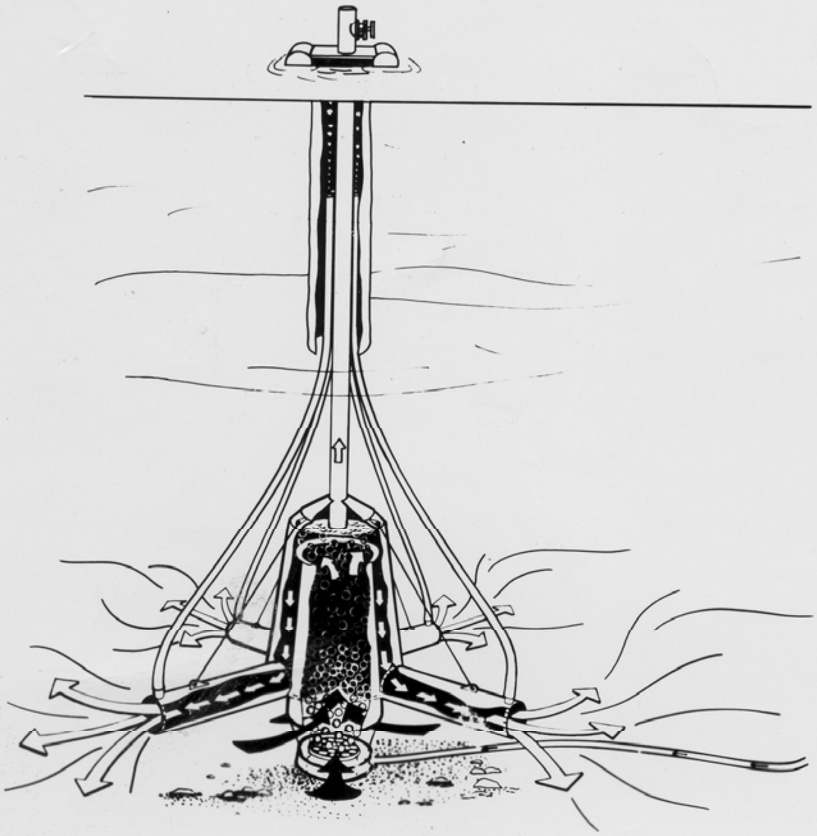

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The Limno Aerator -- This diagram shows how the two aerators used in oxygenating Lake Waccabuc operate. Air from a shore based compressor enters the bottom of the aerator. This air draws water in the hypolimnion -- or bottom water layer -- into the aerator where it becomes saturated with oxygen during its movement up the cylinder. The water flows over the top of the inner shell and out through outlet pipes. Excess air is vented through a pipe leading to the surface. The aerator itself is about 8 feet in diameter and about 15 feet in height.

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UNION CARBIDE BEGINS LAKE RESTORATION PROJECT

LAKE WACCABUC, WESTCHESTER COUNTY, NEW YORK, June 21 -- The waters of a calm and beautiful lake north of New York City were invaded today by two cylindrical devices that could play an important role in preventing and reversing pollution of the nation's 1.6 million lakes, more than half of which are already decaying.

Initiated and funded by Union Carbide Corporation, the pioneering project is an attempt to stop or reverse eutrophication of Lake Waccabuc. The cylinders -- about 8 feet in diameter and 15 feet high -- are specialized aerators. Submerged 45 feet to the bottom of the lake, they will oxygenate the deepest of three strata of lake water.

Last year as part of its extensive aquatic environmental sciences program, Union Carbide conducted a detailed study of Lake Waccabuc and adjoining Lakes Oscaleta and Rippowan. This study revealed that none of the three lakes has any oxygen in the water near the bottom; all are moderately eutrophic, and could reach a complete state of eutrophication within 15 years.

During the summer, a lake stratifies into three distinct zones based essentially on water temperature. No surface oxygen gets down to the bottom zone -- called the hypolimnion, and there are minimal water currents. As a lake begins to eutrophy, this absence of oxygen sharply accelerates the decaying process with many harmful results. Cold water fish, such as trout and salmon cannot survive; high concentrations of noxious gases occur; harmful nutrients formerly trapped in bottom

- MORE -

sediments are released into the water and promote denser growth of unwanted surface plants and algae.

Lake Waccabuc is about a mile and a quarter long and less than a half-mile at its widest part.

The technique that Union Carbide is utilizing is called hypolimnion aeration -- a recent development confined essentially to use in Europe.

