

# You're The Solution!

Pollution may rear its ugly head in many forms.

It is a corruptor and a robber. It corrupts by adding harmful bacteria, minute animal life or toxic chemicals to a stream. It robs the water of the oxygen with which it cleans itself.

Human waste can be a contributing factor in water pollution.

Dilution, oxidation and bacteriological breakdown are the natural cleansers and act to rid the flow of harmful waste under normal conditions.

But pollution grows proportionately with population. Without the proper treatment of wastes, in time, a lake can die.

When choked with large amounts of waste, the oxygen supply dwindles, the useful bacteria die and other aquatic life, including oxygen-releasing plants and fish, dies. For all practical purposes the lake itself is dead.

Often the same aquatic life is poisoned by the harmful pollutants of industrial wastes.

While useful discoveries such as liquid fertilizers, herbicides and insecticides aid the farmer in producing better crops, they too often pollute the water.

Debris from careless dumping and improperly attended landfills clog the water with other materials which in time oxidize and pollute.

If solutions to these problems are not found in the coming decade, it could very well be that man may destroy himself with his own technology.

In the past, pollution control was concerned primarily with problems caused by domestic and the simpler industrial wastes of industry. Control was aimed principally towards protecting downstream public water supplies and stopping or preventing nuisance conditions.

Pollution problems were principally local in extent and their control a local matter.

This is no longer true. National growth and change have altered

## Where To Call

Every citizen can help enforce anti-pollution laws. If you see a violation or know of a source of pollution entering the lake you can do the following things:

(1.) Report the violation to the proper authority. The lake patrol can be reached through Jack's Taxi (842-3366) or through the Culver Boat Company (842-2269).

(2.) Go directly to Dr. J. A. Hafert, Justice of the Peace, and swear out an affidavit against the offender. He will then call a law enforcement officer to serve the papers.

If the offender is in a boat, make sure to note the registration numbers on the side of the boat.

(3.) If the pollution could cause a health threat, call the Marshall County Health Department (936-3331) and report the problem. They are very willing to help.



## Beautiful Maxinkuckee . . .

this picture. Progress in abating pollution has been outdistanced by population growth, the speed of industrial progress and technological developments, changing land practices, and many other factors.

The increased production of goods has greatly increased the amounts of common industrial wastes. New processes in manufacturing are producing new, complex wastes that sometimes defy present pollution control technology. The increased application of commercial fertilizers and the development and widespread use of a vast array of new pesticides are resulting in a host of new pollution problems from water draining off land.

The growth of the nuclear energy field and the use of radioactive materials foreshadow still another complicating and potentially serious pollution situation.

Conventional biological waste treatment processes are hard-pressed to hold the pollution line, and for a growing number of our larger cities, these processes are no longer adequate.

The construction or extension of sewer lines has not matched either the growth rate (of suburbia and exurbia) or its movements. Sea water intrusion is a growing problem in coastal areas.

Present day problems that must be met by sewage treatment plants can be summed up in the eight types of pollutants affecting our waters.

The eight general categories are: common sewage and other oxygen-demanding wastes; disease causing agents; plant nutrients; synthetic organic chemicals; inorganic chemicals and other mineral substances; sediment; radioactive substances; and heat.

### Oxygen-Demanding Wastes

These are the traditional organic wastes contributed by domestic sewage and industrial wastes of plant and animal origin. These wastes are usually destroyed by bacteria if there is sufficient oxy-

gen present in the water. Since fish and other aquatic life depend on oxygen for life, the oxygen-demanding wastes must be controlled, or the fish die.

### Disease-Causing Agents

This category includes infectious organisms which are carried into surface and ground water by sewage and certain kinds of industrial wastes.

Man or animals come in contact with these microbes either by drinking the water or through swimming, fishing, or other activities.

### Plant Nutrients

These are the substances in the food chain of aquatic life, such as algae and water weeds, which support and stimulate their growth.

Nitrogen and phosphorus are the two chief nutrients present in small amounts in natural water, but much larger amounts are contributed by sewage, certain industrial wastes and drainage from fertilized lands. Biological waste treatment processes do not remove the nutrients — in fact, they convert the organic forms of these substances into mineral form, making them more usable by plant life.

The problem starts when an excess of these nutrients over-stimulates the growth of water plants which cause unsightly conditions, interfere with treatment processes, and cause unpleasant and disagreeable tastes and odors in the water.

### Synthetic Organic Chemicals

Included in this category are detergents and other household aids, all the new synthetic organic pesticides, synthetic industrial chemicals, and the wastes from their manufacture.

Many of these substances are toxic to fish and aquatic life and possibly harmful to humans. They cause taste and odor problems, and resist conventional waste treatment. Some are known to be highly poisonous at very low con-

**SPECIAL**  
*Save The Lake*  
**Edition**



## Is Turning Into This!

centrations. What the long-term effects of small doses of toxic substances may be is not yet known.

### Oxygen-Robbing Wastes

A vast array of metal salts, acids, solid matter, and many other chemical compounds are included in this group.

They reach our waters from mining and manufacturing processes, oil field operations, agricultural practices, and natural sources. Water used in irrigation picks up large amounts of minerals as it filters down through the soil on its way to the nearest stream.

### Sediments

These are the particles of silt, sand and minerals washed from the land and paved areas of communities into the water. Construction projects are often large sediment producers.

While not as insidious as some other types of pollution, sediments are a major problem because of the sheer magnitude of the amount reaching our waterways.

More importantly, sediments reduce the amount of sunlight penetrating the water. The sunlight is required by green, aquatic plants which produce the oxygen neces-

sary to normal lake balance. Sediments greatly increase the treatment costs for municipal and industrial water supply and for sewage treatment where combined sewers are in use.

### Radioactive Substances

Increased use of (radioactive) substances poses a potential public health problem. Since radiation accumulates in humans, control of this type of pollution must take into consideration total exposure in the human environment — water, air, food, occupation, and medical treatment.

### Heat

Heat reduces the capacity of water to absorb oxygen.

Summer temperatures heat up the surfaces, causing the water to form into layers, with the cooler water forming the deeper layers. Decomposing vegetation matter from natural and man-made pollutants deplete the oxygen from these cooler lower layers with harmful effects on the aquatic life.

To complicate matters, most of our wastes are a mixture of the eight types of pollution, making the problems of treatment and control that much more difficult.

**YOU'RE THE SOLUTION  
TO WATER POLLUTION**

## Public Urged To Participate

# Lake Assn. To Weigh Anti-Pollution Move

The annual Maxinkuckee Lake Association meeting will be held on Friday, August 28 at 8:00 in the little theater of Eppy Auditorium. All persons who are concerned about the quality of the lake, including lake front owners and renters, are urged to attend. You need not be a member of the Association. For the consideration of the Association the following resolutions will be presented:

1. That the Directors of the Lake Association are authorized to employ the services of an expert or experts who shall make a preliminary survey to determine the method or methods necessary to prevent further pollution of the Lake.

2. That if necessary, as determined by the report, the Directors are authorized to employ a sanitation engineering firm to make such plans and specifications, including estimates of cost, financing, fees, etc., of a sewage sanitation system for the Lake area.

3. That the Directors are authorized to join in and support a petition for the purpose of establishing a Regional Water, Sewage and Solid Waste District in accordance with the provision of Chapter 244 of the Acts of the Indiana Legislature, 1969.

4. That the funds for a preliminary survey and/or a sanitation survey shall not be from the general funds of the Association nor shall the members be assessed therefor. Provided, that if in the discretion of the Board of Directors the donated funds shall be inadequate, a sum not in excess of \$500 may be expended from the General Fund for the said surveys.

A new Act authorizing such a District calls for hearings to provide opportunity for objections on the proposed operational plan prior to the final order of the Court creating the District. Afterwards the Board of Trustees would secure bonds for 25 per cent of the costs and would have the powers necessary to obtain grants consisting of 50 per cent Federal and 25 per cent State. Ultimate costs to the users would be approximately \$1,500 to tie into the system and a monthly rate of about \$8.

Only Association members will be allowed to vote, but all are encouraged to attend and discuss this vital problem.

## Plant Overgrowth From Fertilizers Robs Fish of Oxygen, Chokes Lake



Fertilizer run-off nourishes aquatic plants and is greatly responsible for upsetting the plant-animal balance in the lake. These water weeds are chopped up by boat props and float into shore where they must be disposed of.

## Everybody Uses Lake

Most of us spend time on or in Lake Maxinkuckee water. We ski and sail, boat and swim. We take in leisurely cruises and watch the shoreline.

But when was the last time you looked closely at the lake's shoreline? I mean from a very few feet.

A close and complete tour of this lake's boundaries produces some nauseating results. Trash and garbage accumulate wherever there is room. Orange peels, beer cans, paper plates, plastic, even abandoned boats.

Noxious run-off water seeps from overflow and "surface water" drains. One such drain near the public swimming area was found to leak gasoline into the lake.

Dead, cut-up weeds concentrate in clumps to decay and starve the water of needed oxygen. If you are a nonbeliever just check the east side after some wind.

Oily chemical wastes mark some shore lines. For example, the beach area just north of the woodcraft swimming pier.

