

the Aleutian peninsula a happy hunting ground. "It is relatively easy to get into," he said, "and fairly swarms with game. We saw fifty-two big brown bears and caribou innumerable, and the streams are alive with fish."

EXPERTS FIGHT FISH EPIDEMICS

There are fish epidemics as well as human epidemics. Really serious ones due to a tiny parasite rejoicing in the name. *Ichthyophthirius multifiliis*, have occurred from time to time in France, Germany, Holland and in various parts of the United States. This parasite attacks fresh water fish both in their natural environment and in aquaria with a resulting loss running into hundreds of dollars.

In a recent paper H. F. Prytherch, of the U. S. Bureau of Fisheries, describes various methods of controlling this disease in hatcheries, fish farms and all places where fish are kept in artificial confinement. To make clear how this problem can be attacked, he says, it is first necessary to understand something of the life history of the parasite.

The young *Ichthyophthirius*, according to Mr. Prytherch, goes through a free swimming stage during which it wanders around through the water in search of a host. On coming in contact with a fish it burrows into some unscaled part, especially preferring the gills or fins. Once embedded in the fish's skin it grows rapidly from the nourishment it absorbs from the tissues and soon shows on the outside as a small white spot. Badly infected fish are covered with these "polka dots" all over their bodies.

In a few days this white body leaves the fish and sinks to the bottom where it shortly undergoes a transformation into a hard shelled reproductive cyst. When reproduction is complete the cyst wall bursts and releases hundreds of young parasites of the free-swimming stage.

Mr. Prytherch states, "There are two general methods for treating the disease --first, by killing the parasites while they are attached to the fish, and, second, by destroying them after they leave the fish and are free-swimming in the water. The first general method can be used to hold the disease in check but will not completely wipe it out."

The logical time to begin treatment, he continues, is when the first symptoms of the disease appear and the whole fight in controlling the disease should be directed against reinfection.

Direct application of alum sulphate has been found most efficacious in ridding the fish of the parasites. The healing action of the alum leaves the "patient" in a less weakened condition than any of the various other chemicals tried so far for this purpose.

The second method which attacks the adult parasite after it has left the fish is more successful and should be utilized, says Mr. Prytherch, wherever possible. It consists simply in placing the fish in swiftly running water where the parasites will be carried away before reproduction can take place. The overflow should be

carried off both at the top and the bottom to take care of any that do not fall directly to the bottom. Infected fish, in warm weather, it is stated, may be cured in this way in a week or ten days and further epidemics prevented by quarantining new stock in running water. In some instances swiftly flowing streams may be fenced off and used for this purpose by leaving the fish in the enclosure until cured.

Tadpoles and goldfish kept in tanks with fishes subject to this disease have been found extremely helpful in keeping it down since they prey on the parasites for food.

NERVE CURRENTS HEARD ON RADIO INSTRUMENT

The electric current that shoots along a nerve fiber has been detected by means of radio apparatus, according to Dr. E. D. Adrian of Cambridge University, who described before a meeting of the Physiological Society his method of using a three-tube instrument to make his delicate measurements.

It had long been known, he said, that the passing of messages down a nerve caused an electrical disturbance. But it had only been possible to record the effects from a large number of fibers at once, for example, the thousands of fibers from an eye, or to a muscle. The results obtained were therefore as confused as would be the superimposed records from all the telegraph wires between London and Manchester. Dr. Adrian's new apparatus makes it possible for the first time to obtain records in a rapidly moving photographic plate of the impulses passing along a single fiber.

In conjunction with Dr. Zottermann, a Norwegian neurologist, Dr. Adrian recorded the results of stimulating a sense organ connected to the brain by a single fiber. The sense organs in the skin which give information as to touch, pain, and temperature, are too near together for this to be easy. Those in the muscles subserving the so-called muscular sense are farther apart, and by stretching a frog's muscle, it was found possible to stimulate a single one. The impulses were all of the same size, but as the muscle was stretched, their frequency was increased from ten to fifty per second. Differences of intensity are in fact transmitted through the nerves as differences of rhythm.

This is the first occasion on which the message passing along a nerve has been decoded, and the experiment opens up a new field of neurology, in the opinion of physiologists here. Within the next few years it should be possible to read the main types of messages entering and leaving the nervous system, and the time has been brought measurably nearer when it will be possible to record the actual events in the brain which are the physical correlate of consciousness.

Black opals are becoming rare.
