show a definite increase in vacuolar output subsequent to injection.

Rapid injection of a large quantity of water produces a condition which apparently requires profound physiological reorganization. After the first violent reaction to this treatment, the ameba temporarily assumes a limax form, and, during the readjustment period the diastolic interval of the vacuole is lengthened. As the organism approaches the normal state, gelated regions reappear, and the vacuole shows a marked increase in the fluid output. Repeated small injections, in close sequence, may result in the production of a fluid limax form, which then becomes readjusted to the normal state in the manner just described for large injections. During readjustment, the rate of contraction is accelerated and the fluid output is greatly augmented.

[1] Chambers, Robert, and Reznikoff, Paul, *J. Gen. Physiol.*, 1926, viii, 369-401.

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Microinjection of Urea into the Protoplasm of Amoeba dubia.

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(Introduced by Robert Chambers.)

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Urea is slowly but progressively toxic to amebae when added to the immersing fluid. This toxic condition is evidenced by withdrawal of radiate pseudopods, change to unipodal form of locomotion, and, finally, by rounding up and quiescence. If sedimentation of granules and crystals is taken as a criterion of fluidity, it is concluded that the endoplasm is in a state of liquefaction in a high percentage of cases (M/12 to M/48 urea).

Injection of urea into the internal protoplasm uniformly produces liquefaction. The contractile vacuole, thus deprived of a gelated region for mechanical support,* becomes greatly dilated. It is usually carried anteriorly, and may be artificially emptied by pressure of a blunt microneedle. Small accessory vacuoles of the explosive type may still function in the gelated area maintained just under the plasmalemma. After injections of strong solutions, the plasmalemma blisters over the entire surface. Dilute injections cause the formation of clusters of uroid-like pseudopods.

* See previous paper in same issue.

It is probable that the liquefaction of the internal protoplasm after penetration or injection of urea is due to the chemical property commonly attributed to this substance, *i. e.*, its dispersive action on colloids.

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Extraction of Precipitable Substances of Bacilli with Dilute Alcohol.

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Attempts to verify the statements of Schlemmer[1] and Pick[2] on alcohol soluble specific substances of typhoid bacilli did not give us satisfactory results. On the other hand, in a similar way as described recently for the *V. Cholera,*[3] it was possible to extract precipitable substances of *B. typhosus* with boiling 75 per cent alcohol. With common typhoid immune sera the solution of the substance gave weak precipitation only. It reacted intensely, however, with immune sera made by injections of small amounts of the preparation itself. These sera, in contrast to common typhoid immune sera, were very weakly agglutinating and produced little precipitation in extracts obtained by heating the bacilli to 60° C. in saline solution. The latter extracts reacted strongly with common typhoid immune sera. The relation of our product to that obtained by Douglas and Fleming[4] by digestion with trypsin remains to be determined.

In specificity tests cross reactions were observed between the substances of *B. typhosus* and *B. paratyphosus B.* when tested with the corresponding immune sera. The extracts of *B. paratyphosus B.*, Proteus (OX 19 and HX 19) prepared with 75 per cent alcohol like that of *B. typhosus,* gave strong precipitation reactions with the homologous immune sera obtained by injections of whole bacilli.

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[1] Schlemmer, *Arb. Reichs. ges. amt.*, 1920, lii, 538.

[2] Pick, E. P., *Beitr. chem. Physiol. u. Path.*, 1902, i, 393.

[3] Landsteiner, K., and Levine, P., PROC. SOC. EXP. BIOL. AND MED., 1926, xxiv.

[4] Douglas, S. R., and Fleming, A., *Brit. J. Exp. Path.*, 1921, ii, 131, 175.