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Scaup decoys

Robert W. Hilty

R. Weidenbach

Late Fall, Delaware County

the Conservationist

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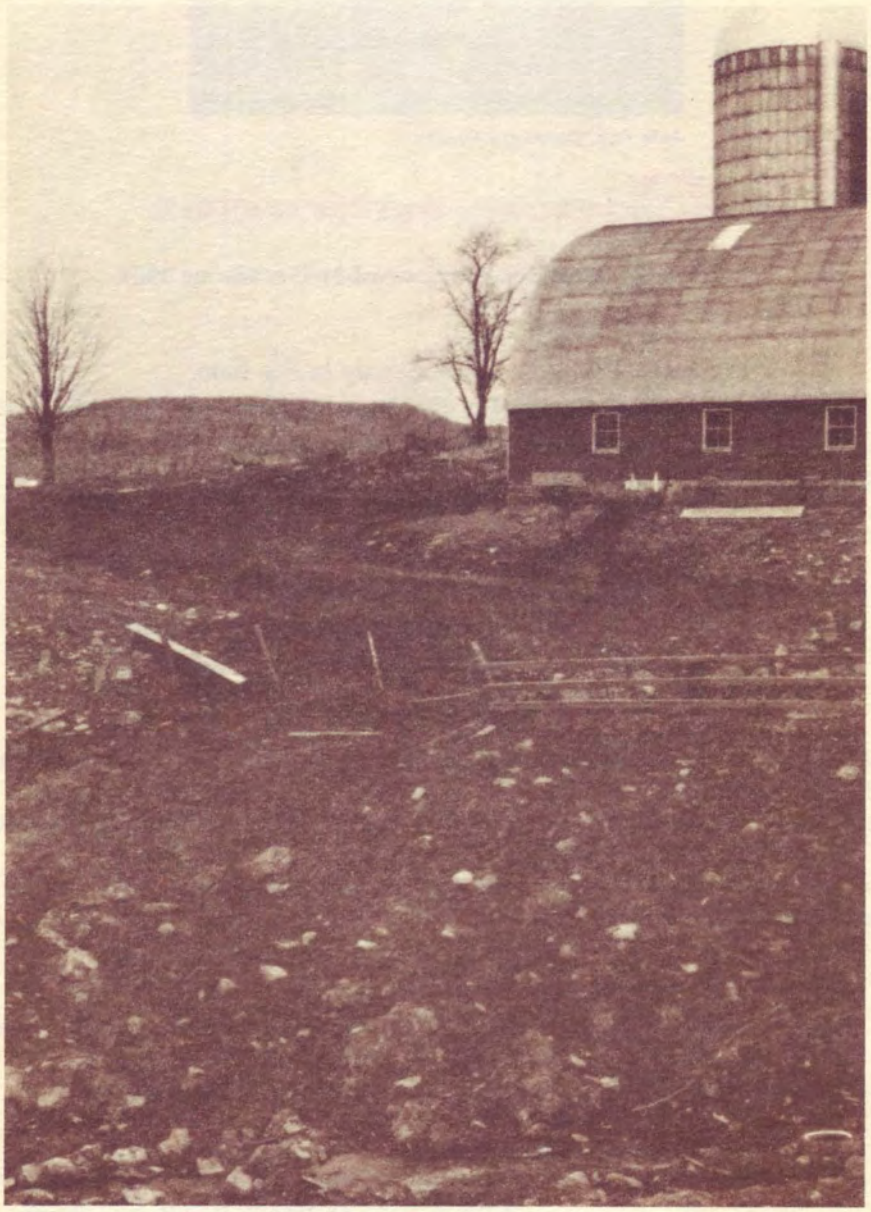
ENVIRONMENTAL QUALITY NEWS



R. Weidenbach

Farm in need of MIP. Note the nutrient-enriched runoff entering brook in foreground.

Farmers Fight Pollution in Delaware County

The Model Implementation Program

by Rick Weidenbach

ONE of the most persistent problems that has plagued New York State's waters for years is something which sanitary engineers refer to as "non-point source pollution." Unlike "point source" pollution that can be readily identified and traced to a single source, non-point source pollution is difficult both to identify and to trace. Non-point sources of pollution include runoff from agricultural and silvicultural operations, mining and construction activities and urban stormwater. They also include diffuse runoff, such as seepage and percolation of pollutants into the aquifer or ground water systems.

Agricultural runoff is a classic example of non-point source pollution. Runoff from storms and snowmelt picks up fertilizers, soil, manure and organic

matter from croplands and barnyards and is eventually transported to watercourses. One individual farm by itself is not a significant polluter, but from all the farms in a given area enough nutrient-enriched runoff is generated to pose a problem.

Under Section 208 of the Federal Water Pollution Control Act Amendments, each state is required to develop plans to control all water pollution sources. Among the many requirements, Section 208 called for "the development of processes to identify and control agricultural and silvicultural non-point sources of water pollution."

