with tuberculosis within 5 weeks after inoculation. All showed strongly positive tuberculin tests, local lesions at the site of injection, gross evidence of tuberculosis in the inguinal glands, spleen and liver, and stained smears revealed typical acid-fast bacilli. Cultures from these organs yielded macroscopic growth in all cases. Histological examinations proved positive.

This investigation is now being repeated and extended but so far has definitely established that *B. tuberculosis* could be recovered from the blood of approximately half of 42 male psychotic patients examined by the Loewenstein method in the absence of any clinical signs of tuberculosis, while the blood of 12 controls remained negative.

The interest and assistance of Dr. C. O. Cheney, Director, was invaluable during this investigation as was that of Lenore M. Kopeloff and John L. Etchells in our laboratory.

6996 P

Somatic Myogenic Action in Embryos of Fundulus Heteroclitus.

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Five phases in the development of motility in this species can be recognized. (A) Localized spontaneous contractions within the trunk (part attached to the yolk-sac) only; tail-bud, immotile. (B) All movements spontaneous; integrated contractions throughout the trunk, but slow in execution and relaxation; localized contractions only in the proximal part of the tail; distal part, immotile. (C) The general integrated contractions are quick; involving about the proximal half of the tail with the trunk; localized contractions only in the most distal myotomes of the region involved in the general integrated contractions, or just behind it, the more distal myotomes being immotile. This phase is marked by the beginning of tactile sensitivity. (D) The general contractions involve the entire trunk and tail; localized spontaneous contraction only at the tip of the tail and in the pectoral fin. (E) Localized movement of the tail has ceased, and the pectoral fin, like the caudal fin, becomes integrated with the total action pattern, without capability of local reflexes.

The skin of the embryo and yolk-sac being highly impervious to

curare, the drug was injected into the yolk-sac, or the latter was cut open while immersed in the solution in order to distinguish myogenic from neurogenic action. In embryos of phase A, under the action of curare, contraction of the myotomes occurred as much as 15 minutes after the circulation of the blood had ceased. This is accepted as conclusive evidence that all muscular contraction of this phase is purely myogenic. In embryos of phase B, injected with curare, spontaneous movements are localized at different levels within the trunk and originally motile part of the tail: integration of the system as a whole is lost. Compression of the fourth ventricle, in some cases, excites movements in all the myotomes that were originally contractile, but in others it excites movement only in the originally motile myotomes of the tail. The contraction of more posterior myotomes in response to compression of the cerebrospinal fluid while the anterior myotomes are passive is accepted as conclusive evidence that these movements are myogenic, for if they were excited through the nervous system the parts nearest the center of compression would also respond. The posterior myotomes which act in this manner are those which normally undergo spontaneous localized contraction. All the myotomes that are normally contractile are capable of myogenic action, but those in the base of the tail are purely myogenic, the more anterior being normally neurogenic. Embryos of phase C, treated with curare, become insensitive to tactile stimulation, but may yet respond to compression of the fourth ventricle. In some there occurs general spontaneous contractions in all the myotomes that are normally contractile, but in most of them spontaneous contraction occurs only in the tail. Infrequently compression of the fourth ventricle excites general flexures, but mostly only contractions in the tail and particularly in its distal half. According to the criteria used in connection with phase B, all of the normally contractile muscles are capable of myogenic action in some specimens but not in all, the normally neurogenic system has extended a considerable distance into the tail, the purely myogenic system has moved farther tailward, and the nonmotile system involves only the tip of the tail. The myotomes that normally undergo localized spontaneous contractions are purely myogenic, although under normal conditions the more rostral of the myogenic series may be stimulated, probably by mechanical stress, to act with the neurogenic system. Fishes of phase D, within a few minutes after injection, become insensitive to touch, but the entire tail in some specimens moves spontaneously or in response to compression of the fourth ventricle, while in others only the tip

of the tail moves under these conditions. Late in this phase the pectoral fins move spontaneously for 9 minutes or more after the fish has become insensitive to touch. In phase D, therefore, the myotomes of the trunk are purely neurogenic in action, while the movements of the caudal and pectoral fins are purely myogenic, and most of the tail, although potentially myogenic in function, is normally neurogenic.

The axial somatic muscles and those of the pectoral fin are first purely myogenic and finally purely neurogenic in action, and between these pure states is an intermediate one in which the contractions are potentially myogenic but normally neurogenic.

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Effect of Parathormone on Bone Phosphatase Activity in vitro.

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The relationship between hormonal and enzymic activity is of considerable biological interest. Kay[1] noted high plasma phosphatase values in generalized *ostitis fibrosa*. Page[2] reported a decrease in the bone phosphatase in rats after parathormone injections. Bodansky and Jaffe[3] obtained increases in plasma phosphatase 8 hours after injection of single large doses in the dog and decreases in the guinea-pig after 1 and 2 days.

Heymann[4] reported a direct effect of parathormone *in vitro*. He observed decreases of 50 to 100% in bone phosphatase activity when 0.1 units of parathormone were added per cc. of hydrolysing mixture. The effect on kidney and intestinal phosphatase was much less marked. He conducted his experiments at a pH of 7.7 using a 50% concentration of a phosphatase preparation which had been extracted from the tissue with glycine buffer. Sodium glycerophosphate and hexosephosphate were employed as substrates. The parathormone was added in a glycine solution.

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[3] Page, I. H., *Biochem. Z.*, 1930, **223**, 222.

[4] Heymann, W., *Biochem. Z.*, 1930, **227**, 1.