The two aerators, manufactured by the Atlas Copco Company of Sweden, each weigh about 1,400 pounds. Made of fiberglass, they have been placed at two strategic locations on the bottom of the lake and are connected to air hoses which in turn are connected to an air compressor placed in an acoustically insulated enclosure on the shore. The compressor will direct about 280 cubic feet of air per minute into the air hose.

In operation, water is drawn into the aerator where it becomes saturated with oxygen and then is discharged back into the bottom of the lake through six outlet pipes. About 550 pounds of oxygen will be added to the water per day per unit. This method of aeration keeps the oxygen in the hypolimnion where it will do the most good.

As part of the program, Union Carbide will maintain a mobile laboratory -- a chemistry lab on wheels -- at the site to monitor and control results. In addition, continued assessment of the two neighboring lakes will be conducted for comparison purposes. To aid in the program, contract agreements have been made with Adelphi University and Ithaca College to perform certain analytical work. A research team from the University of Georgia will also participate in the study.

The project to restore Lake Waccabuc is part of a broad scientific program in the area of aquatic environmental sciences Union Carbide initiated over two years ago. It aims to develop expertise in four distinct but related aquatic areas -- assessment, where the nature, cause, extent, and complexity of an existing environmental quality problem in a body of water can be specifically determined; aquatic bioassay studies in order to develop reliable, standard methods to determine the impact of chemicals and heavy metals on aquatic ecosystems; monitoring and control methods to quickly spot physical changes in a body of water; and restoration approaches designed to return a body of water to a quality consistent with a given desired use.

Specific programs in all four areas are in progress, some of which are being conducted under contracts with the Environmental Protection Agency.

"We are trying to make up lost time," stated Clem Cowley, Manager, Aquatic Environmental Sciences for Union Carbide. "As is usually the case when science attacks a broad problem it has ignored for too long, what we don't know exceeds what we do know. However, in the last two or three years we have cut into that deficit significantly."

Mr. Cowley also reported that Union Carbide will conduct two other lake oxygenation programs in 1973 using a different approach which is proprietary to Union Carbide. The Attica Reservoir in Attica, New York and the Ottoville, Ohio, quarry, both of which are highly eutrophic, will be aerated using pure oxygen.

Called Side Stream Pumping, a given amount of water is pumped from the bottom level through a pipe on shore into which is injected pure oxygen. The oxygen-saturated water is then returned to the bottom of the lake. This method oxygenates the entire hypolimnion of the lake by pumping a very small volume of water, and is extremely efficient in terms of oxygen usage.

Mr. Cowley pointed out that no one aeration method is applicable to all lakes. Shallow lakes, for example, would be more amenable to Side Stream Pumping, as well as those which are highly eutrophic.

- END -

AERATOR INSTALLATION - LAKE WACCABUC, JUNE 21, 1973

What you will see this morning is the installation by helicopter of two 1,400 pound aerators and two 7,700 pound concrete anchors. The air hoses are already installed and run out to the aerator sites.

The two, heavy anchors will be installed first. They will begin to settle immediately into the lake bottom and will serve to hold the aerators in place.

The aerators are equipped with floats and will be carefully placed on the lake surface. The air hoses will be connected to each aerator at the surface. After the floats are removed, the aerators slowly will be winched down to the anchors to a depth of 45 feet and will be attached to the anchors by divers.

The other helicopters you will see contain photographers.