From this act was born the Model Implementation Program (MIP). Conceived and initiated in 1977 by the Environmental Protection Agency, the MIP was designed to accelerate the installation of conservation practices to reduce agriculture and silvicultural runoff.

The MIP provides farmers with a voluntary cost-share program with the federal government paying up to 75 percent of the cost that offers practical ways to reduce the amount of nutrient-enriched runoff that enters streams and rivers. The benefits go even further. Costs are low and everyday farm operations improve. The fears of farmers that high costs and regulatory mandates are the only solution to pollution are put to rest. Compared to other pollution control measures, the MIP concept is unique. Instead of treating nutrient-enriched runoff *after* it leaves the farm, the MIP focuses on diverting clean runoff away from the agriculturally active area where it will pick up pollutants.

In late 1977 the West Branch of the Delaware River (WBDR) was nominated by the New York State Section 208 Advisory Group as a candidate MIP watershed. Sponsored by the Delaware County Soil & Water Conservation District and Delaware County Agricultural Stabilization and Conservation County Committee, the WBDR Watershed in Delaware County was selected by EPA as one of seven watersheds nationwide to sponsor the MIP.

R. Weidenbach

Underground pipe transports water to a safe outlet.

EPA decided that because of its high concentration of dairy farms and its well defined watershed the WBDR would serve as a good model for other watersheds throughout the Northeast.

Delaware County's rural character is unique. Serving as the headwaters of the West Branch of the Delaware River, its rugged topography boasts rushing brooks finding their way through stands of hardwoods, pastures and hollows dotted with tall hemlocks. Family operated farms blend into the terrain offering the comfortable feeling that man and nature are in harmonious balance.

In reality, the picture was not quite so idyllic. In 1980 the NYS Department of Environmental Conservation made official what had been suspected for eight years: The Cannonsville Reservoir, which is part of the vast reservoir system that supplies water to New York City, was in a state of eutrophication. Abnormally high levels of phosphorus entering the reservoir from the West Branch had stimulated excessive growths of oxygen-using algae, were degrading the quality of the water, and raising serious questions as to the future use of the reservoir.

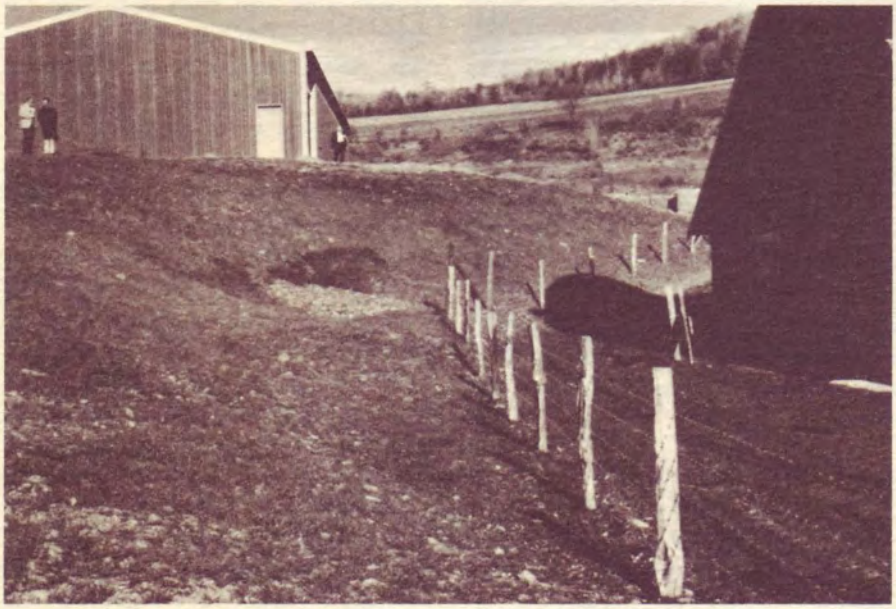
The source of the phosphorus was both point and non-point. Point sources such as the village sewage system in Walton, N.Y. and local creamery effluents were identified. The village of Walton was on the road to solving those problems by building a sewage treatment plant designed to include the local creamery's effluents.

But agricultural runoff was a tougher problem and it was here that the MIP provided an innovative solution.

"The Delaware County SWCD and the local Agricultural Stabilization and Conservation Service (ASCS) committee decided to sponsor the MIP for several reasons," said Milt Thomson, chairman of the SWCD. "While helping farmers voluntarily apply effective conservation practices, this program could help eliminate the need for regulations to control this type of pollution. With farmers being blamed for the increasing algae growth, we had a good opportunity to learn more about our existing water quality problems and their sources."

Specifically, barnyards are a major

Charles Ford



E. Luchsinger

(Top) Barnyard before MIP work. (Bottom) Same barnyard after gravelled trench installed to intercept surface and sub-surface water.

concern. Seventy-five percent of the 275 barnyards in the watershed are located within 200 feet of a stream. During periods of peak runoff, manure and its nutrients, mainly phosphorus, were being transported to the brook. A system of barnyard runoff controls was needed to prevent the pick-up of nutrients. Soil Conservation Service personnel quickly responded to the need for such a system and designed the "barnyard package." Diversion ditches were built uphill from barnyards to intercept the surface water, and roof gutters and downspouts now collect rain water and pipe it safely away. Concrete pads were installed outside the barn door to provide the farmer a means for easy clean-up of manure on a daily basis.

