Blood smears of a native rat, probably a species of *Euneomys,* caught at Verrugas Canyon, have shown nothing definite. Smears of the blood of dogs and burros, doves and ground-owls from the same locality have likewise proved negative. The vizcachas, *Viscaccia* spp., are contraindicated as a reservoir of verruga. It has not yet been practicable to secure vizcacha blood smears from the verruga zone, but these animals do not occur close to the house in Verrugas Canyon, where the *Plebotomus* is very abundant in the rock walls, which it evidently leaves only to enter the house or attack persons and animals close by. Therefore these particular gnats are precluded from deriving their infection from the vizcacha, and they are well known to be infected at most times if not continuously.

In conclusion it may be pointed out that, on *a priori* grounds, the inference is logical that the lizards constitute a verruga reservoir. The *Phlebotomus* passes the daylight hours within the darkened recesses of the loose stone walls and piles of rock in order to escape wind and strong light. Lizards inhabit the same places, finding their food there and coming out only briefly at rare intervals to sun themselves. The *Phlebotomus* is always ready to suck blood in the absence of light and wind, and has been found more prone to suck reptilian than mammalian blood. Nothing is more natural than that the *Phlebotomus* should suck the blood of the lizards to a large extent during the day, and this is what actually happens. If the *Phlebotomus* carries verruga, and this is already demonstrated to be the fact, it follows that the lizards must become infected therefrom even if they were not originally so. That they are probably the original reservoir of the disease is indicated in general by the constant host relation which obtains between *Phlebotomus* and reptiles the world over and specifically by the mutual habitat of the two which has resulted in their being thrown continually together since their existence began.

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Chosica, Peru,
April 27, 1914

Special Articles

On the Antagonistic Action of Salts and Anesthetics in Increasing Permeability of Fish Eggs (Preliminary Note)

In previous papers[1] it was shown that pure salt solutions and nicotine increased the permeability of fish eggs and that these permeable eggs developed abnormally, giving rise to cyclopia and other abnormalities common to fish embryos. During the present season I have observed a few cyclopic or one-eyed pike embryos in the hatching jars of the State Fish Hatchery, St. Paul, Minnesota. Eggs of the pike and muskalonge were found to live in water re-distilled in quartz and to be adaptable to permeability experiments. Pike eggs were used, and although they were not as impermeable as Fundulus eggs, they were normally but very slightly permeable to salts. They were placed in distilled water and in solutions of anesthetics or of sodium nitrate, and the chlorides diffusing out of them estimated quantitatively with the nephelometer. Except for the use of the nephelometer, which admitted of a quantitative estimation of very minute quantities of chlorides, the technique was the same as given in the previous papers. If one or more eggs died in an experiment, it was repeated. Pike eggs will live in 3 per cent. alcohol for many days and in 6 per cent. alcohol for a considerable length of time.

Six per cent. alcohol, or $\frac{1}{3}$ saturated (more than 1 per cent.) ether, or $\frac{1}{10}$ molecular sodium nitrate increased the permeability of the eggs. This change was irreversible, but did not kill the eggs—after the eggs were put back into distilled water they remained permeable.

When a salt and an anesthetic were combined in the same solution, it was found that the anesthetic antagonized the action of the salt. This antagonism was not very marked, but seemed to be constant. The method of procedure is shown by the following example: A mass of pike eggs was divided into three exactly equal lots. Lot 1 was placed in 50 c.c. $\frac{1}{10}$ molecular $NaNO_3$. Lot 2 in 50 c.c. $\frac{1}{10}$ molecular $NaNO_3$ containing 3 per cent. alcohol.

[1] McClendon, Science, N. S., Vol. 38, p. 280; and *Internat. Zeitsch. f. Physik.-Chem. Biologie,* 1914, Vol. 1, p. 28.

Lot 3 in 50 c.c. $\frac{1}{10}$ molecular $NaNO_3$ containing $\frac{1}{2}$ per cent. ether. At the end of eight hours, the water was removed from each lot, evaporated in quartz vessels to 3 c.c. and examined with the nephelometer. The water from lot 2 contained $\frac{1}{2}$, and that from lot 3 contained $\frac{3}{4}$ as much chlorides as that from lot 1.

Two conclusions may be drawn from these experiments.

1. Pure salt solutions or anesthetics, in concentrations approaching the lethal dose, irreversibly increase the permeability.

2. Anesthetics in about $\frac{1}{2}$ the above concentration (which is about the concentration for narcosis) antagonize the action of pure salt solutions, so that the combined action is less than the action of the salt alone in increasing permeability.

It has been shown that the permeability of muscle is increased by stimulation.[2] Anesthetics in certain concentrations tend to inhibit the stimulation of muscle. Perhaps they do so by inhibiting the increase in permeability. This idea is not new, but new facts are brought in support of it.

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THE EFFECT OF SOIL CONDITIONS ON THE TASSELS OF MAIZE

CONSIDERABLE work has been done on the effect of various factors of environment on the growth of the maize plant. Most of these studies have been confined to the pistillate flowers, or the ear, and comparatively little attention has been given to the tassel which produces the pollen.

Lazenby,[1] on studying a number of varieties of corn, showed that the number of flowers upon a stalk varied widely even in the same variety. He also found a certain relation between the number of pistillate and staminate flowers produced by the corn. This relation was not the same for all types.

In work carried on at the Utah Experiment Station by the author and his associates on the effect of soil factors on plants, a study was made of the number of branches produced in the tassels of maize.

The corn was raised at the Greenville experimental farm on a uniform soil that had received no manure for many years previous to beginning this experiment in 1911. There were 36 plats in all, 12 having no manure applied, 12 receiving at the rate of 5 tons to the acre and 12 receiving 15 tons. The size of each plat was 7 x 24 feet.

Each manuring treatment contained six different irrigation treatments of two plats each as follows: (1) no irrigation, (2) 5 inches, (3) 10 inches, (4) 20 inches, (5) 30 inches and (6) 40 inches. The water was applied in irrigations of five inches each. When the plants were a few inches high they were thinned so that each plat contained the same number of plants.

Before harvesting a count was made of the number of branches in the tassel of each plant and averages made for the plats. A record of the number of ears produced on each plat was also made. The work has been carried on for three years. A summary of the results follows:

EFFECT OF MANURE ON THE NUMBER OF BRANCHES PER TASSEL OF MAIZE

Manure Applied	Number Plats Each Year	Number of Branches per Tassel			
		1911	1912	1913	Average
None.....	12	15.45	12.85	13.65	13.98
5 tons.....	12	17.29	14.89	18.61	16.92
15 tons.....	12	18.75	16.09	21.47	18.77

The number of ears produced on each plat was as follows:

Manure Applied	Number of Ears per Plat			
	1911	1912	1913	Average
None.....	70	59.25	49.3	59.52
5 tons.....	75	75.41	66.5	72.30
15 tons.....	75	78.08	83.5	78.86

[1] Lazenby, W. R., "The Flowering and Pollination of Indian Corn," *Proc. Soc. Prom. Agr. Sci.* (1898), pp. 123–129.

[2] McClendon, *Am. Journal Physiology*, Vol. 29, p. 302.