The *Limnoria* species tended to occur in discrete groups in piling, and it is probable that migratory activity resulted in more heterogeneous test-block populations. The migrant (test-block) *Limnoria* may therefore represent a natural sample of the species present, and hence the test-block samples are more likely than those from piling to indicate the proportion of species present in the total *Limnoria* population.

Specific differences in migratory and reproductive behaviour have been found and the results are being prepared for publication.

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[1] Menzies, R. J., Bull. Marine Sci. Gulf and Caribbean, 7, 101 (1957).

Pathological Parthenogenesis in Viviparous Toothcarps

In addition to the cases of parthenogenesis described by Spurway[1] in *Lebistes reticulatus* (Peters) we have observed three new cases: two in the same species, and one in *Xiphophorus helleri* Heckel.

The first case with *Lebistes* involved a female isolated immediately after birth and thus free from any contact with the male sex. When this female reached the age of 18 months and a length of 46 mm. the so-called pregnancy spot occurred, that is, a dark-pigmented spot in front of the tail base on the ventral side, which is characteristic of pregnancy. After some time 22 young fishes were born, which during growth were, without exception, found to be female.

The second case with *Lebistes* was very similar. After reaching a length of 37 mm. at the age of 15 months this virginal animal dropped 14 young fishes, all female.

The virginal *Xiphophorus* female showed a similar behaviour. This animal too was completely isolated immediately after birth. When the fish had reached a length of 71 mm., it showed the pregnancy spot and some time afterwards 28 female young fishes were born. After this the animal became pregnant again, resulting in the birth of young fishes, also exclusively female.

Microscopic examination of mother animals revealed that the sperm chambers of the ovaries contained no spermia. This finding excluded self-fertilization, a phenomenon incidentally seen in viviparous toothcarps and explained by the presence of a bisexual gonad, which produces spermia as well as oocytes.

Another important finding was a pathological process localized in the ovaries and in their surroundings. This was an infection with the *Ichthyophonus* parasite, the phycomycete *Ichthyophonus hoferi* Plehn-Mulsow. The cysts appeared to be situated in the cranial part of the ovaries and in the adjacent regions. Birth would undoubtedly have been prevented if an extensive process had been localized in the caudal parts of the ovaries and near the junction between ovary and oviduct.

The association of parthenogenetic development on one hand, and the occurrence of an *Ichthyophonus* infection on the other, seem to justify the assumption that the cause of parthenogenetic development in these cases is a pathological process. In any event, it could be assumed that the *Ichthyophonus* toxin in these cases provided the artificial stimulus for the development of unfertilized oocytes.

On the strength of these results, we consider it justified to launch the hypothesis of 'pathological parthenogenesis'. By this we mean the development of the unfertilized oocytes due to the influence of a pathological stimulus. Experimental embryology has shown that various stimuli are capable of causing an oocyte to develop without fertilization. The developmental ability was apparently localized in the oocyte itself, and the invading spermia involved in the normal fertilization, and the chemical and physical stimuli used in artificial parthenogenesis, merely serve to eliminate an inhibiting factor, a buffer which impairs development.

On the basis of purely theoretical considerations it is conceivable that a pathological process, localized in the ovaries or in their immediate surroundings, is likewise capable of removing this buffer and of causing development of the unfertilized oocyte. The parthenogenetic stimulus might in such a case consist of toxic substances, or possibly decomposition products liberated in the course of tissue necrosis. From this point of view pathological parthenogenesis may be regarded as a form of artificial parthenogenesis, effected not so much by experimental intervention as by Nature itself.

In our opinion it is undoubtedly possible that the cases of parthenogenesis in *Lebistes* described by Spurway might also involve a pathological process, probably an *Ichthyophonus* infection, which is by no means uncommon in fish; indeed its incidence is very high, particularly in the viviparous toothcarps, as it is highly infectious. Naturally, this does not eliminate the possibility of another pathological process. Experiments in artificial parthenogenesis have shown that the stimulus required need not be at all specific.

In view of these results it would be advisable, in new cases of parthenogenesis, to make a systematic investigation into the possible presence of a pathological process in the ovary or in the immediate vicinity of this organ. So far as I know this has not yet been done, or at least not on an adequate scale.

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[1] Spurway, H., *Nature*, 171, 437 (1953).

Nutritional Anæmia in Mink

Nutritional anæmia in mink has been described by Kennedy[1] and Whithair *et al.*[2]. In recent experiments we observed that mink kits fed diets containing large amounts of raw coalfish (*Gadus virens*) developed anæmia and characteristic fur anomalies, especially light under-fur, in about 40 per cent of the animals. The same disorder was also seen in mink kits fed diets containing raw whiting (*Gadus merlangus*)[3]. A rather high mortality-rate of about 20–30 per cent was noted in the anæmic animals.

Development of anæmic symptoms and light under-fur could be totally prevented by replacing the dietary raw fish with boiled fish of the same species. The results obtained suggest a heat-labile factor capable of producing anæmia, probably an enzyme in the raw fish.

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