"Clean water is shut off from the barnyard except for that which directly falls as rain" said Steve Machovec, SCS District Conservationist in Delaware County. Delaware County barnyards are drying up and nutrient enriched barnyard runoff is becoming a thing of the past.

One reason for the success of MIP is that farmers get benefits which provide incentives to participate. Don Ackerly, an early participant, said: "The drier barnyard has helped reduce hoof disease in my herd."

"Herd health problems associated with wet barnyards may be reduced," said Paul Mattern, Delaware County Cooperative Extension Agent, "and this fact has dramatically helped sell the overall concept of the MIP." As Rich Lewis, SCS District Conservationist for the first two years of the program stated, "By talking barnyard benefits and management, we attracted farmers who had never before participated in the soil and water conservation program. It must have been the right approach, because during the first three months, 92 farmers signed up for the program."

As of April 1, 1981, 64 barnyard packages have been completed, 33 are under construction, and 11 more have been committed. Of a possible 275 farmers, 221 have participated in MIP since 1978 in 716 projects ranging from complete barnyard jobs to diversion ditches above cropland.

But MIP deals with more than agricultural non-point sources of pollution. An increase of forest logging activities in Delaware County was also posing a potentially serious problem. Poorly constructed logging roads were collecting forest runoff, which contains naturally occurring phosphorus, and directing it to watercourses. The negative effects went even further. Severe erosion problems quickly developed, leaving landowners with logging roads which soon became useless.

Cost-share incentives were included for stabilizing logging roads under the direction of DEC's Division of Lands and Forests. Simple and relatively inexpensive water management practices such as broadbase dips and culvert crossings, put woodland runoff collected by logging roads back into the woodlot. "Not only is a potential pollution problem avoided," stated Paul Trotta, MIP Forester, "but farmers are left with logging roads that are functional for many years."

Former SCS State Conservationist Robert Hilliard says, "The MIP here is a big success. The MIP had specific goals and the farmers had specific problems. Through MIP, we met both needs."

The unique framework of MIP is based upon the nationwide Agricultural Conservation Program (ACP) cost-sharing program. For over 40 years, the ACP has been providing farmers with

(Continued on EQN IV)

About this issue

Lee and Karen Rentz

Undaunted

FOX hunting has never really caught on in this country. At least it has not been as widely popular here as in England where the sight of pink-coated gentry astride their hunters following their packs of hounds over fences and hedgerows to the tune of "yoicks" or "tally ho" has become a familiar picture of English rural life. "The unspeakable in pursuit of the inedible" is how George Bernard Shaw referred to the whole panoply of the fox hunt and to that opinionated observer there was something ridiculous if not obscene about the whole thing.

No, your average American today prefers to trap his fox and sell its pelt, a matter-of-fact and most unromantic business. But it was not always that way, so when Larry Brown offered us the heretofore unpublished hunting experiences of his ancestor Abijah Beckwith, we were quick to accept mostly on the basis of the fox hunting stories which, as you will note, have a rough and tumble quality characteristic of rural America in the nineteenth century. They are decidedly un-English.

Our January-February 1981 issue featured articles on wood stoves, heating with wood and romance of wood cutting. To the thousands of New Yorkers who own a woodlot and make use of it either for fuel or for timber we would like to add another dimension—managing your woodlot not only for one's own benefit but for the benefit of the wildlife. Dan Decker and Gary Goff in "More Wildlife on Your Woodlot" give us some practical pointers on how to achieve this, with Cecil Heacox adding some words about the satisfactions to be gained by such wise management.

Long time readers may recall that our entire January-February 1976 issue was devoted to the Six Nations of the Iroquois. That issue was among the most successful we have ever published, so much so that our supply was soon exhausted and copies have now become rare. Implicit in that whole issue was the theme that not only do the Iroquois possess a unique culture which still thrives but that, in common with all Native Americans, there remains a strong desire to preserve this cultural heritage. As a step toward realizing that goal, a group of Native Americans under the leadership of Cree folk singer Buffy St. Marie and other prominent Indians, has opened a new museum, the Native American Center for the Living Arts near Niagara Falls. Art director, Wayne Trimm, a Tuscarora by adoption, covered the opening and presents the results of his visit in "The Turtle—for the Living Arts."

Acid precipitation remains one of our foremost air quality problems, especially here in the northeastern United States and Canada. As Bob Cross points out in "A Canary in the Rain," acid rain not only kills fish in Adirondack Lakes and ruins the facades of buildings and monuments, but also may affect the health of the land itself not to mention possible ill effects on humans. Along with toxic wastes, we consider the problem of acid precipitation to be among the most important environmental issues of the day—one that must be faced squarely and solved by whatever technical and political means available and soon.

