atom than for that reacting with the diplogen atom. The effect of the zero point energy at the top of the barrier is, therefore, to increase the activation energy of the hydrogen atoms to a greater extent than that of the diplogen atoms.

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Dec. 18.

[1] Cremer and Polanyi, *Z. phys. Chem.*, **19** B, 443; 1932. See also Eyring, *Proc. Nat. Acad. Sci.*, **19**, 78; 1933.
[2] Eyring and Polanyi, *Z. phys. Chem.*, **12** B, 279; 1931.

New Developments in *Gammarus chevreuxi*, Sexton

IN the course of some experiments on eye-colour in the amphipod, *Gammarus chevreuxi*, a number of mated pairs were brought in to the Laboratory from the Chelson Meadow salt-marsh between February 20 and March 13, 1933. Half the specimens were placed in an incubator, kept at an approximately constant temperature of 21° C. and half were put in an unheated room.

The F_1 from these pairs numbered 12,164.

The normal eye in the wild *Gammarus* is a compound structure, composed of a number of ommatidia, each of which is provided with five retinular cells containing black pigment, the spaces between the ommatidia being filled with white 'accessory pigment' cells. It is this pigment which gives to the eye of the living animal the effect as of a superficial white network spread over a black ground. In the embryo eye, the retinular pigment commences as bright red, and darkens to black before extrusion.

During the twenty years of our work on this species we have never found any but black-eyed animals in the wild, nor have any changes in eye-structure or in colour appeared in the laboratory cultures before the F_2 generation. Lately, however, we have come to the conclusion that the character of the wild stock is changing. The conditions of its habitat have altered, owing probably to the installation of new sluice gates at the outlet from the salt-marsh. These being operated at infrequent intervals have caused considerable variation in the depth, temperature and salinity of the water in the draining ditches where the *Gammarus* live, and are responsible for what is probably the most influential factor in the change, namely, the great fluctuations in the numbers of the population within comparatively short periods. But whatever the causes may be, we have noticed in recent experiments that not only is there a much higher percentage of variation than formerly, but a much wider range as well.

For the first time, we have had colour changes in the F_1 from the wild, and, for the first time also, a remarkable example of different coloured eyes in the same animal, one eye black and the other bright red. Both instances came from a dredging taken on March 13.

The first, an ovigerous female, which hatched her eggs in the cold room a few days after being brought into the Laboratory, had evidently mated with a heterozygous male in the wild, for her brood when extruded contained 2 red-eyed young and 9 black-eyed. She was then mated with three different males from the same dredging, and gave an F_1 of 62 black with the first, 37 black with the second, and 34 black with the third, the red appearing in the F_2.

The second instance, the specimen with eyes of different colours, came from one of the pairs in the incubator. This pair produced three broods, the first numbering 13 black, and the third, 15 black, died without offspring. The second brood consisted of 14 black and the one-sided red specimen just referred to, which had the right eye red. Fourteen reached maturity, seven black males, six black females, and the one-sided red, a male. The blacks, mated together, gave in some pairs an F_2 of black and red in a 3 : 1 ratio, and in others, all black offspring.

The one-sided red male's matings show that it behaves genetically as a heterozygous black. It was mated with two of the heterozygous black females, giving 77 black and 22 red with one, and 25 black and 12 red with the other. It was then tried with three of the F_2 red females and gave with the first 11 black and 10 red, with the second 10 black and 11 red, but with the third (which was from its own mating with one of the black females) the proportions were unexpected, 2 black and 20 red.

Not one of the offspring of the one-sided red, nor of the thirteen blacks of its brood, has had eyes of different colours, either in the F_2 or the F_3, so far.

With heterozygosity definitely proved to exist now in the wild stock, it seems strange that no red-eyed specimens have yet been found in the ditches. Dredgings have been made throughout the year, and all the animals captured, 5015, examined for eye colour, but all without exception had the normal black eyes typical of the species.

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Endocrine Factors in the Causation of the Creatinuria of Pregnancy

THE following points emerge from the experiments of Schrire and Zwarenstein[1].

1. Castration of male and female rabbits produces an increased excretion of creatinine. In females the excretion of creatine is not affected.

2. Injection of gonadal extracts reduces the high creatinine of castration to the pre-castration level. Injection of anterior pituitary extracts into normal animals produces an increased elimination of creatinine.

3. The castration effect on creatinine is a secondary effect due to functional hypertrophy of the anterior lobe of the pituitary, which occurs as a result of gonadectomy.

The experimental data are explicable on the following assumptions. The pituitary stimulates the formation of creatine. The transformation of creatine to creatinine in the muscles is controlled by the gonads in that they inhibit the formation of creatinine. In the gonadectomised animal, as a result of anterior pituitary hypertrophy, more creatine becomes available, and owing to the absence of the inhibitory activity of the gonads it is completely eliminated as creatinine.

A typical case of acromegaly (male, aged forty-five years) investigated by Mirvish and Schrire[2] excreted 0·59 gm. creatine, 2·58 gm. creatinine in 24 hours (average figures). The presence of creatine in large amounts, and the increased excretion of creatinine, can