Thickly intertwined living weed beds, a good indication of human nutrient waste leakage, grow unnaturally thick in many areas of the lake, especially along the north and northwest shore.

Tributary streams such as those by the Woodcraft camp, near the east side access, and from the Maxinkuckee Golf Association course bring odorous and discolored water into the lake.

After a rain the southeast and south shore are a muddy brown color due to run-off clay and soil from improperly planned land development.

Gasoline and oil slicks are not unseen. Nor is algae slime.

You can see houses that lie only a few feet from the water. Where does their sewage go?

You can see people washing their hair and their dogs and their boats. Where does the soap and the "dirt" go?

People talk of keeping this as the "cleanest lake in Indiana." But talk isn't helping Lake Maxinkuckee clean up the mess already in it or prevent more mess.

## Don't Do It In The Lake!

To look out across the lake on a sunny morning one would never believe that it is becoming the victim of man's pollution. In fact, that is the problem. Too few people believe that we are polluting our lake. They still do it, everything, in the lake.

The Indiana State Legislature has provided some protection for our streams and waterways through the Indiana Stream Pollution Control Law (Acts of 1943). This law prohibits any individual or group to "dispose any organic or inorganic matter that shall cause or contribute to a polluted condition" of streams and waterways in Indiana.

This law applies to all of us in some way because there are probably very few people who have not dumped some kind of refuse in the lake.

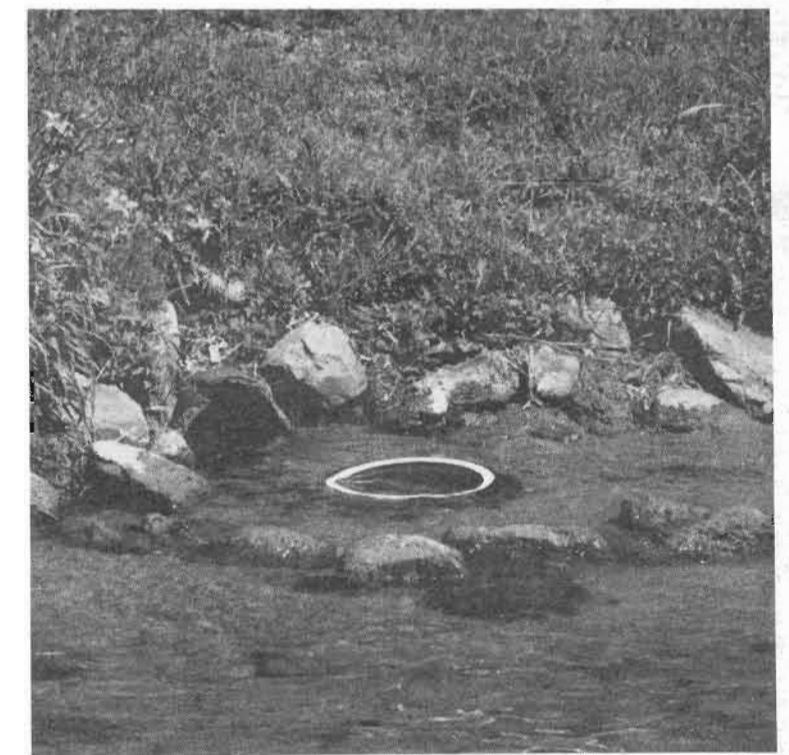
Too many people think only the corporations are guilty of polluting the water. But since we have no large percentage of heavy industry around Culver, the guilt must fall on individuals and institutions.

For the individual who uses the lake as a garbage pile the fine could be not less than \$25 and not more than \$100. He may also be ordered to serve not less than five days and not more than 30 days in jail.

Many people still throw refuse into the lake. When it sinks out of sight their consciences are eased. And anyway, what does one little candy wrapper do? And how can washing your hair in the lake hurt? A prevailing attitude seems to be "But we've done it for years!"

Try a little experiment. Run a tub full of water and instruct each member of the family to take a bath and wash his hair in it. Give the family pet a bath, too, but don't change the water. Now, what if everyone who came to the lake took a bath in our water?

The lake is 2.6 miles long, 1.6 miles wide and about 90 feet at its deepest hole. It is largely spring fed. It is a finite body; it has definite limits. Yet we abuse it as if it



A trip around the shoreline reveals man's pollution. The pipe behind the discarded tire carried gasoline into the lake.

will heal itself overnight. Don't do it in the lake.

The lake is not a human garbage disposal nor was it ever intended to be a public restroom. We are deeply concerned about partially treated sewage entering the lake, consider the harm of raw sewage. Don't do it in the lake.

We must learn to treat the lake with respect or it will someday turn and get its revenge from us. Remember these 'don'ts' and practice them.

1. Don't throw paper of any kind in the lake.
2. Don't deposit those "no-deposit, no return" cans and bottles in the lake.
3. Don't put detergents, paints, or other chemicals in the lake.
4. Don't wash pets in the lake.
5. Don't rake leaves or grass into the lake - they use oxygen to decay.
6. Don't use the lake as a personal bathroom. You wouldn't swim in a toilet would you?

Increasing use of artificial fertilizers in farming is another major problem facing those who are striving to save the natural balance of the nation's rivers and lakes.

While the use of fertilizers, such as phosphate compounds and liquid nitrogen, have been a boon to the farmer in the production of high-yield crops, they have similar effects on the growth of aquatic plant life.

The volume of these fertilizers in run-off water upsets the natural plant-animal balance in the stream or lake. Not only do these nitrate and phosphate compounds feed bacteria but also increase the quantity of algae and other aquatic weeds to such proportions that the water often becomes a slimy green.

This green algae film is visible in certain areas of the lake now.

During their summer growth, these green plants absorb carbon dioxide given off by the animal life and supply the water with oxygen necessary for the animal life in the natural processes of the lake. But come the fall, this plant life dies, decays and in turn oxidizes at a high rate. The oxygen supply of the water is depleted and aquatic animal life dies from lack of oxygen.

Such was the case in the infamous "death of Lake Erie" and such will be the case in many other bodies of water, even ours, if solutions are not found controlling the run-off of these fertilizers.

This same decay and oxygen depletion process occurs when underwater weeds are killed by chemical herbicides such as those used around the larger swimming piers. The weed elimination is also only effective for one season and the weeds will return the next year.

The only way to permanently eliminate a weed patch after it has overgrown is to pull the weeds out by their roots and burn or bury them outside the waterbasin area.

In the case of fertilizers and by-products of both human and animal waste the nutrients supplied are mainly nitrates. A major problem in controlling these nitrates is that they are so easily soluble in water.

Current studies show phosphate compounds are the controlling factor in inhibiting aquatic plant growth.

# Housewife Key Figure In Fight To Save Lake

"If you aren't part of the solution, you're part of the pollution." To save Lake Maxinkuckee and the world from becoming a giant garbage pile very individual must help.

The housewife can be one of the strongest forces to help preserve our quality of life. Think of the buying power she takes to the market place.

Saving the environment might bring a few inconveniences and it might mean breaking a few patterns. It will also mean a cleaner, healthier world in which to live.

Here are a few positive measures the housewife can take at home to aid in the battle against pollution:

1. Returnable containers save money and the environment. If you really feel like protesting those "throwaway" bottles and cans, pack them up and send them back to the manufacturer.

Reynolds Aluminum will even pay \$200 per ton on recycled aluminum.

2. Don't purchase liquids sold in

milk-white plastic containers. This material is polyvinyl chloride. When burned, it produces a very strong acid mist which can destroy nearby vegetation as well as the inside of an incinerator.

3. Don't buy over-packaged products. Write to the manufacturers and tell them why you aren't buying their product. Tell your friends to do the same.

4. Reuse paper bags, boxes, envelopes, and other containers.

5. Use handkerchiefs, cloth napkins and towels instead of paper substitutes.

6. If you must use paper, don't use colored tissues, towels or napkins. Dyes released to steams by factories making them produce visual and biological pollution. Those dyes don't help your local treatment plant or septic system either.

7. Those lovely plastic bags that wrap your trash and garbage in such nice packages leave them just that way - in nice packages. The plastic is not bio-degradable so yesterday's coffee grounds will

stay gift wrapped for some time to come. Ditto for tin foil.

8. Do you really need an electric can opener? The more gadgets, the more electrical power that must be generated.

9. A 15c fly swatter is as effective

on most insects as a \$1.39 spray can of pesticide. The water will last longer and has no chemicals which might harm you or your children.

10. Place two or three bricks in the flush tank of every toilet you use. This will reduce the amount of water used without decreasing the efficiency of the toilet. In a city the size of Muncie this could save around 350,000 gallons a day.

11. If your bathroom has a shower determine whether a bath or shower takes more water. Close the drain and take a shower. See how much water accumulates. If it is less than you would use for a bath, (which it probably is by three to four gallons) stay with showers most of the time.

12. Much pollution comes from household detergents. Most of these detergents contain large quantities of phosphates which fertilize algae and other aquatic vegetation causing over-growth and a green scum that increasingly destroys water quality.

The accompanying chart will

## Fish Don't Mind Outboard Motors

A study done by scientists at the University of Michigan concluded that outboard motors do not disturb fish. In many cases the fish curiously swam toward the suspended bubbles.