Deer hunting season again. Last year was one of the most successful ever with a total take of 136, 255, and this year promises to be even better. Because of the anticipated increase in numbers of available deer, DEC is increasing the number of its deer management permits to 177,575, an increase of 61 percent over last year. With this increase we can expect an increase in hunting camps, which we would here define as any group of men gathered in one place for a certain period of time for the ostensible purpose of hunting deer. We say "ostensible" since Lee Chamberlaine tells us in "The Deer Camp" many do not necessarily come to hunt. Staff artist Ed Kenney plies his witty brush to come up with what we hope are some recognizable deer camp characters. Maybe you will recognize someone you know. Maybe it will be you.

A congratulatory note at the end. Dan Decker of Cornell University who writes many articles for our publication was a recent recipient of the award for best magazine article for 1980 presented annually by the New York Outdoor Writers Association. His story "The Beaver—New York's Empire Builder" first appeared in the November-December 1980 issue of THE CONSERVATIONIST. We wish to congratulate Dan for winning the award and to publicly acknowledge our pride in having him as a contributor.—J.J.D.

A Canary in the Rain

by Robert F. Cross

Years ago coal miners would bring a caged canary into the mine shaft to detect poisonous gases. If the canary died suddenly, the miners knew they were in danger. The death of thousands of fish in our Adirondack lakes—from acid precipitation—like the canary in the mine, signals the presence of danger both to the environment and to human health.

THEY sat by the shoreline for hours—waiting. They baited and re-baited their hooks, but the fish were not biting. The fish were gone—gone from that lake and from hundreds of others throughout the Northeast.

Fish populations, which flourished in pristine Adirondack lakes and ponds since the end of the last Ice Age, have fallen victims to acid precipitation, more commonly known as acid rain. And like the proverbial canary in the coal mine, their destruction may serve as a dismal harbinger of things to come.

Acid precipitation is slowly taking its toll here in New York and, indeed throughout the Northeastern United States and Canada. Wilderness mountain lakes and ponds, productive farm land, agricultural crops, soils and buildings—all of these and, perhaps, more may be falling prey to this most subtle, yet pervasive, form of air pollution.

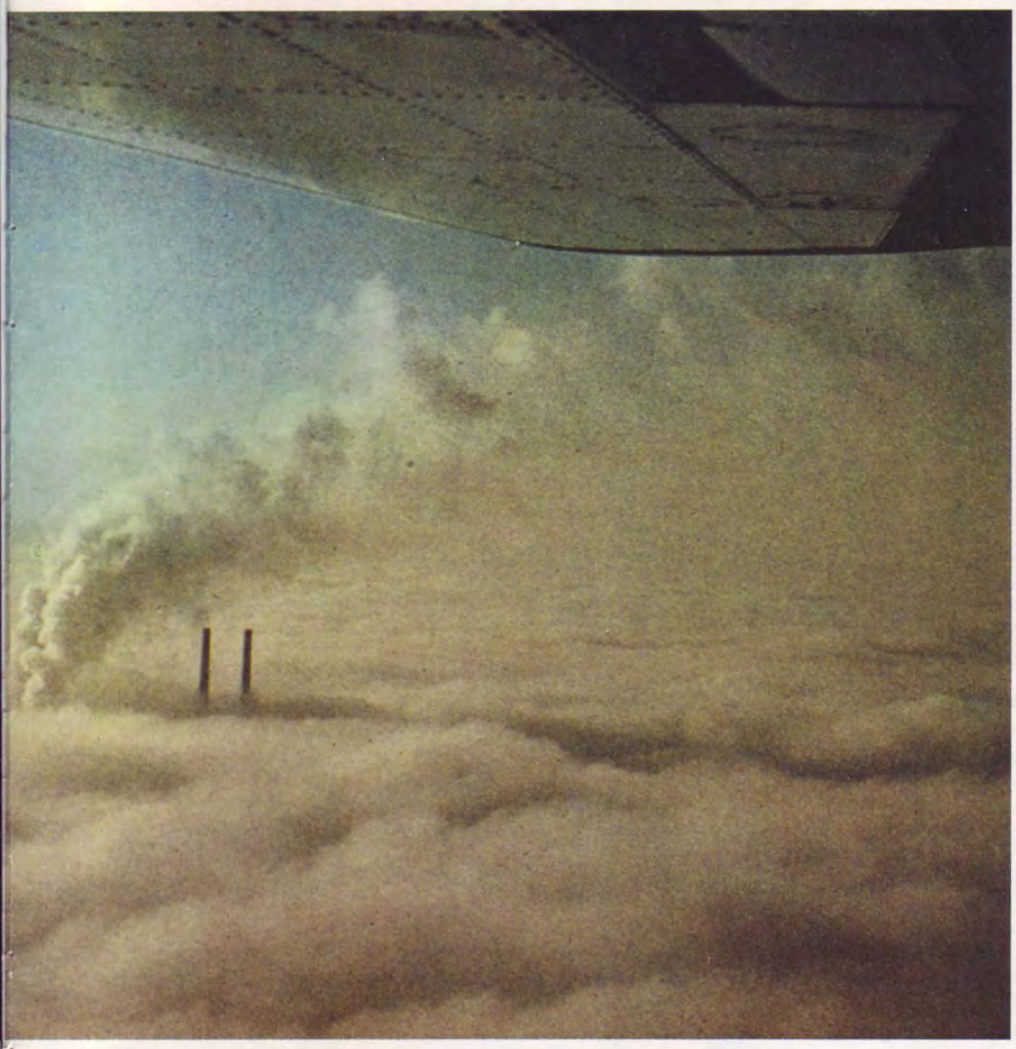
Acid rain begins when sulfur dioxide and nitrogen oxide gases are emitted from the tall stacks of coal-fired power plants in the Midwest and other upwind areas. Almost twice as much sulfur dioxide is emitted from smokestacks in Ohio alone as from all the smokestacks in New York and seven other Northeast states combined. As the wind blows these gases east, they are converted to sulfates and nitrates, which combine with water to form acid precipitation.