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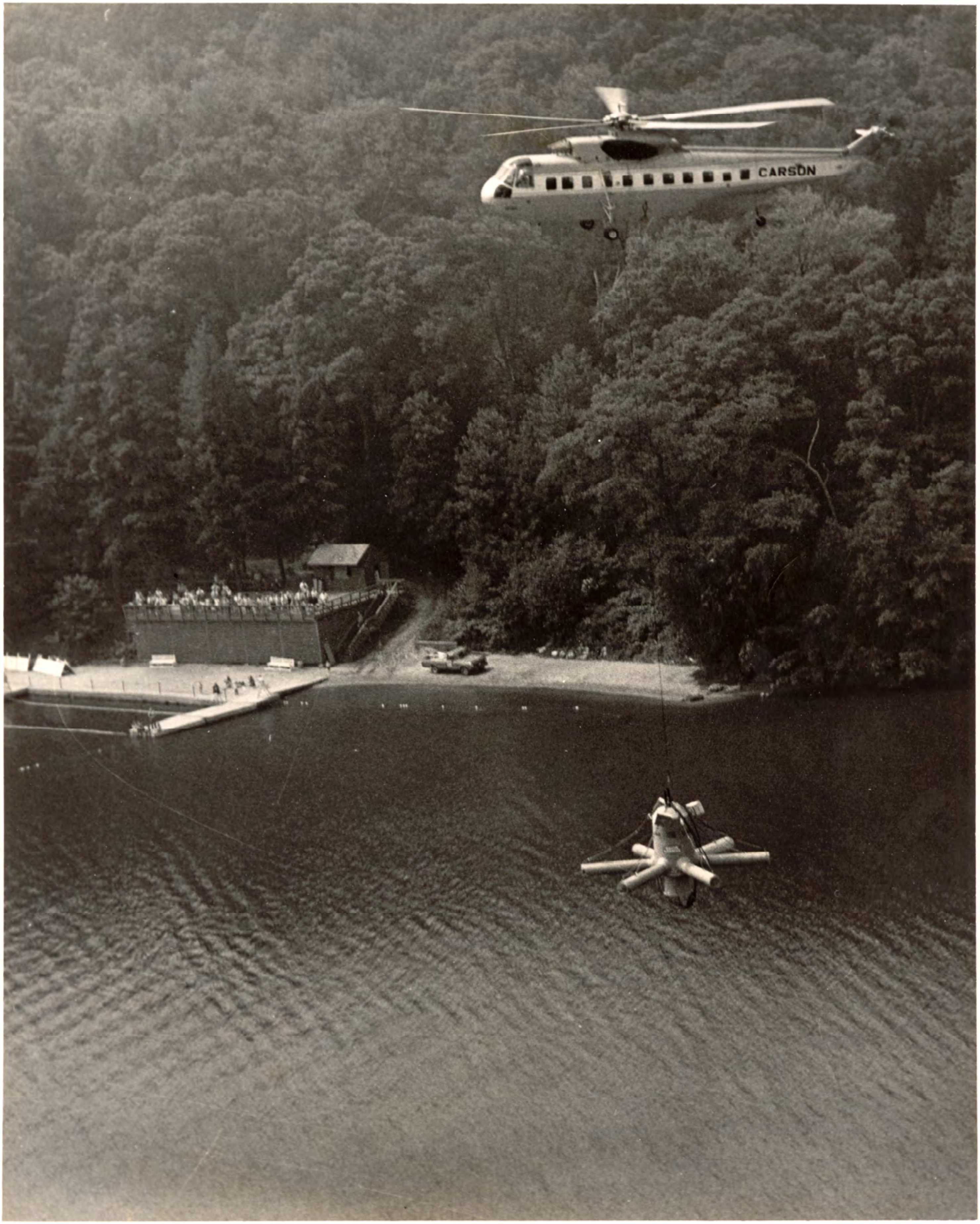
This is one of two specialized cylinders submerged 45 feet to the bottom of Lake Waccabuc, north of New York City, in a pioneering project initiated and funded by Union Carbide Corporation to oxygenate the bottom strata and restore the polluted lake to its former clean condition.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Aerator Being Air Lifted -- One of two aerators which are oxygenating Lake Waccabuc north of New York City is shown here being lifted to the site by a large helicopter. The project, initiated and funded by Union Carbide Corporation, will attempt to halt and reverse eutrophication of this fresh water lake in Westchester County.


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Settling In -- After being installed and hooked up to an air hose, this spider-like container -- along with a sister unit -- will supply about 1,100 pounds of oxygen per day to the lake. Last year, Union Carbide scientists evaluated the lake and discovered that the bottom layer -- or hypolimnion -- had no oxygen. A lack of oxygen in a fresh water lake sharply accelerates the eutrophication process.


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Easy Does It -- With Union Carbide divers watching nearby, a helicopter gently lowers a 1,400 pound aerator onto Lake Waccabuc. The aerator was later lowered to the floor of the lake and connected to an air hose leading to a shore-based compressor. During the summer, these aerators will supply needed oxygen to the lower level of the lake in order to stave off predicted decay, or eutrophication.

1973

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UNION CARBIDE REPORTS SIGNIFICANT PROGRESS WITH WATER RESTORATION PROJECTS

NEW YORK, Nov. 27 -- First results of a major pioneering effort in lake restoration by Union Carbide Corporation show that an important step has been taken in the battle to save the nation's decaying fresh waters.

Clem Cowley, manager of Aquatic Environmental Sciences for Union Carbide, said his group's work this summer on projects to counteract eutrophication have made improvements at Lake Waccabuc, in Westchester County, north of New York City; Ottoville, Ohio, Quarry; and the Attica, New York, Reservoir. Further work will be required next summer to obtain more definitive data on the long-range benefits.