The most significant test to fishermen was whether or not an outboard driven close to where men were casting would bother their fishing. The results showed no significant difference between the catch on motor days and on non-motor days.

## Water Quality Depends On Enforcement

Water quality standards, like any other set of rules, are only as good as their enforcement.

The Indiana Stream Pollution Control Board schedules administrative hearings to consider alleged violations of it appears a municipality, industry or any other legal entity is not taking proper steps to abate pollution in Hoosier waters.

If it is determined that pollution exists, the board will issue an order to the polluter to submit plans and specifications for facilities necessary to abate the pollution and the board will set a minimum time for the start and the completion of those facilities.

In the case that the polluter does not comply with the order, the board may ask that the Indiana Attorney General take up the enforcement of the order and file charges in the Circuit or Superior Court of the county, where the pollution is said to exist.

During fiscal year 1968-69, 16 enforcement actions were initiated by the Stream Pollution Control Board. Three administrative hearings were conducted and final orders issued to the alleged polluters.

Thirteen additional actions were resolved without hearings when the industries involved stipulated that plans and specifications for correction of the pollution would be made in compliance with dates ordered.

Three cases were referred to the Attorney General's Office. Of the three, one firm received a court order to comply, one company furnished plans for pollution abatement, and the third case was pending at the end of the fiscal year.

## Testing Your Septic Tank

Even the most effective septic tank can develop problems - often unseen problems. Tanks can fill so that water passes through them without receiving any treatment. Finger tiles may crack causing water to seep directly into the water or into drinking wells.

One good, and inexpensive way to check that a septic tank is not sending any effluent into recreation or drinking water supplies is to test it with a small amount of dye.

A dye recommended by Indiana Water Pollution Control authorities is called Fluorescein, a water soluble powder. This red powder is safe to use and will not stain bathroom fixtures.

To test a septic system one need only flush one heaping teaspoon of the dye down into the tank. Plenty of water should follow the dye to insure it reaches the tank.

If the septic system is functioning ineffectively surrounding water will show up a brilliant, highly noticeable green, at any period up to about two days.

Many lakes and lake groups are now using this test to check all lake-bordering property.

### LET OUR WATERS LIVE

You can help fight pollution! Detergents contain large amounts of phosphates, an essential nutrient for algae. Over abundance of nutrients result in large growths of algae, which choke up many of our waterways now. The death of these masses of algae results in oxygen removal from the water, thereby killing fish. The decaying, smelly masses of algae either wash up on our beaches or gradually fill our waterways. Buy low phosphate detergents and help fight pollution! NSBE has compiled the following list of detergent products and the units (grams) of phosphate added with each wash load. Stay below 25 units. Whichever detergent you use, avoid waste, use no more than the quantity specified on the box.

DETERGENTS	Amt. per Washload	Units of Phosphates per Washload	DETERGENTS	Amt. per Washload	Units of Phosphates per Washload
Add-it	1/2 c.	0	Easy Life Heavy Duty	1 1/2 c.	32
Culligan Soap	any	0	Cheer	1 1/4 c.	33
Diaper Sweet	any	0	Fab	1 1/2 c.	34
Ivory Flakes	any	0	Oxydol Plus	1 1/4 c.	34
Diaper Pure	1 1/4 Tbsp.	1	Punch	1 1/4 c.	35
Trend	1 1/2 c.	6	Breeze	2 c.	36
Special-T Laundry	1/2 c.	7	222	3/4 c.	37
Instant Fels	1 1/2 c.	8	Concentrate All	1 c.	38
Blue Magic	1 1/4 c.	19	Sears	1/2 c.	38
Amway SA-8	1/4 c.	20	Ad	1 c.	38
Bestline B-7	1/4 c.	20	Easy Life Enzyme	1 1/2 c.	38
Wisk	1/2 c.	21	Duz	1 1/2 c.	39
Montgomery Wards	2/3 c.	21	Easy Life Blue	1 1/2 c.	39
Surf	1 1/4 c.	24	Tide XK	1 1/4 c.	40
Lauder Maid Blue	1 c.	25	American Family	1 1/4 c.	40
Gain	1 1/4 c.	27	Drive	1 1/4 c.	41
Draft	1 1/2 c.	27	Cold Water All	1 1/4 c.	42
Silver Dust	2 c.	28	Vim	4 tablets	44
Cold Power	1 1/4 c.	29	Fluffy All	1 1/2 c.	52
Bold	1 1/4 c.	29	Bonus	2 c.	55
Ajax	1 1/4 c.	31	Salvo	2 tablets	59
Cold Water All (liquid)	1/2 c.	31	Dash	1 c.	60
Rinso	1 1/4 c.	32			
<b>ENZYME PRESOAKS</b>			<b>BLEACHES AND BLUING</b>		
Brion	1/2 c.	30	LaFrance Bluing	1/2 c.	0
Axion	1/2 c.	34	Miracle White Bleach	1/2 c.	14
Biz	1/2 c.	37	Action	1 packet	24
Sears	1/2 c.	55	Snowy	3/4 c.	27
<b>ADDITIVES</b>			<b>BOOSTERS</b>		
Fels Naphtha Bar	any	0	Climalene	1/4 c.	14
Borateem	any	0	Easy White	1/2 c.	24
Borax	any	0	Anything Goes	1/2 c.	27
Right Fabric Softener	any	0	Miracle White	1/2 c.	41
Sal Soda	any	0	<b>DISHWASHING LIQUIDS</b>		
Calgon	1/2 c.	57	(Generally contain no phosphates)		
<b>AUTOMATIC DISHWASHING COMPOUNDS (per washload)</b>			<b>ALL PURPOSE CLEANERS</b>		
Special-T	1 Tbsp.	1	Amway L.O.C.	any	0
Calgonite	2 Tbsp.	6	20 Mule Team Household	any	0
Advance	2 Tbsp.	6	Ajax Floor and Wall	2 Tbsp.	4
Finish	1 1/2 Tbsp.	6	Janitor in a Drum	1 c.	9
Electra-Sol	2 Tbsp.	6	Soilax	3 Tbsp.	12
Dishwater All	2 Tbsp.	9	Spic & Span	1/2 c.	23
Cascade	2 1/2 Tbsp.	11			
Amway	2 Tbsp.	11			

Phosphates can be eliminated from detergents. Help back legislation banning phosphates by writing your Congressmen and Senators.

Analyses performed by Northwestern Students for a Better Environment, Cresap Lab, Northwestern University, Evanston, Illinois 60201 (312) 491-9627

# Treating Municipal Wastes Is Essential

Sewage disposal is not one of the most pleasant conversation topics, but it is one of the most essential to the welfare of any community. This is particularly true for Culver, which is centered on and derives much of its existence from Lake Maxinkuckee.

Improper sewage disposal is hurting the lake and the community; in time it will destroy them both. An understanding of the sewage system is essential to an understanding of Culver's pollution problems.

The aim of the town sewage system is to purify water polluted by human usage within the town, and to restore the water to a state where it can fulfill its role in the ecological system.

The first step in Culver's water purification system is the pipelines. Each house and business establishment within the city limits of Culver has its sinks, tubs, toilets, showers, etc. joined by pipes to a major pipeline which carries the sewage to the treatment plant.

Also attached to the pipeline system are the toilets, sinks and showers at McGills Bearing Plant and Culver Military Academy. The sewage from all these sources is transported by a network of pipes to the treatment plant on Hawk Lake.

Upon its arrival at the treatment plant the sewage is run through a communitor, a machine which cuts up the large objects contained in the flow. The incoming sewage enters primary treat-

ment by running through a screen which filters out the large solid pieces from the flow. The filters are cleaned at least once a day. The sludge is removed from the filters and buried on the surrounding ground.

The sewage flow is measured as it enters the primary settling tanks. The Culver Sewage Disposal Plant has two of these tanks, in which the sewage is allowed to settle and the solid material is screened off.

This sludge is removed to a digester. The digester is a large round tank in which anaerobic (non-oxygen using) bacteria feed on the sludge, breaking it down into humous which can eventually be used for fertilizer.

This settling, screening, and removal of the solid material completes the primary treatment of the sewage.

The secondary system of the Culver Sewage Plant is an activated sludge plant, designed to remove the pollutants which remain suspended in the water after primary treatment. After the sewage leaves the settling tanks in primary treatment, it flows into an aeration tank where it is mixed with air and sludge loaded with bacteria.

It remains in this aeration tank for several hours, all the while air is being blown into the tanks to facilitate the bacterial action. The bacteria feed on the organic waste material and thus break it down into non-harmful elements.

From the aeration tank the sewage flows to a final sedimentation tank, where the water is filtered over several layers of pebbles to remove the remaining wastes. This step removes the sludge and bacteria that were added to the sewage in the aeration tank. They are recycled back to the aeration tank to be used again to break down organic material.

The purified water gains oxygen, the essential of life, as it bounces over the rocks and flows out into the channel between Lake Maxinkuckee and Hawk Lake.

The aim of the Culver Sewage Disposal Plant is to turn out pure water. The effluent (water turned out by the sanitation system) is required by the State Board to be 99 per cent pure; the Culver plant's effluent averages 85 per cent pure water.

