

Reducing the amount of waste water to 10 per cent., it was found that two stickleback placed in such a mixture on July 16th lived until July 27th, when the animals were liberated.

Trout are much more sensitive to this pollution. One placed in a 10 per cent. mixture of pulp water and spring water lived from 5 p.m. of July 21st to about 7 p.m. of the 22nd.

White perch from Bocabec lake lived in lake water polluted with 10 per cent. of pulp waste water for about 36 hours.

Rock bass and sunfish lived about 24 hours in a similar mixture; but fresh water clams (*anodon*) lived for two or three weeks in it without apparent inconvenience.

These experiments indicate that river or brook water when mixed with 10 per cent. of waste water from pulp mills is decidedly poisonous to fish life. If, therefore, a large quantity of this waste is poured into a comparatively small stream, it must result in the destruction of fish; if into a large river, then it is difficult to see how any great harm could be done. The specific gravity of the pollution, 1.00005, being so very slightly greater than that of river water, shows that the water from a pulp mill would mingle readily with that of any stream into which it was discharged, and unless the pollution equalled or exceeded 10 per cent., no great harm could be done.

WASTE WATER FROM GAS WORKS.

This water is much more poisonous to fish life than the former and kills much more quickly. The very quickness with which fish succumb to its effects indicates that death results from poisoning with the sulphuretted hydrogen which the water contains. Confirmation of this view is afforded by the fact that if a fish does not die in the polluted water during the first 24 hours, it will usually live on in the pollution for several days. Besides, when a fish succumbs quickly, say, in 10 to 20 minutes, to the effects of this gas, it could usually be resuscitated by transference to pure water. Within 15 to 30 minutes after transference the fish was as lively as ever, especially if the water were agitated so as to increase the amount of oxygen dissolved in it.

The following were typical experiments: A *rocas Americanus* was immersed in a 5 per cent. solution of gas water, and in 20 minutes it was dead. Immersed in a 2 per cent. solution, the same kind of a fish survived about half an hour. In a $\frac{1}{2}$ per cent. solution, the fish lived about half a day.