

SESSIONAL PAPER No. 38a

October 12, all with no visible disease, showed that the great majority had some abrasions, the commonest being on the tip of the snout, the top of the head, and the margins of the fins (particularly the caudal). There were also net marks around the middle of the head and the marks of fish lice (removal of scales) along the middle line of the back in a number of cases. These marks explain the usual distribution of the fungus, the other parts of the body—for example, the sides—being attacked only in the later stages.

The vigour of the fish declines with the spread of the fungus. Fish with well-developed but localized patches of fungus on the head or elsewhere, or with wounds raw or bleeding, appeared to be nearly as vigorous as healthy fish. But if the fungus were present over much of the surface they were sluggish, came close inshore or floated near the surface with the fins, particularly the caudal, sticking out of the water. In the last stages they dropped to the bottom of the water on their sides.

The only data with reference to the rate of spread of the disease have to do with a fish put in clean on October 4th and removed on the 12th in a sluggish condition, with the fungus covering most of the surface, but so slightly developed that it was not easily seen after the fish had been removed from the water.

The salmon-lice [*Lepeophtheirus salmonis* (Krøyer), see Wilson, 1905, p. 649] was found on a fairly large proportion of the fish taken from the traps. It occurred chiefly along the middle of the back between the fins. It appears to be responsible for the removal of the scales and doubtless determines the location of the disease in this region.

The fungus proved to be *Saprolegnia*, several species of which are commonly found growing on dead organic matter in fresh water. Prof. J. H. Faul' of the University of Toronto, to whom material was submitted, informs me that it belongs to the *ferax* group of *Saprolegnia*, but since no oospores could be seen (they are rarely found) exact identification was impossible. Several species of the *ferax* group occur on dead or diseased fishes (Hofer, 1906, p. 106.) The growth and extension of the *Saprolegnia* proceeds *pari passu* with the disease and may be taken as an evidence of the extent of the disease. Whether its relation to the disease is to any extent a causal one or whether it is merely an accompaniment, may well be disputed.

An examination of the internal organs of the diseased salmon revealed no distinct lesions. A microscopic study of the body fluids and of sections of the organs likewise revealed nothing. We may conclude that the disease is confined chiefly to the skin and subjacent parts.

The bacteriological examination of the diseased fish was in the hands of Principal Harrison. However, having some material, I handed over to Dr. H. K. Detwiler of the Pathological Department, University of Toronto, portions of the skin from fish in various stages of the disease. He very kindly had sections made and stained with thionin blue in order to demonstrate, if possible, the presence of the *Bacillus salmonis pestis*, which was found by J. Hume Patterson (1903) in cases of the salmon disease occurring in Great Britain. He informs me that no positive results have been obtained. Negative results in such a case prove nothing.

The gross characters of this disease appear to be identical with those of the well known salmon disease that appeared in the form of an epidemic among the salmon in certain rivers in the north of England and Scotland in 1877. It spread in the course of a few years to the neighbouring rivers up and down the coast and has continued in an endemic state in the waters of Great Britain ever since. No means of successfully combatting it has as yet been found.

The *Saprolegnia ferax* was for many years considered to be the cause of the disease (Stirling, 1878 and 1879, and Walpole and Huxley, 1882). In 1903, however, Patterson published the results of investigations which went to show that *Saprolegnia* was not