The reasons for this dangerous inefficiency are several. It is not that the plant is poorly managed, but rather that it is grossly overworked and needs new equipment.

The plant was designed in 1953 to accommodate a maximum capacity of 250,000 gallons of sewage a day, yet often over 400,000 gallons enter the treatment plant in one day, particularly in the summer.

This overload stems from the fact that the town has grown since the plant was designed; new areas of land have been annexed; a factory has been added; and Culver Military Academy has expanded its usage of the town sewage system.

This overload cuts the plant efficiency because it reduces the time allowed for the sewage to settle, thus less waste material filters out. It also lessens the time that the sewage is in the aeration tanks. The bacteria have less time to work on the waste and the sewage is thus not fully treated.

Another factor reducing the plant efficiency is that the sewage system is designed to handle only home, and commercial wastes. However, it is infiltrated by storm drainage water that greatly increases the volume of sewage water.

When it is run through the plant the excess water washes away the bacteria in the aeration tank which break down the wastes. This then leaves the plant with only primary treatment while new bacteria are being grown.

In order to preserve the bacteria to keep the activated sludge plant working, it is necessary after a large storm, which brings great volumes of storm water into the plant, to allow the excess water and sewage to bypass all secondary treatment and flow directly into the channel.

To work efficiently the plant needs a doubling of facilities. Particularly needed are another blower to disperse air through the aeration tank; there is presently not enough oxygen in the tank to allow the bacteria to work to their utmost capacity. New pumps are needed to remove sludge from the settling tanks. The present pumps

are unable to remove all the sludge from the water in the settling tanks.

The Culver Sewage Treatment Plant uses no chemical treatment in its sanitation process. Chemical treatment, if applied properly, could remove many of the dissolved pollutants that escape the activated sludge treatment. By 1972, Culver will be required by state law to add a chlorination process to its sewage treatment. The chlorine will kill disease-causing bacteria and will reduce odors.

The cure for the Culver Sewage Plant is interest and money, neither of which is easy to get. But they must be attained if Culver is to survive as a healthy, prosperous community.

## CMA Employs Several Methods

Culver Military Academy uses several methods of disposing of its waste water.

The Woodcraft Camp sends its waste water to a septic tank system.

Water from the laundramat and from barracks showers is pumped to the North 40 near the Academy dump where it is drained into tiled fields.

Sewage waste water is pumped to the Culver treatment plant. This waste includes urine washed from the riding hall and stables. Waste water is kept in holding tanks behind the naval building and released to the town system on a regular time basis.

This animal waste is 25 times the B.O.D. of human waste thus it requires 25 times the oxygen to break it down. The horse manure is loaded and trucked up the hill behind the Woodcraft Camp where it is deposited.

During heavy rains when the town system carries a heavier load a separate system pumps all waste water into the North 40. There it drains into the field just as the laundry water does. This procedure is only used during storms.

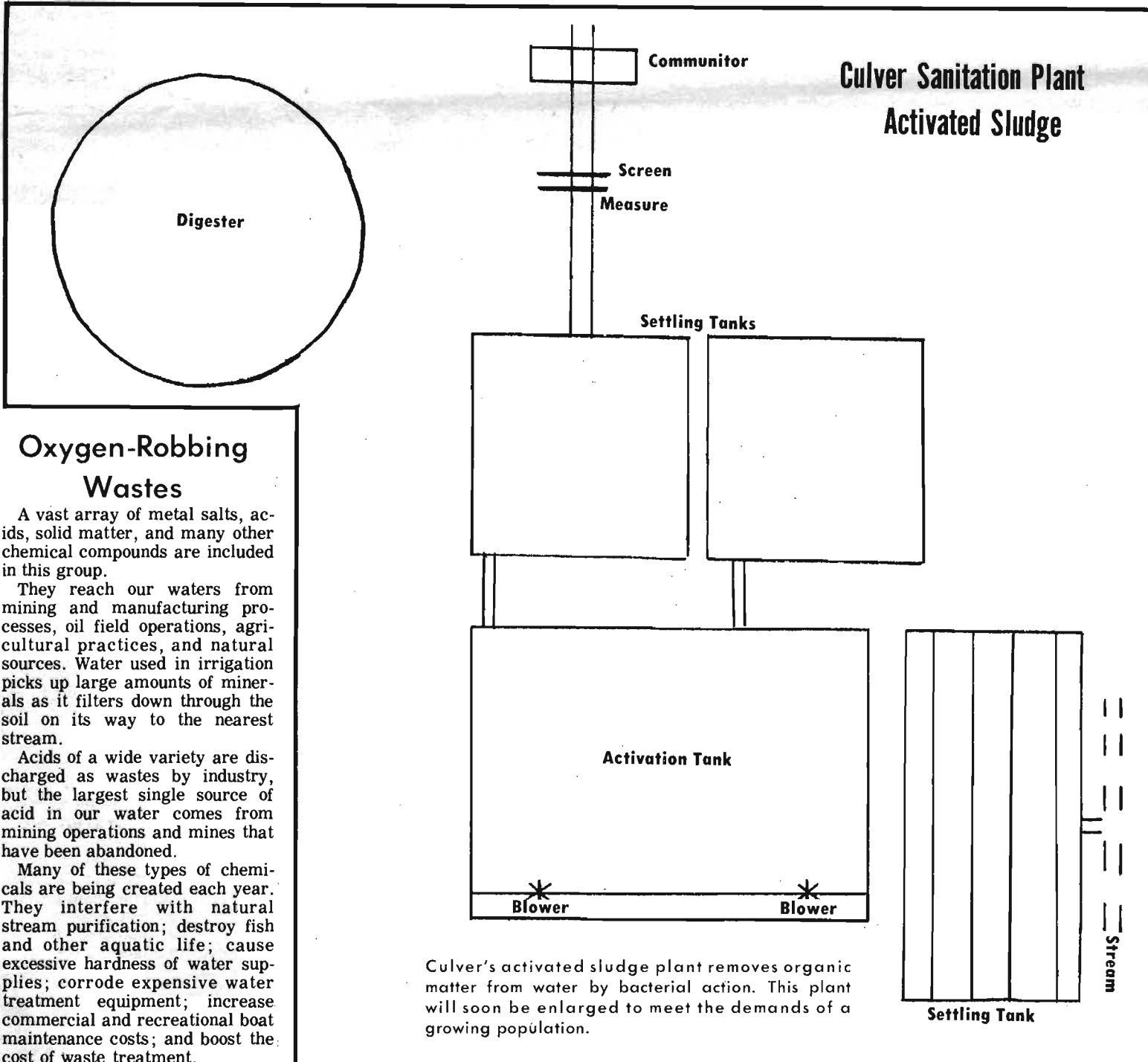
This summer, as in past years, the Academy chemically killed the weeds around the swimming piers. Pellets of Aquathol-Plus were dropped into the water. This chemical is bio-degradable and would need a 20 concentration to be toxic to fish. It only effectively removes weeds for one season, however.

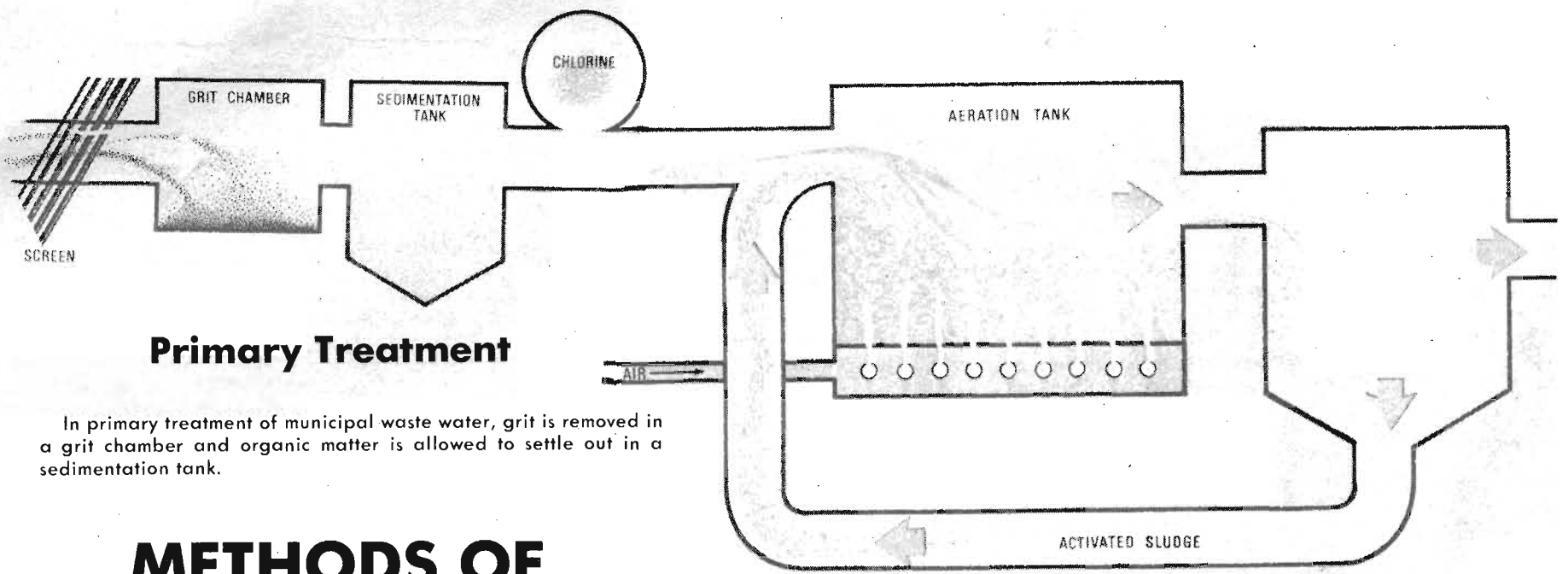
For three days following the weed kill swimming and fishing were discontinued due to possible toxic side effects to humans.

