

RESISTANCE AND REACTIONS OF FISHES TO
POISONOUS POLLUTING SUBSTANCES FROM
THE MANUFACTURE OF ILLUMINATING
GAS.

ABSTRACT

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One of the most important sources of stream pollution viewed from the standpoint of fishes is wastes from the manufacture of illuminating gas. Illuminating gas, gas liquor, and thirty-four organic compounds representing the chief classes of compounds found in coal tar and gas liquor have been studied (carbon monoxide and carbon dioxide by Dr. Wells). All the mixtures and all but three of the single compounds (methane, acetylene, and anthracene) are very poisonous to fishes. A surprising feature of the investigation is (a) that compounds which are gases and which would be expected to diffuse out of water rapidly and leave it harmless, as, for example, carbon monoxide, remain in standing water for several weeks and continue to kill fishes, and (b) that substances which are commonly regarded as insoluble in water, such as naphthalene and benzene are among the most toxic of all. Thus considering the physical properties of these compounds (gases, volatile liquids and solids) it is obvious that the various methods of treating and recovering by-products will almost certainly deliver some poisonous compounds into streams.

Usually the toxicity of compounds is greatest for the smallest fishes, or in other words, the smaller fishes are most easily killed by the poisons. This is true down to the smallest fry studied. The relative toxicity of over thirty compounds has been determined, but as yet no attempt to determine the mini-

imum amount required to kill fishes has been made because the determination should be made as the minimum amount for the most sensitive stage in the life history of the fish. This is yet to be investigated.

Another surprising feature of the investigation is the fact that, while fishes usually turn away from detrimental substances or conditions such as carbondioxide, lack of oxygen, etc., in the case of the poisons thrown into streams by gas plants, they do not avoid the dangerous conditions but swim into them without noting them and on encountering pure water again they very commonly turn back into the poison, though death may ensue there in a short time. This strong tendency on the part of the fish renders the pollution by gas waste many times more dangerous to our supply of fish.

(A full account of this work will be found in the Bulletin, Illinois State Laboratory, Vol. XI, pp. 381-412.)
