

After the raw material, used for pulp manufacture, has reached the mills, it is subjected to the various mechanical, thermic and chemical processes, and it is claimed that the liquid waste flowing from the mills during those processes is injurious to fish. Widespread alarm, indeed, was caused upon some of the principal rivers of Eastern Canada—rivers, perhaps, the most productive in the world for salmon fishermen, it being alleged that the acids used, and the floating debris, resulted in a polluting waste-product, poisonous and mechanically harmful to fish-life. The actual tests hitherto applied have not borne out these alarming contentions, and it must not be forgotten that the pulp mills spare no efforts to save every particle of waste pulp matter. They use the most recent and scientific apparatus to prevent loss, either of chemical or paper-pulp materials. One of the best biological workers in the Maritime Provinces—a man thoroughly posted in the fish fauna, and the conditions of fish-life in that part of the Dominion, Dr. Phillip Cox, made an experiment with a view to deciding the effect of pulp refuse upon living fishes. The experiment does not profess to be final or scientifically conclusive, as the opportunity did not occur to make a full and accurate analysis of the waste materials, which differ at different stages of the pulp-making process, (and the proportions of the components of the waste no doubt vary), but the experiment suffices to show that delicate fish like *Osmerus mordax* are not seriously affected, and salmon, sea-bass, trout, etc., would be even less liable to injurious effects.

DR. COX'S EXPERIMENT.

Tests made April 14, 1894, with waste discharge from the Fibre Company's factory, Chatham, N.B., to ascertain its effects on fish life in the river.

Three vessels of 620 oz. capacity each were used, and were at the beginning of each test filled with water taken directly from the river, the acidulous waste being added.

First Test.

Vessel A, cap. 620 oz. + 2 oz. waste.....	10.45 a.m.
" B, " 620 oz. + 4 oz. "	10.48 "
" C, " 620 oz. + no waste.....	10.48 "

Freshly caught and uninjured smelt (*Osmerus mordax*) were put one in each vessel, at the time mentioned. At 12 noon all were active and apparently unaffected.

Second Test.

Vessel A, cap. 620 oz. + 6 oz. waste	12.00 noon
" B, " 620 oz. + 8 oz. "	12.01 "
" C, " 620 oz. + 12 oz. "	12.05 "

At 2 p.m. the fish in C died, but the others were unaffected. I suspected injury to the one that died before it was put in, so in next test I put same quantity of waste in vessel C.

Third Test.

Vessel A, cap. 620 oz. + 12 oz. waste.....	2.26 p.m.
" B, " 620 oz. + 16 oz. "	2.27 "
" C, " 620 oz. + 24 oz. "	2.28 "

At 3.26 p.m. all active and unaffected. Vessel A was then replenished with fresh water, 48 oz. waste added, and a freshly caught smelt placed therein.

At 4.10 the latter and B and C of the third test were alive and well.

Hence it is seen that a mixture containing 8 or 10 per cent of the waste has no apparently injurious effect.