

exconjugant line with that attained by its parent line during the first 15 days after the former's origin gives the following results. Forty-two exconjugant lines produced more generations, eight produced less generations and two produced essentially the same number of generations as their respective parent lines. The various cases in which the parent line did not survive the first fifteen days after the exconjugant line was derived from it are not comprised in these data. If such cases were included it obviously would increase the number of plus cases of exconjugant lines.

Analysis of the data thus far obtained inevitably leads to the conclusion that the exconjugant lines of this pedigree culture of *Spathidium*, under the conditions of the experiment, exhibit, in the great majority of cases, a higher division rate for the first fifteen days after conjugation than the parent lines.

The evidence to date also indicates that exconjugant lines which are derived from old parent lines (*i.e.* from lines which have undergone many generations since conjugation) show a relatively greater increase in the division rate, during the first fifteen days, as compared with the parent lines, than do exconjugant lines which are derived from young parent lines (*i.e.*, from lines which have more recently conjugated).

The complete paper will appear in the *Journal of Experimental Zoölogy*.

120 (1702)

### Comparative study of ethanol, caffeine and nicotine on the development of frogs' larvæ.

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The effects of ethanol, caffeine (alkaloid) and nicotine (alkaloid) solutions were studied on the growth and development of the larvæ of two species of frogs, viz., *Rana sylvatica* and *Rana palustris*. The study of the larvæ was begun immediately after hatching from the eggs and continued on tadpoles of older ages. Tadpoles of the same species and ages were placed in solutions of the above drugs of various concentrations and the effect of the poisons was noted.

It was found that the toxicity of the drugs varied with the age of the tadpoles and with the nature of the drug. Very young tadpoles succumbed much more quickly to all the poisons than the older ones when placed in solutions of the drugs of the same concentration. Tadpoles 1 and 2 days old quickly died in all the solutions unless the drugs were present in a very dilute concentration. Older tadpoles continued to live in solutions of all the drugs longer than was at first expected. The most toxic of the 3 drugs in point of dosage was nicotine. Next in toxicity came caffeine and the weakest of the 3 drugs studied was ethanol. It was surprising to find that while caffeine even in great dilution proved deleterious to the growth and development of the tadpoles, ethanol affected the animals to a much lesser degree. Thus it was found that while tadpoles of the age of 8 days when placed in a solution of nicotine, 1-50,000 succumbed on the 23d day, other tadpoles of the same age placed in caffeine solution, 1-10,000 died on the 12th day, while still other tadpoles of the same age placed in a solution of ethanol, 1-100, by volume, lived as long as 40 days. It was furthermore noted that tadpoles placed in solutions of ethanol, 1-500, lived even longer and appeared to be but slightly affected by the drug. Further experiments on the subject are in progress. This investigation was begun in the spring of 1920.

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**The nutritive properties of milk with special reference to growth and reproduction in the white mouse.**

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In a recent paper<sup>1</sup> from this laboratory some success was reported in correcting the failure of rats to reproduce by the addition of yeast to a ration of powdered whole milk. The value of yeast had been indicated by some simultaneous experiments on the white mouse. As was suggested by Miss Wheeler some years ago,<sup>2</sup> the mouse, unlike the rat, cannot grow normally on an ex-

<sup>1</sup> Mattill, H. A. and Conklin, R. E., *J. Biol. Chem.*, 1920, xlv, 137.

<sup>2</sup> Wheeler, Ruth, *J. Exp. Zool.*, 1913, xv, 209.