mitotically dividing cell remains in all mitotic phases about 7 times as long as in the last 2 phases.

Group III indicates that 1 or 2 previous hemorrhages may have no great effect on the % M.D.C. Group IV shows that when an animal is subjected to extensive (No. 145) or moderate (No. 146) recurring hemorrhages no great change occurs in the % M.D.C., except possibly at the end, when the animal becomes less active; and the total count decreases. On the 14th day, No. 145 was feebly active and hard to bleed, necessitating the use of blood from the leg; this may in part account for the high values then obtained. The facts that No. 145 bled freely on all days except the 14th and that its total count decreased indicate that each hemorrhage but the last was followed by a readjustment involving (1) a replacement of lost plasma by fluid and (2) a failure to replace all of the lost blood cells. No. 146, suffering slighter hemorrhages, seemed able to replace lost cells and fluid, maintaining its total count and always bleeding freely.

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Some Effects of X-Ray Irradiation on Respiration and Development.*

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In much of the previous work on the biological effects of X-rays morphological criteria alone have been used. It is, therefore, impossible to tell whether certain end-points are reached in similar or far different manner. This report states briefly the findings of a study of the effects of different intensities of irradiation on the oxygen consumption and development of the larva of the Mud-dauber Wasp *Sceliphron caementarium.*

The method used to separate latent-developing (diapause) larvæ from the developing organisms has been described.[1] Correlations between the morphological stages in development and the respiratory curve are also pointed out.

Four distinct morphological and physiological stages are distin-

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[1] *Biol. Bull.*, 1932, **63**, 235.

guished—larva, post-larva, pre-pupa, and pupa. When the diapause factor is present the organism remains normally in the quiescent larval stage for several weeks before developing. Such organisms when irradiated with 300-400 R. Units at the beginning of diapause remain in that condition several weeks longer than the controls. Higher intensities of irradiation (600-700 R. Units) shorten, and may even destroy the diapause factor, allowing the larva to develop at once. Still higher intensities (800-1500 R. Units) destroy diapause and permit of development which is subsequently inhibited.

Organisms in which the diapause factor is no longer present are accelerated by irradiation of 300-400 R. Units. The respiratory rate is higher and the time required to reach the pre-pupal stage is much shorter than in the controls. Six hundred to 700 R. Units inhibit, and 800-1000 R. Units are lethal before the pupal stage is reached.

Irradiation may affect (within limits) the physiological stage, active at the time of the treatment, without affecting following stages. If the physiological stage, dominant at the time of irradiation, is of such a character as to be antagonistic to development, then the response is not only quantitatively different from that of the developing stages, but will be apparently opposite in nature.

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Relationship Between Surface Activity of Homologous Carbamates and Effects on E.M.F. and Oxygen Consumption of Frog Skin.

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From the Zoological Laboratory, State University of Iowa.

The effects of different concentrations of methyl, ethyl, n-propyl, n-butyl, i-amyl, and phenyl carbamate in Ringer's solution on the electric potential of frog skin have been quantitatively and comparatively studied.

The skin of each frog used was divided into 11 pieces which were fastened over the mouths of tubes by means of rubber bands, and were bathed in Ringer's solution maintained at a temperature of 25° ± 0.5° C. Determinations of E.M.F. were made potentiometrically. After a preliminary period of approximately 2 hours in Ringer's solution, the skins were transferred to one containing a certain percentage of carbamate and were finally again placed in Ringer's.