

When the eggs from the donor (hooded) strain are of a later stage than those of the recipient animal, only 10% developed (2 out of 20 egg transplants).

When the eggs from the hooded strain (donor) were transplanted at a stage younger than those secured from the recipient animal, implantation occurred in 80% (16 out of 20). In these cases, some of the eggs of the recipient animal had entered the uterine horn before the donor eggs (hooded) were introduced. The embryos from the 2 sources were spaced at regular intervals in the uterine horn. The development of the donor (hooded) embryos was, however, noticeably retarded when compared with those developing from the recipient (white) mother.

Development was permitted to continue to the end of the period of gestation in several cases and the young were born normally. In the cases in which the eggs of the donor and recipient were of the same stage of development, the young were all born at the same time. When the donor eggs were of later stage than those of the recipient the gestation period was not completed in any experiments so far performed. The donor eggs which were transplanted when they were in an earlier stage of development than those of the recipient were born later than the ones normal to the recipient. The maximum interval so far obtained is 48 hours, resulting in the prolongation of pregnancy to that extent as well as involving a separate second birth process 2 days later than the first.

Further experiments are in progress to determine how far this process of increasing the gestation period can be prolonged by varying the differences in the ages of the donor and recipient.

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#### Oxygen Consumption of Egg: A Quantitative Study of Oxygen Consumption of Single Developing Eggs (Orthoptera).

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Respiratory metabolism has been determined and correlated with the morphological development of single grasshopper eggs (*Melanoplus differentialis*) from the time of laying to hatching at constant temperature of 28° C.

A rhythmic rise and fall in the oxygen consumption occurs dur-

ing the successive stages. A gradual increase takes place up to about the ninth day (Fig. 1, I) which marks the peak during the early formation and differentiation of tissue. From this point the usage of oxygen steadily falls until the embryo enters into a state of quiescence (diapause), on or about the 21st day. During diapause, the embryo uses the minimum amount of oxygen. After the diapause block is destroyed and active development begins (Fig. 1, Ia) there is an immediate rise in oxygen consumption which continues through the remaining 3 morphological periods, characterized respectively by the revolution of the embryo (Fig. 1, II), the engulfment of the yolk by the growth and closure of the lateral walls (Fig. 1, III), and the period of rapid growth ending with hatching (Fig. 1, IV).

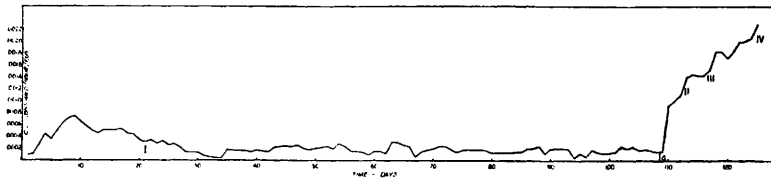


FIG. 1.

Rates of oxygen consumed during the entire development of typical egg at 28°C. Roman numerals designate the end of each developmental period; ordinates, cubic centimeters of oxygen consumed per hour per egg; abscissae, time in days indicated.

The total volume of oxygen consumed by each egg, as well as the percentage of the total volume used during each period of embryonic development, has been measured. The volume used by various eggs during corresponding intervals of growth shows a close correlation irrespective of: (a) the difference in total volume used; (b) the differences in volume used during respective periods; (c) the differences in time required to cover the respective developmental interval. When the oxygen consumption for a period varies either as to amount of energy used or time required to complete that phase of development, the following period tends to compensate for the difference.