Acid precipitation or, more accurately, the long-range transport of pollutants, has surfaced as an alarming environmental problem of national and international scope. Although additional research on its effects is needed, much is already known about the devastating wallop packed by those tiny raindrops.

New York State has documented the loss of sportfish populations by acid rain in 264 Adirondack lakes and ponds, totaling more than 11,000 acres. Additionally, some 256 others, totaling 63,000 acres, are in danger of reaching a point where prized sportfish populations can no longer survive. In addition to destruction of fisheries habitat, amphibians such as salamanders, frogs and toads, are also adversely affected by acid rain.

Last year, Martin H. Pfeiffer and Patrick J. Festa, DEC biologists, documented acid rain damage in Adirondack lakes. Of the 849 lakes and ponds sampled between 1975 and 1979, one-quarter were found to be at "critical" pH levels (a pH of less than 5) while about 30 percent were at "endangered" levels (pH levels between 5 and 6). (See box.)

Additionally, the Pfeiffer-Festa study indicated that populations of



Photos courtesy of NEIWPCC and NESCAUM

warm-water species, including smallmouth bass and walleye, may be experiencing adverse effects from acid rain. Adirondack lakes such as Big Moose and Canada have lost their smallmouth bass populations, and acid rain is the suspected cause.

Most fish species, many aquatic plants, and invertebrates cannot tolerate pH levels below pH 5. Existing biological communities are disrupted at that level and metabolic and reproductive activities in fish populations are often upset, to a point where whole populations are eliminated. This situation is what has happened and is still happening in our Adirondack lakes.

The Pfeiffer-Festa study is significant because the 849 lakes tested have more than 80 percent of the 282,154 acres of ponded water acreage in the Adirondacks.

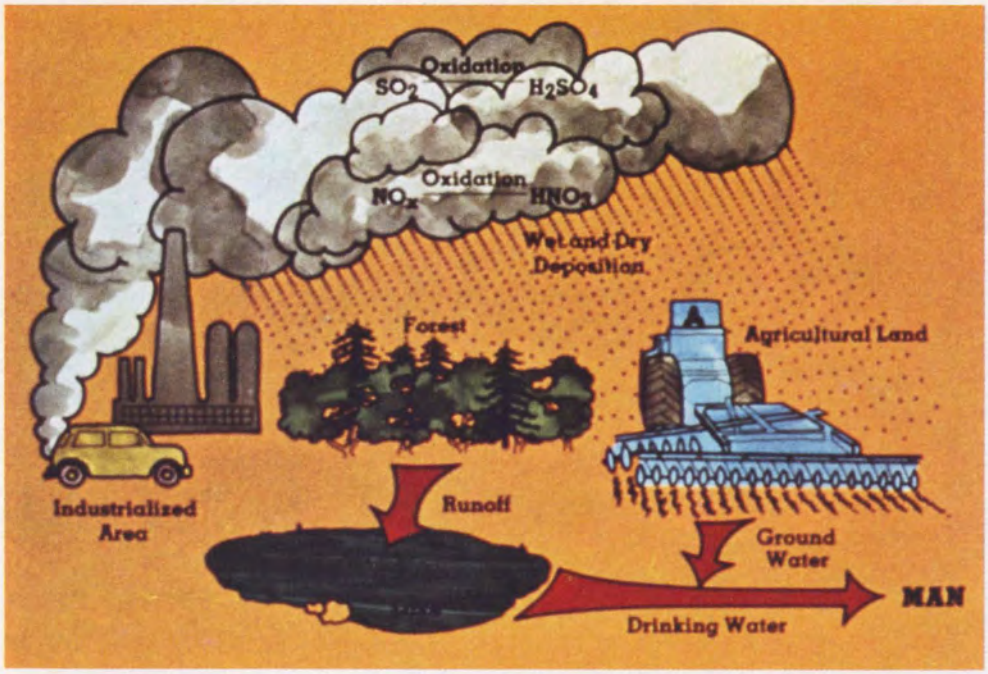
In addition to damage to American resources, acid precipitation is also posing a similar problem for our neighbors to the north. Canadian officials are conducting an experiment on the effects of increased sulfuric acid levels on aquatic ecosystems. They have selected a pristine lake and are applying large amounts of sulphuric acid to it. By monitoring the changes in the lake, authorities can quantify ecosystem damage due to acid rain. Although the current experiments will take five years to complete, some dramatic changes in Lake Ontario already have been observed, including destruction of tiny freshwater shrimp populations, which serve as food for lake trout; increased embryo malformation in lake trout, and mobilization of metals such as aluminum and zinc, resulting in a toxic problem for aquatic life.

