was obtained from which the products described by Evans, Emerson and Emerson¹ could be isolated, in addition to a crystalline allophanate, m.p. 70°, which has not yet been examined biologically.

The above purified oil from the rice concentrate deposited on standing a crystalline substance, m.p. 73°, which appears to be an aliphatic mono-unsaturated alcohol containing approximately 20 carbon atoms. After removal of this alcohol, the oil on saturation with cyanic acid in benzene solution gave a complex mixture of substances from which a small amount of an allophanate, m.p. 135°–138°, having the properties of β -tocopheryl allophanate¹, could be isolated together with a larger quantity of an allophanate, m.p. 195°–200°; the parent alcohol of the latter substance is being tested biologically.

In view of the formula of the tocopherols and the probability that they may represent mono-alkyl ethers of durohydroquinone⁶, the occurrence in active rice-germ oil concentrates of the alcohol m.p. 73° may be of some significance. The work on the structure of these various compounds, of which fuller details will be published elsewhere, is being continued.

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¹ Evans, Emerson and Emerson, *J. Biol. Chem.*, **113**, 319 (1936).

² Emerson, Emerson and Evans, *Science*, **83**, 421 (1936).

³ Kimm, *J. Agric. Chem. Soc. Jap.*, **11**, 514 (1935).

⁴ Kimm, *Sci. Pap. Inst. Phys. Chem. Res. Tokyo*, **28**, 74 (1935).

⁵ Karrer and Salomon, *Helv. chim. Acta.*, **20**, 424 (1937).

⁶ Fernholz, *J. Amer. Chem. Soc.*, **59**, 1154 (1937).

Para-Cresol from the Urine of Pregnant Mares

Burrows, Cook *et al.*¹ have recently isolated *p*-cresol, along with certain ketones of the sterol group, from the urine of a man with a malignant tumour of the adrenal cortex. The urine (30 l.) was submitted to an initial hydrolysis by boiling with hydrochloric acid, and 0.75 gm. of *p*-cresol was isolated from the non-ketonic phenol fraction.

It should be recorded that in this Laboratory a similar observation has been made in regard to the urine of pregnant mares. Approximately 110 gm. of pure *p*-cresol, containing no detectable trace of *o*- or *m*-isomeride, was obtained from 400 gallons of mares' urine, which had been submitted to hydrolysis—a considerably higher proportion than that reported by Burrows, Cook *et al.* for a pathological specimen of human male urine. The significance of this finding is not yet apparent.

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Burrows, Cook, Roe and Warren, *Biochem. J.*, **31**, 950 (1937).

Artificial Release of Crossing-over in Meiosis and Mitosis

THE experiments with artificial production of crossing-over described below belong to a new series which were finished in the spring of this year; they enable us to carry our analysis much further and bring out a series of facts which are entirely new. The following are the main conclusions drawn from this work:

1. (a) X-ray treatment of *Drosophila melanogaster* males induces not only spermatogonial, but also meiotic crossing-over.

(b) Histological examination of irradiated testes revealed that the early spermatocytes of the first order possess the greatest susceptibility to treatment, whereas the spermatogonia, though also affected, react to a much less extent.

2. (a) The mitotic origin of spermatogonial crossing-over induced by X-rays in *Drosophila melanogaster* has been definitely established.

(b) The presence of inversions lowers somewhat the frequency of spermatogonial crossing-over throughout the non-inverted region of chromosome III. This proves that there is a similarity between regular meiotic and induced mitotic crossing-over.

(c) The frequency of spermatogonial crossing-over is extremely high in the central region (which carries the spindle fibre) of chromosome III. In the remaining regions of the chromosomes there is a closer correspondence with the cytological map than in the case of the normal meiotic crossing-over in females.

(d) The frequency of induced crossing-over is higher for later than for earlier spermatogonial stages.

(e) The frequency of spermatogonial crossing-over is not proportional to the X-ray dose (a comparison at 1,000 r. and 4,000 r. shows a frequency greater than fourfold in the latter case).

3. (a) No oogonial crossing-over was released in female larvae of *Drosophila melanogaster* with a treatment of 2,000 r.

(b) The *Cy* females used in this experiment

b cn c
showed nevertheless a statistically significant increase in crossing-over between 'b' and 'cn'. Since only the gonial stages were irradiated, this result must be taken to mean that there exists an after-effect of the treatment on crossing-over.

4. (a) Contrary to the current point of view, which excludes the possibility of crossing-over in the late oocyte of *Drosophila melanogaster*, we were successful in inducing interchange at that stage; this type of interchange we designate as late meiotic crossing-over.

(b) This fact raises certain difficulties for Darlington's and Belling's points of view on the mechanism of crossing-over, whereas it favours the interpretation offered by Sax.

From the above summarized results we may draw the following general conclusions:

(1) Crossing-over is a feature to some extent inherent in both meiosis and mitosis.

(2) The absence of regular crossing-over in the gonial stages of gametogenesis in *Drosophila melanogaster* can be explained by the disadvantages somatic crossing-over would offer; the suppression of crossing-over in the soma means its suppression in mitosis and also in the gonial cells.

(3) The hypothesis of Haldane and Huxley, which is based on the disadvantages that crossing-over would offer in the heterogametic sex, does not sufficiently substantiate the nearly complete absence of normal crossing-over in meiosis of *Drosophila melanogaster* males.

A detailed account of the work will appear in Russian (with an extensive German summary) in the *Biologicheskoy Zhurnal*.

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