We are currently adding a city the size of Indianapolis every two days, a country with the size of Japan, the most crowded country on earth, every 14 months.

If we talk in terms of a comfortable suburban life with forests, parks, recreational areas, and a standard of life no lower than our present one in the U.S., then it is obvious that we shall probably approach the limits of existence within the lifespan of our children.

Information from  
Paul Ehrlich,  
Dean Fraser, Time.





### Primary Treatment

In primary treatment of municipal waste water, grit is removed in a grit chamber and organic matter is allowed to settle out in a sedimentation tank.

# METHODS OF TREATING MUNICIPAL WASTES

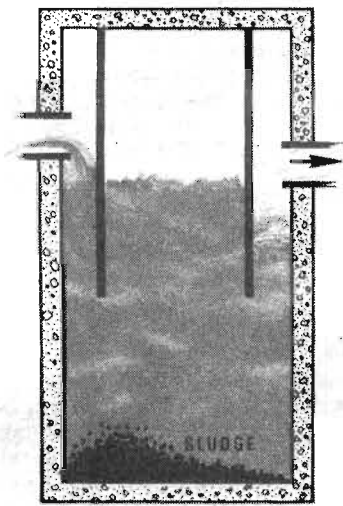
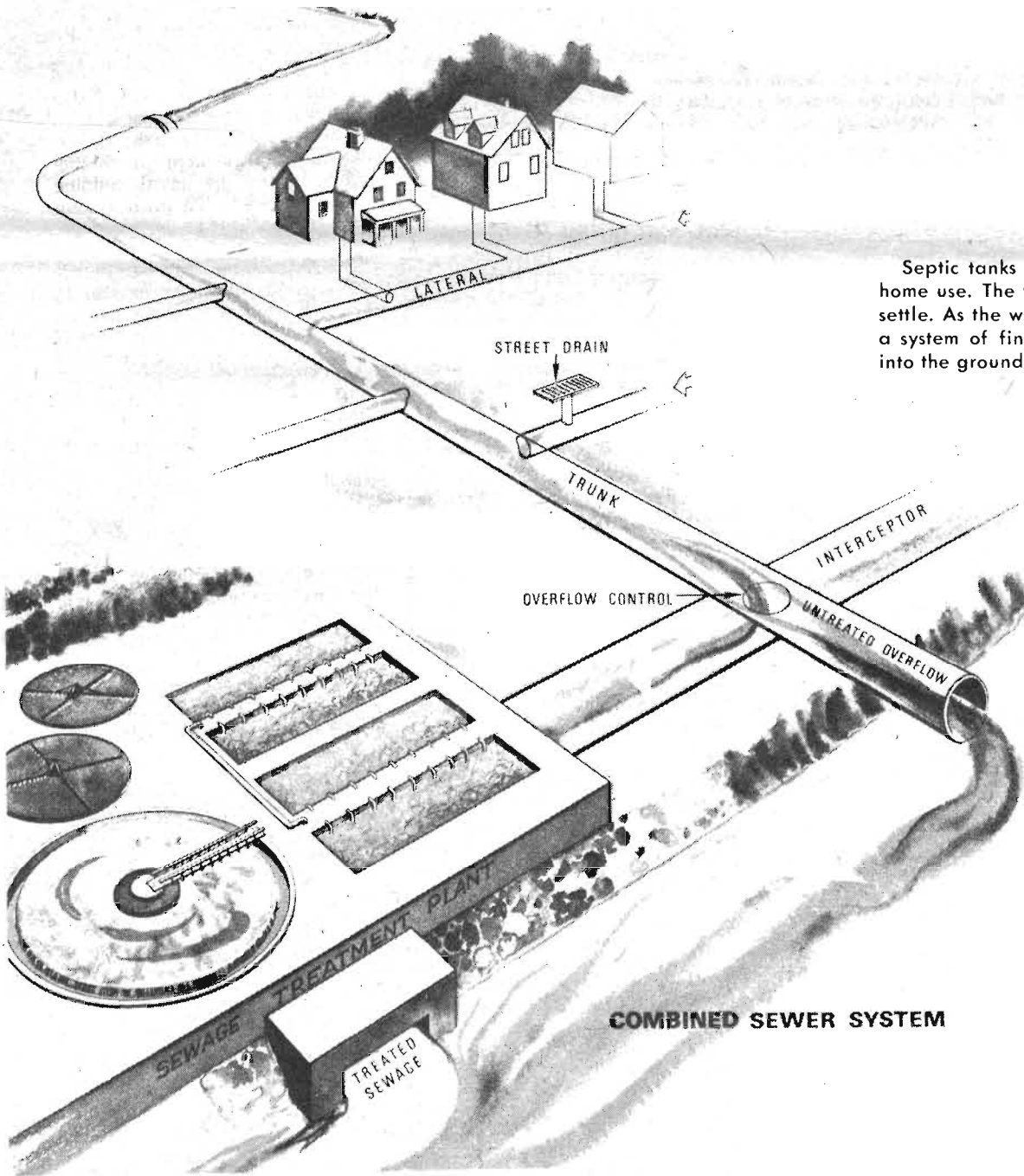


DIAGRAM OF A SEPTIC TANK

### Septic Tanks

Septic tanks serves a simple waste water treatment devices for home use. The waste water enters one side of the tank and solids settle. As the waste water flows through the outflow, it passes into a system of finger tiles (not shown in diagram) and is absorbed into the ground for natural purification.



### Secondary Treatment

In the secondary process, air is blown through the waste water and chlorine is added to coagulate undesirable substances. The activated waste water is recirculated and allowed to settle out. Further cleansing can be accomplished by trickling filters and digesters, in which bacteria are used to consume the organic matter (shown at far left in diagram).

## Culver To Expand Plant

The Culver Town Board has realized the necessity of improving the sanitation system and has responded by passing a two phase program to expand and improve the plant facilities. The first phase of the plan will be implemented whether Culver receives federal funding or not. It is concentrated on improving the existing facilities and enabling them to work to their utmost capacity.

The main provisions account for a lid for the existing digester and a digester control building with heating, piping, and electric service. This would alleviate the unpleasant odor that is now put off by the plant. It also provides for new sludge return pumps, thus enabling a higher percentage of the polluting sludge to be removed during treatment. Chlorination tanks are also included in the initial phase of development. Safety equipment for the plant, plus painting and excavation of the sight round out phase one of the sewage plant improvement.

Phase two of the improvement will be undertaken if federal aid which has been applied for is granted. This phase includes plant expansion as well as improvement. New entrance works for the

sewage entering the plant, including a grid chamber, and flow meter are in the plans. New primary settling tanks, aeration tank, final settling tank with collectors, and a sludge drying bed are in the planning.

Phase two funding includes a new blower and air filter for the existing aeration tank, as well as for the tank to be built. There will be a new sludge pump and new de-watering pump. There will be additions and improvement to the control building to enable complete and accurate managing of the expanded plant.

The entire proposal of the Town Board — both phases one and two — is designed to handle not only the immediate needs of the community but the projected needs up to and through the year 2000. It will cost a great deal of money — a total of \$480,000, of which Culver's share will be approximately \$150,000 — but the health and welfare of the community are worth it. The Town Board need the help and support of everyone in the community to enable them to implement this much needed proposal which will enable Culver to be a clean, healthy, and prosperous community.

# Sewage Major Cause Of Lake Pollution

The disposal of sewage is one of the major pollution considerations affecting Lake Maxinkuckee.

Pollution arises when bacteria from human waste are released into the lake. This bacteria takes oxygen from the water thus starving healthy plants and animals of needed oxygen. Unwanted algae is then given a free environment in which to grow and possibly take over the lake.

Individual septic tanks as are used by most lake shore residents only remove about 40 per cent of the oxygen eating bacteria when operating efficiently.

A septic tank is simply a tank buried in the ground to treat the sewage from an individual home. Waste water from the home flows into the tank where bacteria in the sewage break down the organic

matter and the cleaner water flows out of the tank into the ground through sub-surface drains. Periodically the sludge or solid matter in the bottom of the tank must be removed and disposed of.

In a rural setting, with the right kind of soil and the proper location, the septic tank is a safe and effective means of disposing of strictly domestic wastes. Around the lake though many septic systems have too little area in which to work or are located too low to the water. Under these unfavorable conditions some untreated or partially treated sewage can not help but find its way into the water.