The objective in all three projects was to saturate with oxygen the bottom zone -- called the hypolimnion -- of eutrophic lakes. During the summer, as a body of water stratifies into three distinct zones based on temperature, no surface oxygen reaches the hypolimnion where there are minimal water currents. In the absence of oxygen in the hypolimnion, nutrients formerly trapped in bottom sediments are released into the water and promote growth of unwanted surface plants and algae. Cold water fish, such as trout and salmon, cannot survive and high concentrations of noxious gases occur.

Two separate and distinct techniques were used in these projects -- the concept of hypolimnion aeration at Lake Waccabuc and the concept of hypolimnion oxygenation by Side Stream Pumping (SSP) at Ottoville and Attica.

At Waccabuc, two aerators, manufactured by the Atlas Copco Company of Sweden, were placed at two strategic locations on the bottom of the lake and

- MORE -

connected with hoses to an air compressor located in an acoustically insulated enclosure on shore. In operation, air is pumped into the aerator, drawing in water and saturating it with oxygen. The water is then discharged back into the bottom of the lake through six outlet pipes. This is the first use of this equipment in the United States. The concept of hypolimnion aeration originated and has been successful in Europe over the past few years.

Prior to initiation of the project, Lake Waccabuc had a dissolved oxygen level in the hypolimnion of zero parts per million (ppm). After six weeks of aeration and continuing to the end of the summer, the dissolved oxygen level increased to nearly 5 ppm, adequate for supporting cold water fish life. Union Carbide stocked Lake Waccabuc with 2,100 trout and as of this date they are surviving well. One of the most important results of the project was the reduction of dissolved phosphates by 30 per cent in the hypolimnion. This means that next summer these nutrients will not be available to support the growth of algae. In addition, foul-smelling hydrogen sulfide present inthe hypolimnion at the start-up of the operation is no longer apparent. Residents report the lake the clearest it has been for a number of years.

With SSP, water is withdrawn from the hypolimnion through a pipe and is injected with pure oxygen from a shore-based unit. The oxygen-saturated water is then returned to the bottom of the lake. This method, developed by Union Carbide, is an alternate approach to oxygenating the entire hypolimnion of a lake.

Data from Ottoville Quarry shows that the dissolved oxygen level has increased from zero ppm to the ecologically desirable level of 8 ppm, and stocked trout are also surviving well. The relatively shallow hypolimnion at Attica posed special problems which necessitated modification of the oxygenated-water distributors. As a result, the period of oxygenation was greatly reduced. However, oxygen levels were increased, but more importantly, much useful data was obtained to continue this work next summer.

Cowley emphasized that no one aeration/oxygenation system is applicable to all lakes. A study of each individual body of water would be necessary to determine which system offers the most effective means of coping with its particular eutrophication problem.

- END -

GLOSSARY

AEROBE (aerobic). Organism that requires the presence of free oxygen to carry on its life processes.

ANAEROBE (anaerobic). Organism that may thrive in the absence of free oxygen.

COLDWATER FISHERY. A fishery consisting of fish requiring cold water, generally below 70°F. Trout and salmon are typical.

ECOLOGY. Study of living organisms and their interaction with the environment.

EPILIMNION. Warmwater volume of a stratified lake. Generally circulated by the wind, lacks thermal stratification and oxygen concentrations near saturation. Located above the metalimnion.

EUTROPHIC. Water characterized by a high organic and nutrient content. Eutrophic lakes develop an oxygen deficit in or below the metalimnion.

HYPOLIMNION. Coldwater volume of a stratified lake located below the epilimnion and metalimnion. Temperatures are almost homogeneous throughout. Oxygen usually absent in the hypolimnion of eutrophic lakes sometime during their stratified period.

LAKE. A large body of water that characteristically stratifies during summer.

LITTORAL ZONE. The shoreward area of the lake. Shallow water zone characterized by rooted aquatic plants.

METALIMNION. A layer of water between the epilimnion and hypolimnion. A transition zone that generally has a temperature gradient of 1°C/meter or greater. Also called the thermocline.

PHYTOPLANKTON. Plant portion of plankton.

PLANKTON. Small organisms that live in the open water and are carried by the water currents. May possess some means of locomotion.

PRIMARY PRODUCTION. Generally the fixing of carbon dioxide and water into organic compounds by plants.

PROFUNDAL ZONE. The deep water benthic area beyond the depth of effective light penetration. The bottom of the hypolimnion.

WARMWATER FISHERY. A fishery consisting of fishes that tolerate warm water of 75°F or greater. Bass, bluegill, catfish and bullheads are typical.

ZOOBENTHOS. Animals living on the bottom of the lake.

ZOOPLANKTON. Animal portion of the plankton.