

**Total and Thyroxine Iodine Content of Thyroid Gland After Injection of Saline Anterior Pituitary Extracts.**

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The striking hyperplasia of the thyroid gland produced experimentally by injection of anterior pituitary extracts<sup>1</sup> affords an unusual opportunity to study the intermediate iodine metabolism of the hyperplastic thyroid gland under adequately controlled conditions. It is now well established that following parenteral administration of anterior pituitary extracts there is a decrease in the total iodine content of the thyroid gland, as shown in the dog,<sup>2, 3</sup> guinea pig,<sup>4</sup> duck,<sup>5</sup> and chick.<sup>6</sup> Closs, Loeb and MacKay<sup>4</sup> investigated the nature of this decrease in total iodine further by alcoholic fractionation of pooled thyroid glands of guinea pigs previously treated with anterior pituitary extract. They found a consistent and significant decrease in the alcohol-insoluble or "organic" fraction of the total thyroid iodine. Grab<sup>7</sup> employed the Reid Hunt acetonitrile test to compare the protective potency of thyroid glands of dogs treated with anterior pituitary preparations with that of untreated dog thyroids. The results were variable, but as the average potency

<sup>3</sup> Winn, W. A., and Petroff, S. A., *J. Exp. Med.*, 1933, **57**, 239.

<sup>1</sup> Literature reviewed by Loeb, L., *Klin. Woch.*, 1932, **11**, 2121.

<sup>2</sup> Loeser, A., *Klin. Woch.*, 1932, **10**, 2047; *Arch. exp. Path. u. Pharmacol.*, 1931, **163**, 530.

<sup>3</sup> Grab, W., *Arch. exp. Path. u. Pharmacol.*, 1932, **167**, 413.

<sup>4</sup> Closs, K., Loeb, L., and MacKay, E., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **29**, 170; *J. Biol. Chem.*, 1932, **96**, 585.

<sup>5</sup> Schockaert, J. A., and Foster, G. L., *J. Biol. Chem.*, 1932, **95**, 89.

<sup>6</sup> Unpublished data.

<sup>7</sup> Grab, W., *Arch. exp. Path. u. Pharmacol.*, 1932, **167**, 313.