In contrast, the average secondary treatment plant is between 85 per cent - 90 per cent effective in cleansing the water of these bacteria. A treatment plant can also provide treatment methods such as chlorination and aeration which are beyond the capabilities of a septic tank.

The town of Culver has a secondary treatment plant, the effluent of which does not empty into this lake. Thus all of the human waste pollution in the lake must come from those septic systems surrounding the shore line or from run-off water. Much of this could be eliminated by the installation of a sewage line and treatment process to serve the lake.

Several types of systems could be implemented. Most would mean tying on to the town treatment plant, although the increased load would mean that the Culver plant would have to be expanded. Expansion would probably be less expensive than the construction of a second, separate plant.

One alternative is to place the sewage line in the lakebed. Here the biggest concern would be to prevent leakage directly into the lake.

A more conservative approach would be to place the line on land. The hilly terrain would pose a problem because more lift stations would have to be built, thus more expense.

These are not the only alternatives. Even at this early stage, several other possibilities are being explored.

According to Herbert Zinsmeister, civil engineer and vice president of Clyde E. Williams & Associates, "Biological pollutants from septic tanks are probably the greatest difficulty around any lake simply because, financially, no one has taken the initiative to provide sewage collection facilities.

"... The problem can be solved by money only. It also requires a true feeling for trying to protect any lake as it exists today.

"The cost of providing sewage collection systems is high. But compared to the cost of trying to bring a dead lake back to life there is really no comparison."

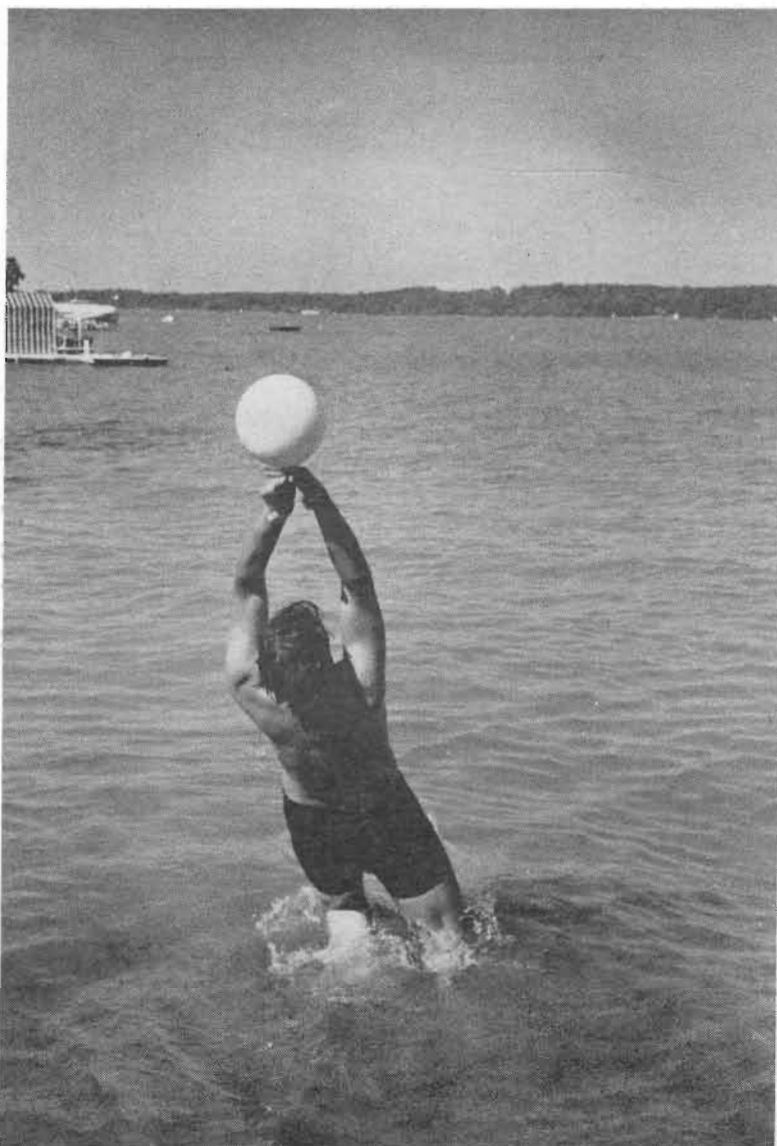
The problem of expense would not be so great if a government subsidy could be attained. Fifty-five per cent could be paid by the federal government, 25 per cent by the state, and the remaining 20 per cent from local funds. It also seems that the federal government is more apt to subsidize a project encompassing a lake rather than a small area.

Time is a major factor. The interval from the time of decision until construction can begin is about two years.

And why is time so important? According to Zinsmeister, "... Ten years hence, if no corrective or preventative measures are taken, it (Lake Maxinkuckee) could be for all intents and purposes a dead lake.

"It is dying right now... a little bit every day simply because of inadequate pollution control facilities. Whether it will be completely dead in ten years is a statement no one can make definitely. But comparing the quality of it today to where it was five years ago there can be no question that it has deteriorated - and on a more rapid basis each year."

It is no longer a valid argument to say Lake Maxinkuckee is the cleanest lake in Indiana. All lakes have problems and it has become



Water seeping from poorly working septic tanks carries sewage bacteria to recreational waters.

## Power Boats Don't Pollute Study Shows

An independent study of two Florida lakes has shown that no contamination exists in the waters tested due to exhaust gases or liquids from marine engines.

The survey was conducted by Environmental Engineering of Gainesville, Florida, at the request of Kiekhaefer Mercury, manufacturers of Mercury outboard motors and MerCruiser engines.

Sites of the study were Lake X, Kiekhaefer Mercury's principal marine testing base in central Florida, and nearby Cat Lake. Lake X supports a continuous 24-hour test program involving the use of outboard, inboard and stern drive marine engines. Company officials believe the lake carries the most concentrated boat traffic of any lake in the world.

Since the test center was officially opened 10 years ago, approximately 3 million gallons of fuel and oil have been used in normal operation.

Two studies were made concerning the effects of exhaust emissions in Lake X. Cat Lake, inaccessible and never used by power boats, was included in the studies as a basis for comparison.

Results indicated "no observable effect on plankton or bottom organisms in the lake."

A spokesman from Environmental Engineering went on to say, "Numerous samples from both lakes were collected... and analyzed for organic compounds known to be found in exhaust emissions of internal combustion engines. Neither Lake X nor Cat Lake were found to contain any of the organic compounds found in gasoline and oil."

The study concluded that the organics were easily broken down into harmless material by the bacteria already in the water, or that they were in such minute quantity that the best equipment could not detect them.

The only hazard from the marine engine industry seems to center near areas where refueling operations take place, such as marinas. Spilled gasoline or oil settles to the bottom and destroys benthic organisms according to the study.

## State Unit Sets Water Standards

Indiana's current water criteria were set up in several categories of water usage and published in the 1966 Stream Pollution Control Board Report.

These water standards vary in whether the water is intended for public water supply, industrial water supply, for support of aquatic life, for recreation (water contact activities such as swimming or water skiing) or for agricultural stock watering.

The most stringent limits are placed on water earmarked for public water supply. Items to be controlled include: Bacteria - coliform bacteria not to exceed 5,000 per milliliter average value.

Threshold odor - not to exceed 24 (at 60 degrees c.) on a rating scale as a daily average.

Dissolved solids - not to exceed 500 milligrams per liter as a monthly average or not to exceed 750 mg-1 at any one time.

Radioactivity - Beta activity not to exceed 1,000 microcuries per liter at any time.

Chemical	Concentration mg - 1
Arsenic	0.05
Barium	1.00
Cadmium	0.01
Chromium (6)	0.05
Cyanide	0.025
Fluoride	1.00
Lead	0.05
Selenium	0.01
Silver	0.05

Criteria imposed for the support of aquatic life include those at any point in the stream except in the immediate area of an outfall.

In the case of recreation waters, stringent limits are placed on coliform bacteria number for whole body contact and partial body contact.

Minimum conditions for all waters include:

1. Free from substances attributable to municipal, industrial, agricultural or other discharges that will settle to form putrescent or otherwise objectionable deposits.
2. Free from floating debris, oil,

a question of which is the least worst, not which is the best.

The first step in providing community sewage facilities for lake residents is to establish a regional sanitary district. It is now possible by the House Enrolled Act No. 1292 to establish a sanitary district outside the city limits.

Governmental organization must convince the circuit court that there is a need to establish a district. After the need is established, the organization must decide on a specific plan. This plan is usually made after a preliminary engineering survey has been conducted.

This survey includes such things as a preliminary cost estimate, engineers recommendations for expansion of existing facilities, and

the best route to lay the pipe.

The organization must then return to circuit court to have the district legally established. Federal funds can then be applied for.

The application for federal funds must be completed by April 15 of the year. If late, it will have to wait a full year before it can be resubmitted.

The final step is, of course, construction of the system.

If, for example, an organization decided this September to establish a sanitary district, the timetable might read like this: The circuit court establishes the regional sanitary district in February of 1971; federal funds secured in June 1971; construction begins in June 1972.

There is no time to waste.

scum, and other floating material attributable to municipal, industrial, agricultural or other discharges in amounts sufficient to be unsightly or deleterious.