Canadian officials are especially alarmed because the Canadian Shield holds more than one million productive lakes, rivers and streams—all of which may be potentially threatened by acid precipitation. Water bodies in this Canadian Shield area—which includes almost half the total area of Canada and part of the United States—are very sensitive to acid precipitation because of the area's geology.

Likewise, the geology of the Adirondacks makes this region especially sensitive to acid rain. Although other similar areas of the state likely are experiencing some degree of impact, low to medium buffering capacity (e.g. a lack of limestone which would help neutralize the acidity) of watersheds throughout the Adirondacks makes this region especially susceptible to acidification. Couple this low natural buffering capacity with weather patterns which transport pollutants from west to east, along with increased

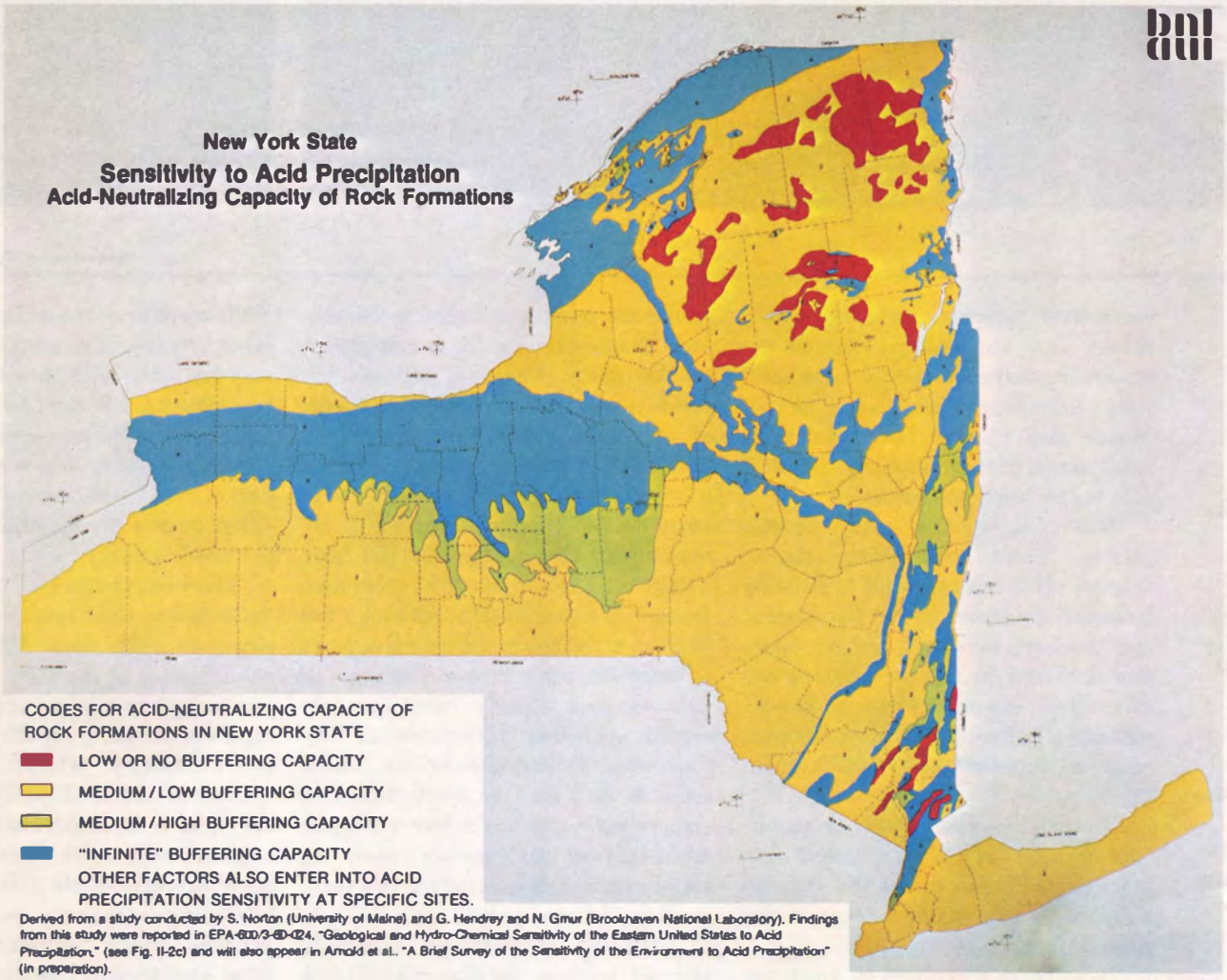
What is acidity?

