and European forms are being investigated by a programme of controlled breeding.

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Effect of Nitrogen Mustard on an Inherited Character in the Rat

IN 1949, the late P. Ellinger[1] described some experiments which suggested that treatment of rats with nitrogen mustard had produced a mutation in the gene or genes controlling the output of nicotinamide methochloride. He followed up this work with some extensive experiments, and recently asked me to analyse the results. Prof. Ellinger died before I had the opportunity of discussing with him the results of the analysis, and this communication is therefore published without the benefit of his advice.

Ellinger mated a given pair of parents twice, first without treatment, and again one day after treatment of one or both parents with nitrogen mustard (0·2 mgm./kgm. injected intraperitoneally). The daily nicotinamide methochloride output of each member of the two litters was measured. Ellinger reported four such experiments, in two of which the mean output of the offspring born after treatment of the parent was significantly lower than that of the offspring born before. Such an effect can be attributed to a gene mutation or a chromosome rearrangement only if there is, in the absence of the treatment, no litter-to-litter variation of a similar magnitude. In a genetic study of the nicotinamide methylating mechanism, Ellinger and Armitage[2] found the output to be controlled by a number of genes, but also subject to considerable environmental fluctuations. It therefore seemed possible that the changes observed in the nitrogen mustard experiments were environmental rather than genetic, and unconnected with the treatment.

The results are now available of thirty-nine non-sterile matings, in which litters were produced before and after treatment of one or both parents with nitrogen mustard. Usually, F_2 litters were produced by mating rats within the post-treatment litter, and often subsequent generations were obtained. In sixteen of the thirty-nine primary matings, the mean logarithm of output was higher in the litter produced after treatment than in that produced before, and in twenty-three the mean was lower. There is evidently no strong evidence of a systematic rise or fall in mean logarithm of output after treatment. In four matings the change in the mean logarithm of output was particularly marked (at least 0·40 logarithmic unit). Further examination of the results of these four matings suggests very strongly, however, that the changes were not genetic. In the first place, each of these changes affected the whole litter rather than (as would have been expected had a mutation occurred) an individual rat. Secondly, the output of F_2 rats, one of whose parents had an abnormally high or low output, always reverted to about the level of the treated animals and of their pre-treatment offspring. Finally, a comparison is possible with some data on untreated animals[2]. Five pairs of untreated rats each produced two litters. For four of these pairs the two litter means were very similar. In the fifth case the difference in mean logarithm of output was 0·34, a difference greater than most of those found in the nitrogen mustard experiments.

It must be concluded that the observed changes in output are probably due to environmental causes unrelated to the nitrogen mustard treatment.

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Function of the Foot in the Lucinacea (Eulamellibranchia)

THE Lucinacea, comprising the families Ungulinidæ, Thyasiridæ and Lucinidæ, all have a characteristically slender vermiform foot. Its anatomy has been described by Barrois[1] and Menegeaux[2] and its locomotory movements by Stoll[3]. In some species, for example, *Diplodonta rotundata*, the slightly bulbous tip is distinct from the rest of the foot. The foot can extend four or five times the length of the animal and the tip can swell out even when the foot is extended. When the foot is contracted, it lies with the tip close to the posterior edge of the anterior adductor muscle. This muscle (Fig. 1) is characteristically elongate.

These animals live in a variety of soft substrata from sand to mud, both intertidally and sublittorally, to great depths. They burrow to a depth that is equal to the length of the extended foot. All Lucinacea have anterior and posterior inhalant currents.

It has been found that, in addition to its normal movements for burrowing and locomotion, the foot forms an anterior inhalant tube lined with mucus. This has been demonstrated in *Loripes lucinalis*, *Thyasira flexuosa* and *Phacoides borealis*. This habit

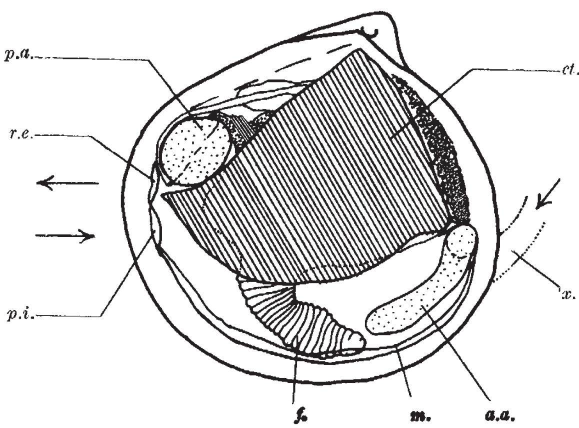

Fig. 1. *Loripes lucinalis*, with right valve removed. *a.a.*, anterior adductor; *ct.*, ctenidium; *f.*, foot; *m.*, mantle edge; *p.a.*, posterior adductor; *p.i.*, inhalant aperture; *r.e.*, retracted exhalant siphon; *x.*, position of the anterior inhalant tube