3. Free from materials attributable to municipal, industrial, agricultural or other discharges in concentrations or combinations which are toxic or harmful to human, animal, plant, or aquatic life.

You may send to the Indiana Stream Pollution Control Board for a copy of the water quality Standards and Plan of Implementation for your river basin (Everybody in Indiana lives in a river basin.) Ask for progress reports. Find out who is cleaning up and who isn't. Demand action against polluters.

Tell the Board you support an "effluent standard", which means that all water discharged to a stream or lake should be of good enough quality to permit all uses specified for the stream or lake itself.

Organize to fight pollution. Have inspection and survey committees. Keep a record of water pollution sources you find. Take pictures and send them to the county health department and the Indiana Stream Pollution Control Board. Demand abatement action and see that it is carried through.

Learn what the problems are and support legislators in the fight to clean up our home.

### Conservationists Challenge Officials

Herman Coussens, a member of the Oklahoma State Soil Conservation Board, claimed recently that sewage was being dumped in a stream which end up on "our land the Kiamichi River."

A prominent advertisement in the local newspaper offers \$100 for each of the first ten persons "from the board of health, legislature, city council, or just plain citizens" who will drink a quart of water.

# Weed, Pest Killers Pollute, Upset Nature

The word herbicide is used to denote any chemical employed to kill plants and to kill insects on plants. Careless use of herbicides has resulted in fish kills in Indiana waterways, according to the Indiana Stream Pollution Control Board. Herbicides have also been shown to cause birth defects and to attack the nervous system.

Farmers impregnate their crops with herbicides in order to gain a greater yield. Unfortunately, it is the consumer who eventually takes in huge dosages of these chemicals.

Two types of herbicides, 2,4,5-T (Trichlorophenoxyacetic) and 2,4-D, have been used extensively as defoliants in Viet Nam. Both caused birth abnormalities in lab animals and were suspected of causing defects in babies born near the sprayed Viet Nam area as reported in "Sprayed Earth Policy," of Nov. 4, 1969.

A class of chemicals known as organophosphates have also been used to control plant eating insects. They were developed by the Germans during World War II as a nerve gas. Being a nerve gas, they are extremely effective for they destroy a protective body enzyme called cholinesterase. This enzyme is responsible for stopping nerve impulses in the body when they reach their appointed place. Without this substance the body would become uncoordinated.

Repeated exposure to organophosphates can lower the cholinesterase level in the body until the individual reaches the brink of acute poisoning at which he may be pushed over by a very small additional exposure. Unfortunately, up to that point his symptoms are usually taken for flu.

These organophosphates come under various names, a few of which are:

Parathon  
methyl parathion  
TEDD (tetraethyl phosphosphate)  
Azodrin  
Malathion

You as the consumer eat foods sprayed with these chemicals and use them around your homes in commercial products. The two herbicides we found in Culver stated explicitly that they were not to be used in the vicinity of water. They are:

Ortho — Triox — liquid vegetation killer  
Dyrene — fungicide  
Even though much more might have been included, these facts should be enough to point out the dangers associated with these chemicals. The most important thing is to read the labels before you buy and buy only those considered safest.

And use them sparingly, considering not just your needs and property but the entire ecological make-up, of which your plot is only a small part. Nature is continuous and man's boundaries superficial; spraying or dumping chemicals affects your environment.

## THE POPULATION LINE

Throughout the world, 3.7 human beings are born every second. This amounts to 221 per minute, 318,575 per day and over 2.2 million per week. By the year 2,000, world population is expected to reach at least 6 billion, a level some ecologists consider a crash point.



Pesticides and herbicides find their way to the lake in storm and surface water. These chemicals may be toxic to fish and harmful to humans.

## Nation Responds To Crisis

The environmental crisis existing in the United States today is massing a new kind of revolutionary. He is not the stereotype 'angry, young student' burning Establishment symbols, but your next door neighbor, your teacher, your fourteen year old child, your sheriff, and even your Congressman or Senator.

They call for a revolution against the passiveness that allows pollution to endanger all forms of life, against the growing tolerance for foul smelling lakes and rivers, air that burns and poisons our bodies, and noise that eats away at our peace of mind. Anyone whose awareness of these polluted conditions in his environment may include himself in this revolution. But outrage is not enough to win this battle and it is up to everyone to learn what he must do to help.

One of the greatest strengths that we as citizens have is our voice in the government, especially at the state and local levels. Through our elected officials, we may help regulate the environmental quality that we desire. Yet they need tremendous support in their work, more so than possibly with any other issue, not only from voters, but from all ages groups.

In letters to various state and federal candidates we requested their platforms on the ecological problems, not just consent, in correcting many every-day habits and re-evaluating priorities that are depleting our resources and littering our 'home.' Mrs. Trudy Etherton, State Auditor, included the following statement of her party's platform for 1970 concerning the problem:

"The survival of future generations may well depend on our efforts now to stop the pollution of our air, water, and soil, and on the careful management and development of our precious natural resources.

We advocate strict enforcement of anti-pollution ordinances at all levels of government, and the development of a system of tax credits that will enable business to install necessary anti-pollution equipment."

She continues by saying that if we require industry to correct its role in the destruction of the environment, then individually we

should assess our own corrections and act accordingly. She cites our roadsides, parks, lakes, and rivers, as a few examples.

Mr. Don M. Newman, Republican candidate for Congress, has the same perspective as Mrs. Etherton. He points out our natural tendency to discover a scape-goat, such as industry, to avoid recognizing our own contribution. He states: "Until each and every individual feels a personal responsibility for cleaning up his own mess, little will be accomplished nationally."

William N. Salin, Secretary of State, writes of his role as an avid supporter of anti-pollution programs. He has attributed much of the success and effort of the Earth Day in Indiana to the work of the Indiana Student Association, of which he is the founder and sponsor. As part of the executive branch, he is urging the legislature to attack the environmental problem, supporting any laws which they may enact.

In the United States Congress, Richard L. Roudebush has pledged strong support of a packet of seven bills sent by President Nixon designed to make certain that our air is pure and our water clean. The bills, if passed, would provide means to construct every sewage disposal treatment plant needed in Indiana plus provisions that will further protect our water and air. He believes that the President recognizes this program as top priority and as one desired by all Americans.

Congressman John Brademas, Chairman of the Select Subcommittee on Education, introduced in November a bill, H.R. 14753, "to encourage educational programs on preserving and enhancing the quality of the environment." It is his conviction that in order to protect the environment that sustains life, we must alert the public to the pollution crisis. Under section 2, Statement of Findings and Purpose, the bill states:

"The Congress of the United States finds that the deterioration of the quality of the Nation's environment and of its ecological balance is in part due to poor understanding by citizens of the Nation's environment and of the need for ecological balance; that presently there do not exist adequate resources for educating citizens

about environmental quality and ecological balance are therefore necessary."

The bill continues by encouraging development of new and improved curriculums, training of personnel, teachers and community leaders for such educational programs. It also shall appropriate funds to allow for grants and other financial aid to institutions and groups performing in this interest.

In addition, Congressman Brademas joined a bipartisan group of 82 other members of the House who signed a statement designating the 1970's as the "Environmental Decade." The last section is titled "People" and repeats the cry of each of the other preceding politicians.

"If the environment is for the people, it is also people — mostly private citizens, not just the government — who must lead the fight to preserve our environment. Surely the government must reorder its structure for an all-out fight during the Environmental Decade; the federal executive branch must have a top-level Council on Environmental Quality, and the Committees of Congress with which we are associated must redouble their efforts. Federal, state, and local legislatures and courts must erect the framework for the battle. But citizen activity must lead the fight."

The plea of the men we have elected to represent us is very clear: "We cannot do it alone." Many of the large pollution problems are not affecting our small community and are easily forgotten. Others that do exist may not be real enough for us.

Congressman Brademas' bill points out the primary importance of educating ourselves on the subject of our environment, which may begin immediately. Our awareness of the problems and ecosystems may prevent our careless littering that costs tax dollars, or use of dangerous pesticides and herbicides, or detergents with over-fertilizing phosphates, that drain into our lake and destroy its quality. The impact of such information, as that found in The Environmental Handbook, for example, will give us tools with which we may help our "revolutionary" public servants and join them in their efforts.

A pesticide is any chemical used to kill insects. Yet pesticides are now found not only to affect insects, but other living organisms, including man.

The famous killer DDT has been discovered to harm men, birds, and the oceanic food chain. It stores in the fatty tissues of carnivores and builds as it climbs the food chain. DDT has been discovered in unborn infants.

Some theories suggest that DDT has irreparably upset the oceanic food chain by reducing photosynthesis in algae. Ocean diatoms produce 70 per cent of the world's oxygen.

Men constantly exposed to DDT showed a deterioration of memory and reaction time.

Although the federal government has imposed a "ban" on DDT for all but "essential uses", it can still be purchased in almost every hardware store.

Because of its long half-life most of the 1 billion pounds already used is still active in the environment. Methods of breaking down the chemical are being experimented with but the concentrations are still critical.