The acidity of any solution is measured by its pH on a scale numbered from 0 to 14. A pH of 7 is neutral. Solutions with a pH lower than 7 are acidic, while those greater than 7 are alkaline. Because the pH scale is logarithmic, a small difference in pH really means a large difference in acidity. A pH of 4 is ten times more acidic than a pH of 5, and 100 times more acidic than a pH of 6.



NEIWPCC & NESCAUM

A recent report by the New England Basins Commission pegs the yearly cost at $250 to $500 million for acid-precipitation damage to both aquatic and terrestrial ecosystems in New York and New England.



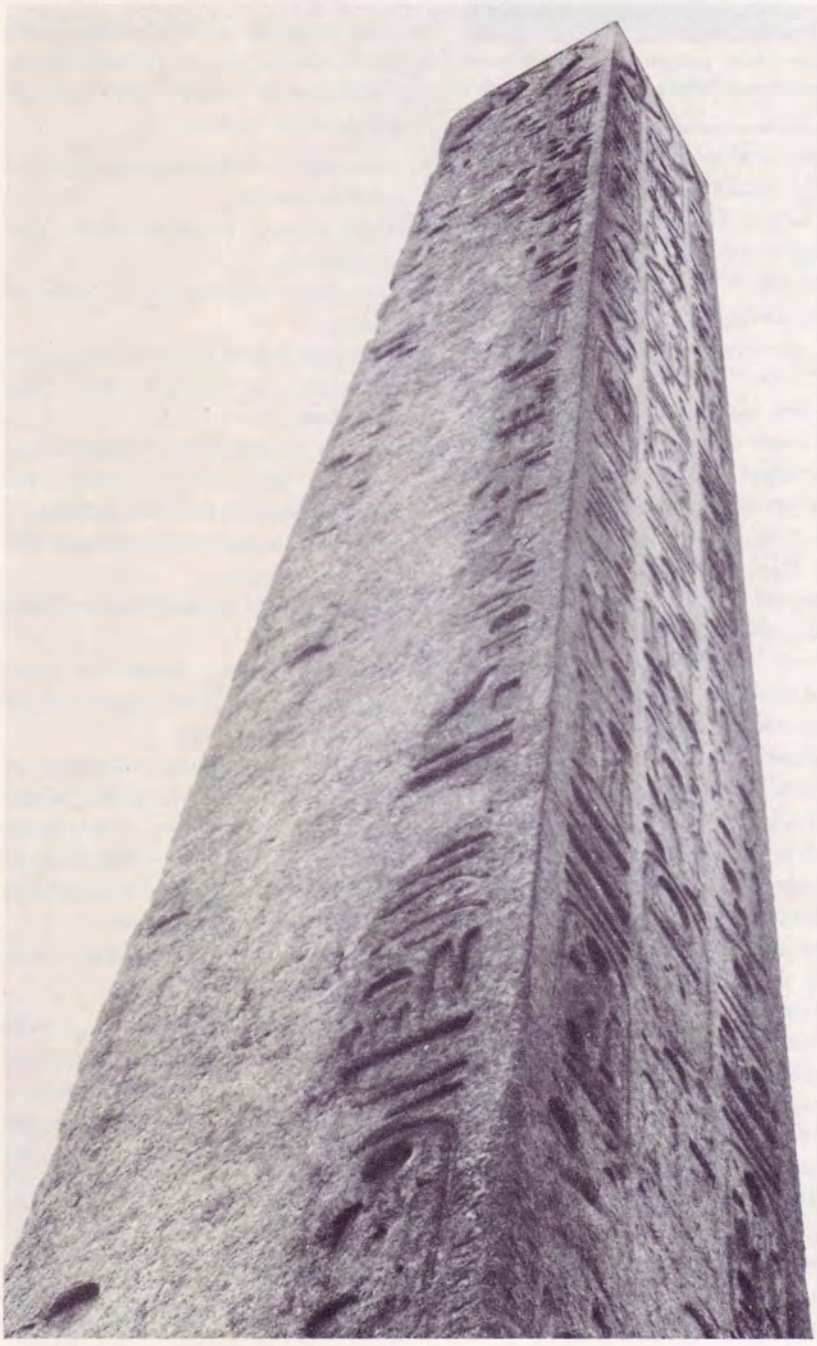
Derived from a study conducted by S. Norton (University of Maine) and G. Hendrey and N. Gmur (Brookhaven National Laboratory). Findings from this study were reported in EPA-600/3-80-024, "Geological and Hydro-Chemical Sensitivity of the Eastern United States to Acid Precipitation," (see Fig. II-2c) and will also appear in Arnold et al., "A Brief Survey of the Sensitivity of the Environment to Acid Precipitation" (in preparation).

levels of precipitation normally found at high elevations, and you have a model case for acid rain destruction.

