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**Beef extract as a "constant" culture medium  
for *Paramæcium aurelia*.**

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Previous work with pedigree cultures of *Paramæcium aurelia* and *caudatum* has apparently shown that the life history of these forms, when bred continuously on infusions of hay made up exactly the same from day to day, tends to run in a cycle which terminates with the death of the culture. Previous work (Woodruff) has also shown that *Paramæcium aurelia* may be bred indefinitely on a culture medium which is frequently varied.

In view of these results the following question is of interest: Is the longevity of paramæcia on a "varied environment" dependent upon the intrinsic stimuli from the frequent changes in the medium, or is a "constant" medium of hay infusion unfavorable because it lacks some elements which are essential for the continued existence of this protozoon? To test this point beef extract was chosen because it was believed that it contains all of the essential elements. After a series of preliminary tests, a .025 per cent. solution of Liebig's extract of beef was decided upon for the experiments.

Briefly, it may be stated that the solution of beef extract employed has proved (during the seven and one half months of the experiment) to be practically as favorable a medium for the reproduction of the pedigree culture of *Paramæcium aurelia* as the "varied" culture medium; and therefore the conclusion seems justified that this culture can, in all probability, be continued indefinitely on this medium, and that it is the "composition" of the medium rather than "changes" in the medium which is conducive to the unlimited development of this culture without conjugation or artificial stimulation. It is also believed that a "constant" medium of beef extract, in this or similar solutions, will prove to be a favorable culture medium in which to breed pedigree cultures of paramæcia for certain physiological studies,

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*.**

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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