There are other chemicals beside DDT which, due to their similar effects and derivatives, are classed with DDT. The following are included:

Dieldrin  
Lindane  
Chlordane  
Heptachlor  
Endrin  
Aldrin  
BHD  
2,4,5-T  
Taxaphene  
Q,4,5,4-D

Some products found in Culver contain these chemicals and the buyer should beware. They are:

1. Good Way Insect Killer — Chlordane, 20 per cent
2. Ortho - chlordane spray (and dust) - Chlordane, 75 per cent
3. Ortho — Borer and Leaf Miner Spray - Lindane, 20 per cent
4. Ortho - DDT - 25 - DDT, 25 per cent
6. Raid - Ant and Roach Killer - Dieldrin, 50 per cent

It is possible to buy "safe" pesticides. Read the labels and choose those containing the following if possible:

Rotenone  
Sevin  
Pyrethrin  
Methoxychlor

Many pesticide labels contain warnings not to use the product near water because it is toxic to fish. Remember, rain water will take some of that product to the lake.

The Indiana Stream Pollution Control Board has had several reports in recent years of both pesticides and herbicides killing fish and plants and disrupting the natural balance of Indiana streams.

In many instances carelessness or accident is the contributing factor. When used as directed pesticide chemicals serve a useful purpose.

## REPORT FINDINGS

A February report from the International Oceanographic Foundation shows that one-third to one-half of all the industrial pollutants found in the ocean are dumped by U.S. industries.

**YOU'RE THE SOLUTION TO WATER POLLUTION**

# An Alien's Ate

by Perry Smith

Take, take,  
(your stay is summershort)  
sink your beercans  
in the lake.

"It's still large."  
and  
"It's wounds heal."

How long until  
the bottom fills with swill  
from your take?

How long to  
Green-water-scum  
oil-choked DEATH?

"We're here to enjoy the lake,  
away from worries  
(of awareness)

"OUR lake will never fade."  
(they think)

Spea : to dead carp.  
(they know)

# What Are You Doing About Pollution?



## Student Efforts Appreciated

The collective Culver community owes a great debt to this no-name diligent and scholarly group of college students who researched and compiled these articles on the dangers of water pollution to Lake Maxinkuckee.

It is the best job of uniting the community in one effort in this writer's memory and proves that most collegians are diligent and intelligent in facing local problems better than their elders. They are not the riotous, insufferable brats so many times depicted.

Undoubtedly we have too many thoughtless people, too many motorboats and the ever-conflict of speedboaters as against fishermen, but some kind of zoning as used on our new large-acre downstate reservoirs might be the approach.

The lake's water to be pure as possible must be thoroughly oxygenized, and this comes from rainfall, artesian springs and the aquatic plants growing in the

shallower waters.

Two performances lately have greatly reduced these oxygen-giving, hosts for plankton which furnish food for young fish, namely, the use of chemicals to kill the plants in Aubbeenaubee Bay at Culver Military Academy and the Outboard Regatta off the Town Park.

The morning following the races the beach and offshore looked like regurgitated dog's breakfast after a night spent upsetting neighbor's garbage. Precious aquatic plants, uprooted and mangled, floated along the shores. A sickening sight to behold and a graphic picture of how thoughtlessness in our ecology is damaging the lake and making a greater problem in pollution.

The innate selfishness of man-woman causes almost all of us to think we own the lake, but we don't — it belongs to the people of Indiana and we are only trustees. Let's keep it clean and make it cleaner.

And you collegians, even though you will scatter to the winds after Labor Day, keep up the good work. You have started something that will become a lasting benefit in new sewage disposal plans and other projects outlined here.

—Robert Kyle

## Chamber Active In Town Clean-Up

The Culver Chamber of Commerce organized a Paint Up - Clean Up Week in April with the goal of stimulating not only the local merchants, but the citizens as well, to take pride in a cleaner Culver. This promotion was a great success due to the interest shown by a great majority of citizens.

There was almost 100 per cent backing of a clean-up moratorium by the merchants. During this time they closed for an hour, cleaned their store fronts, and helped the Fire Department wash down the streets.

Local organizations had their own projects, such as cleaning the town park, cleaning yards of invalid citizens, cleaning the roadways, and collecting litter.

Mrs. Heiser's fifth grade class collected litter on their way to and from school and filled a box which was displayed in the bank lot. The Maxinkuckee Auto Club towed away at least a dozen junk cars from the streets and yards.

Culver Military Academy took an active part by covering the road around the lake and State Road 17 North to collect litter. They also freed the campus grounds of trash.

Being the chairman of this committee, I found that, with a little stimulation, the people of Culver will go all-out to keep a litter free town. - Ronald E. Tusing

## Language of Pollution

**ACTIVATED SLUDGE** - process removes organic matter from sewage by saturating it with air and biologically activated active sludge.

The town of Culver has an activated sludge treatment plant.

**AERATION TANK** serves as a chamber for injecting air into water.

**ALGAE** are plants which grow in sunlit waters. They are a food for fish and small aquatic animals and, like all plants, put oxygen in the water.

**BACTERIA** are the smallest living organisms which literally eat the organic parts of sewage.

**BIO-DEGRADABLE** - a product substance, such as a new group of detergent surfacants, which are consumed by bacteria during waste treatment.

**BOD**, or biochemical oxygen demand, is the amount of oxygen necessary in the water for bacteria who consume the organic sewage. It is used as a measure in telling how well a sewage treatment plant is working.

**COAGULATION** is the clumping together of solids to make them settle out of the sewage faster. Coagulation of solids is brought about with the use of certain chemicals such as lime, alum, or polyelectrolytes.

**COMBINED SEWER** carries both sewage and storm water run-off.

**DIGESTION** of sludge takes place in heated tanks where the material can decompose naturally and the odors can be controlled.

**EFFLUENT** is the liquid that comes out of a treatment plant after completion of the treatment process.

**EUTROPHICATION** (over enrichment) is caused by excessive quantities of sewage containing phosphorus. These nutrients stimulate increased plant growth mineral and biological materials fill the lake and it becomes a swamp, and, eventually, solid ground. The whole process is called eutrophication.

**FLOCCULATION** is the process by which certain chemicals form lumps of solids in sewage.

**GROUNDWATER** is the term describing all subsurface water. It can be found as deep as several miles.

**INTERCEPTOR SEWERS** in a combined system control the flow of the sewage to the treatment plant. In a storm they allow some of the sewage to flow directly into a receiving stream. This protects the treatment plant from being overloaded in case of a sudden surge of water into the sewers.

**LAGOONS** are scientifically constructed ponds in which sunlight, algae and oxygen interact to restore water to a quality equal to effluent from a secondary treatment plant.

**LEACHING** - The process by which

water, seeping through earth and rocks, dissolves and carries away certain minerals and compounds, such as the oxides of iron.

**MICROBES** are minute living things, either plant or animal. In sewage microbes might be germs that cause disease.

**SANITARY SEWERS**, in a separate system, are pipes that carry only domestic waste water. The storm water runoff is taken care of by a separate system of pipes.

**SECONDARY TREATMENT** is the second step in most waste treatment system in which bacteria consume the organic parts of the wastes. It is accomplished by bringing the sewage and bacteria together in trickling filters or in the activated sludge process.

**SEDIMENT** is tiny particles of dirt and rock carried by water which eventually settle to the bottom.

**SEPTIC TANKS** are used to treat domestic wastes. The underground tanks receive the waste water directly from the home. The bacteria in the sewage decomposes the organic waste and the sludge settles on the bottom of the tank. The effluent flows out of the tank into the ground through drains. The sludge must be pumped out of the tanks, usually by commercial firms.

**SEWERS** are systems of pipes that collect and deliver waste water to treatment plants or receiving streams.

**SLUDGE** is the solid matter that settles to the bottom of sedimentation tanks and must be disposed of by digestion or other methods to complete waste treatment.

**SPRING** is an opening in the surface of the earth from which groundwater flows.

**STORM SEWERS** are a separate system of pipes that carry only runoffs from buildings and land during a storm.

**SURFACANT** - a chemical used in detergents which breaks up the surface tension of the water and makes the water seem wetter and more penetrating. It is the ingredient which makes detergent foam.

**SUSPENDED SOLIDS** are the wastes which that will not sink or settle in sewage.

**TRICKLING FILTER** is a bed of rocks or stones. The sewage is trickled over the bed so the bacteria can break down the organic wastes. The bacteria collect on the stones through repeated use of the filter. Also known as **FINGER SYSTEM**.

**TURBIDITY** is cloudiness caused by sediment suspended in water.

**WASTE TREATMENT PLANT** is a series of tanks, screens, filters, and other processes by which pollutants are removed from water.

## Credits

Edited by ..... Tammy Studebaker  
Research by ..... Jim Brown, Julie Brown, Fred Crowden,  
Lela Donnelly, Susan Donnelly, Chris Greenleaf, Beth  
Howard, Jeanne Maull, Suzanne Overmeyer, Barbara  
Smith, Perry Smith, Lianne Somerville

Photos by ..... Bill Studebaker; Tammy Studebaker

Also we acknowledge the aid supplied by:  
The Kokomo Tribune  
The Maxinkuckee Lake Association  
Culver Military Academy  
Indiana Board of Health  
Mrs. Wayne Maddox  
Mr. Ron Tusing  
Mr. Robert Kyle  
Mr. Jim Rinesmith

