since it is clear from many investigations that the reactions of paramæcia to various stimuli are greatly modified by the past and present environment of the organisms.

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Conjugation of closely related individuals of Stylonychia.

By **GEORGE ALFRED BAITSELL.**

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A "wild" *Stylonychia pustulata* was isolated from a laboratory aquarium on October 1, 1910, and placed on a "constant" beef extract medium. This culture, which consisted of four lines, was kept on depression slides and the animals were isolated daily. The medium proved to be a favorable one for this animal and in a period of about four months the culture reached the 350th generation. At that time (February 5, 1911), when for ten days they had been dividing at an average rate of over three divisions per day (which was the highest rate of division that they had attained) a considerable number of conjugations between closely related cells occurred in the "stock" of the culture left over from the daily isolations. For a period of about three weeks this phenomenon was quite general in the stock and apparently would occur whenever a sufficient number of animals were present on a slide. To study the effects of conjugation, 132 conjugating pairs were isolated. These were kept in exactly the same kind of medium as that in which the conjugation had occurred so that the character of their environment was not changed by the isolation. From over 90 per cent. of the isolated conjugating pairs, ex-conjugants were obtained (after a union of the usual duration) which were perfectly normal in general appearance and behavior. However, none of these ex-conjugants divided and none lived 48 hours after separating. Animals obtained from "split" conjugating pairs also died without dividing. It was impossible to prolong the life of the ex-conjugants by any of the methods tried. Also from the time that the epidemic of conjugation made its appearance there was a continuous and rapid fall in the division rate of the main lines of the culture when averaged for ten-day

periods, and by the 25th day following, the entire culture had died out. In another culture, which was started from this one at the 150th generation and kept on a hay infusion medium, conjugation did not occur and this culture is still alive.

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The cultivation of tissue in plasma from alien species.

By **ROBERT A. LAMBERT** and **FREDERIC M. HANES.**

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The present series of experiments have been concerned with the attempt at cultivating in vitro rat sarcoma, rat spleen and mouse carcinoma, in plasma obtained from animals of other species, and at analyzing the factors contributing to the phenomena observed.

In a former note we recorded the fact that mouse and rat plasma could be interchanged as culture media for the tumors of these species, but that growth seemed to be more vigorous when homologous plasma was used. Guinea pig, rabbit, dog, goat, human and pigeon plasmas have been employed in the studies herewith reported.

For determining the viability of tissue under the conditions of the experiment we have made transfers of the pieces to homologous plasma—a rapid and satisfactory test. Animal inoculations have also been made in the case of tumor tissue, but aside from the delay in noting the results the procedure has other objections.

As a culture medium for rat sarcoma guinea pig plasma is only slightly less suitable than rat plasma, the difference consisting chiefly in the extent of the out-wandering of cells. The cells may remain viable in a single drop of plasma for twelve days or more; we have had pieces which showed marked activity after a month's sojourn in several drops of the alien medium. Mouse carcinoma seems to grow almost as well in guinea pig plasma as in rat plasma. Mitoses have been observed after eight days, and cultures nine days old produced tumors when inoculated into mice.

Rabbit plasma is distinctly less suitable for the growth of mouse