of the cells within the first few hours to about the same extent as the prototroph yield is increased, the multiplication being supported by growth factors present in the supernatant liquid and presumably derived from the full medium on which the parent strains were cultured.

On the other hand, the experiments with the *Hfr* strain, while supporting the former conclusion, also give some indication that the high frequency of recombination in crosses involving the *Hfr* strain is not to be accounted for in the same way as the behaviour of the supernatant liquids.

More details and further results will be published later.

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[1] Lederberg, J., *Genetics*, **32**, 505 (1947).
[2] For the composition of media and the meaning of symbols, see Lederberg, J., ref. 1.
[3] Cavalli, L. L., 100th meeting of the Genetical Society (Cambridge, 1949).

An Example of Parasitism among Polychætes

I have observed a case in which the young of one polychæte annelid, *Arabella*—probably *A. iricolor* (Montagu), the cosmopolitan species which is common to the Woods Hole area—parasitizes another polychæte, namely, *Diopatra cuprea* (Bosc.). On August 24, I recovered fifty-three complete worms of the genus *Arabella*, and the parts of approximately ten others from one adult *Diopatra*. The segment from which the parasites were recovered was approximately one and a half inches in length. The *Arabella* ranged in size from small worms of approximately thirty segments without eyes or setæ to large worms with four eyes (arranged in the transverse row typical for the genus) and with numerous segments (up to approximately 180), some of which contained setæ. The largest parasite was approximately 5 cm. in length, as compared with the adult *Arabella*, which ranged in size from 50 cm. to 60 cm. in length[1]. The larger parasitic *Arabella* appeared to lie free in the cœlom, whereas the smaller ones were held in place by the small parietal blood vessels in the body-wall of *Diopatra*.

On August 27, a second infected *Diopatra* was observed. This animal and the other infected worm came from the same batch, which was dug at Hadley Harbor, Nonamesset Island, near Woods Hole, Massachusetts. Most of the *Arabella* recovered from the second infected animal were small. Twenty-six complete worms and parts of approximately four others were obtained. Most of these small parasites had no eyes, no setæ, and relatively few segments, a number having as few as seven segments.

Several years ago, during the first part of August, Dr. Frank Brown observed three or four large *Arabella* emerging from the body cavity of *Diopatra* (personal communication). He suspected, at that time, that *Arabella* may normally go through certain stages of its life-history as a parasite in *Diopatra*. The observations reported here confirm Dr. Brown's suspicions.

The significance of these observations lies in the fact that very few cases of parasitism have ever been described among the polychætes and rarely, if ever, has a polychæte been described which parasitizes another polychæte. Dr. Ralph Smith[2] has reviewed a case which was described by Koch in 1847 as an example of viviparity in *Marphysa*. Certain later workers considered this to be a case of a parasitic lumbrinereid. It may be noted that *Marphysa*, *Lumbrinereis*, *Diopatra* and *Arabella* are all members of the same family, the Eunicidæ.

Just how the stages of *Arabella* here reported get into the tube-dwelling *Diopatra* is, as yet, an unsolved problem.

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[1] Fauvel, P., "Polychètes Errantes" (Faune de France, **5**), 1 (1923).
[2] Smith, Ralph I., *J. Morph.*, **87**, 417 (1950).

Hunger-Reaction of Flies (*Musca*) and the Functions of their Stomatogastric System

During my work with house flies (*Musca domestica* L.) I noticed one day that the bodyless heads of about ten flies all made drinking movements when their tongues came in contact with sugar water, but, probably due to quick desiccation of the œsophagus, no sugar water ever passed through this passage. After some time, the sucking movements became more vigorous and then rather suddenly stopped. In the case of flies with their tongues forcibly in touch with sugar water, the pumping activity of the fulcrum, even when the crop was full, never ceased. Only the contra pressure from the crop prevented a further intake. These experiments suggest that the sucking reaction takes place independently of the hunger- or thirst-condition of the fly.

Allowing a fly to walk over a sheet of filter paper sprinkled with sugar water, it was found that a starved fly will stop as soon as one of its front tarsi comes in contact with a moistened spot, stretch out its tongue and try to drink.

In a number of starved flies the crop was ligatured. Two of these flies showed hunger-reaction after the operation. In four cases when the crop was removed after a small meal, the flies' hunger-reaction remained. The reverse experiment, in which the crop was removed from three flies after they had been allowed to eat as much as they desired, showed that none of them behaved as if it was hungry. Flies without a crop eat often and little at a time, but otherwise they behave normally. Seven flies had the abdomen removed after a big meal. Not until an hour or two later did their thirst- and hunger-reactions return, and then their reactions to sugar water and distilled water increased rapidly. The flies were able to detect a droplet of water near them by means of their antennæ, and then if their front tarsi were simultaneously brought into contact with droplets of sugar water and pure water, they turned towards the sugar water. From these experiments it may be concluded