



### Fish Can Drown

► **RESPIRATION** in fish is basically the same as it is in land animals, a matter of getting oxygen into contact with the blood corpuscles which will in turn get into contact with the body tissues that need it. If that does not take place, the animal dies, be it fish or be he man. Drowning is really a form of suffocation.

There are several ways in which fish can die for lack of oxygen. One is sheer mechanical interference with their normal mode of respiration, the ceaseless business of gulping water in through the mouth and expelling it through the gill-slits. If a fish has a stick thrust through mouth and gills and is then dragged at abnormal speed through the water (as

small boys often do), it will die, and it will die of drowning, that is, suffocation, because it could not "breathe" naturally.

A more wholesale extermination of fish through de-oxygenation of water takes place sometimes in summer, when fish that have been landlocked in a pond or lagoon find the water getting too warm, and at the same time swarming with fast-multiplying small forms of animal and plant life. Fish ordinarily do not live in a green stagnant pool because green water is poisonous. It is because the myriads of lesser organisms living there snatch up every available molecule of oxygen for themselves, so that there is none left to pass through the gill walls and enrich the fishes' blood.

This kind of minor tragedy of the waters is relatively small-scale and unimportant, as compared with what the fish are often up against in rivers and lakes polluted by the outpourings of factories. Sometimes these pollutants are chemicals that directly poison the fish; much more often, however, they are things that the swarming bacterial life of inland waters can use for food. They do feed greedily, using up oxygen in the process, until again the turbid water will not support fish respiration.

In considerable areas in the tropics, small lakes and sluggish rivers go nearly dry in the hot season, and have so little oxygen in their water at all times that ordinary fish cannot live in them. Their principal inhabitants are lung-fishes, strange creatures that have given up the use of gills entirely and depend on air sucked into their swimbladders which function as primitive lungs. When things get really bad, these fish sink to the bottom, ball themselves up into mud cocoons, and sleep the summer through as toads and turtles sleep through our winter.

*Science News Letter, June 22, 1946*

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### CHEMISTRY

## Valuable Chlorine from Sulfur and Common Salt

► **CHLORINE**, that poisonous green gas that is as necessary to many industries as gastric juice is to human physiology, can be made copiously and cheaply by a new process on which U. S. patent 2,401,644 has just been granted to a du Pont research chemist, Dr. Ralph K. Iler of East Cleveland, Ohio.

Raw materials are sulfur and common salt, which chemically is sodium chloride. The sulfur is burned, producing sulfur dioxide. To this more oxygen is added, forming sulfur trioxide. The trioxide is brought into contact with fine-grained salt, at a temperature between 450 and 600 degrees Centigrade. Part of the sulfur is seized upon by the sodium in the salt, forming sodium sulfate, which is removed.

From this reaction comes a mixed gas, containing chlorine and sulfur dioxide in equal quantities. This gas is then passed through dry silica gel, which adsorbs most of the sulfur dioxide. The rest is taken out by contacting the gas with activated carbon or other catalyst, which combines it with part of the chlorine to form sulfuryl chloride, and holds it in liquid form on the carbon.

The chlorine, now in substantially pure state, is drawn off and prepared for industrial use. The sulfuryl chloride, subsequently recovered, is broken down again to sulfur dioxide and chlorine by heating, and these gases are fed back into the process.

*Science News Letter, June 22, 1946*

A new family of *plastics* developed in Germany is based on isocyanates; no comparable product has been announced in the United States.

### CHEMISTRY

## Hens Need Lots of Lime To Package Eggs Properly

► **HENS**, like farmers, have trouble in packaging eggs. Farmers struggling with the problem of getting enough wooden or fiber cases in which to ship eggs should also consider the need of their laying hens for lime to form strong eggshells, the Utah Extension Service suggests. Approved poultry diets allow more than twice as much calcium for a laying mash as for a growing mash.

*Science News Letter, June 22, 1946*

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