As alarming as these data appear, adverse effects from acid rain are not solely limited to aquatic ecosystems. Although information on other effects is still being collected and analyzed, acid rain is also thought to be adversely affecting terrestrial ecosystems, visibility and, perhaps, man himself.

In fact, a recent report by the Interstate Water Pollution Control Commission pegs the yearly cost at $250 to $500 million for damage to both aquatic and terrestrial ecosystems in New York and New England. This includes losses to recreational fishing and related tourism; drinking water supply treatment; lumber, paper and related industries; crops and vegetation, and to manmade materials such as buildings and monuments.

These losses are conservative, says the commission report, and could be as high as $2.5 billion per year, if other secondary and human costs are considered.



Bill Oddo

Dramatic evidence of long-range transport of pollutants is seen in the deterioration of hieroglyphics on Cleopatra's Needle in New York's Central Park.

Acid rain adversely affects terrestrial ecosystems by altering soil chemistry, upsetting the normal cycling of metals in the soils; accelerates leaching of minerals and metals such as aluminum, manganese, zinc, calcium and potassium, and, ultimately, may be reducing forest productivity in some areas.

Studies now underway indicate that when soils become acidic, certain metals such as lead accumulate in the soils while other minerals, such as aluminum, manganese and calcium, are leached out. This has a dual negative effect not only on the terrestrial ecosystem but also on nearby water bodies.

First, as these minerals are leached, the nutrient pool necessary for plant growth is diminished, the chemistry of the soil altered from a carbonate to a sulfate base, and the action of soil microbes reduced. Secondly, as these same leached minerals accumulate in aquatic ecosystems, they pose a toxic problem to fish and other life.

Thus, continued acid deposition is also a threat to forest productivity in the Northeast, a potential source of damage to New York's $2 billion small crop agriculture base, as well as to other important segments of our economy.

Acid precipitation also has resulted in damage to historic monuments and buildings such as the Statue of Liberty in New York Harbor.

Researchers have shown that the deterioration of masonry occurs when acidic substances dissolve such materials as limestones and marbles. Acid also destroys sculptured details, as seen by the hieroglyphic deterioration on Cleopatra's Needle, in New York's Central Park.

The New England Commission estimates at $13 billion the annual cost of degradation of materials—mortar, stone, metal, concrete, textiles, paper, paint and leather—in the eastern part of the nation.

Another adverse effect of acid precipitation is reduced visibility in the Northeast. Over the past quarter of a century visibility has been reduced significantly by fine particulates in the atmosphere. These fine particulates—precursors to acid rain—scatter and absorb light. The most dramatic reduction

in visibility occurs in the summer when reductions of 25 to 60 percent in the Northeast have been documented.

Researchers have shown that visibility from Whiteface Mountain in the Adirondacks was over 50 miles on August 24, 1977, when winds were blowing from the northwest. Two days later, visibility was less than five miles when winds were blowing from the southwest. (See "Smuggled in By the Wind, March-April 1979, THE CONSERVATIONIST.)

In addition, climatological effects may also be linked to decreased visibility. Increased levels of particulates in the atmosphere result in less sunlight reaching earth, thus reducing the potential for solar energy production and photosynthesis in plants, altering the length of the growing season and changing precipitation patterns. All of this may adversely influence agricultural and forest productivity.

Besides effects on aquatic and terrestrial ecosystems, the damage to monuments and buildings and decreased visibility, an all-important question remains unanswered. What is the long-range transport of fine particulates doing to man?

To date, little documentation exists on the human health implications of acid deposition. However, it is known that acid rain may be encouraging the leaching of lead, copper and other metals into the drinking water in some areas. Additionally, recent information indicates that sulfates and other fine particulates may cause adverse effects in those with respiratory and cardiovascular diseases.

Of all areas of concern, human health is probably the least well understood but, at the same time, of utmost concern to us all. Documenting aquatic and terrestrial losses due to acid rain is important, to be sure, but it can serve only as an omen of what may be in store for humans.

What can be done to stop this destruction? Under Governor Carey's leadership, DEC has pioneered in efforts to seek a federal solution to this nationwide problem. New York State has petitioned the U.S. Environmental Protection Agency in an effort to convince that agency that the problem is interstate and cannot be solved by any one state alone. New York has formed a coalition with several other Northeast and Mid-Atlantic states to push for federal action. But, so far, Washington has failed to accept its role in resolving this problem.

John Goerg

DEC's lake-liming program preserves some fish species but is useful only in selected lakes.

Meanwhile, New York has proposed several modifications to the Federal Clean Air Act. These changes, which are now before the Congress, would make the Act more responsive to the needs of the Northeast, address acid rain from a national perspective, and be a major step towards a solution. New York's senior senator Daniel Patrick Moynihan was successful at convincing legislators that more data on acid rain was needed and, as a result, the Congress authorized a national research program to explore and document the problem over the next decade.

Senator Moynihan believes, as does New York State, that, while this research program is underway, there are some steps that could be taken now to curb the problem. Some of these steps include: establishing a national coal washing program to require the cleaning of coal with a sulfur content greater than three percent; retrofitting existing power plants for staged combustion to cut down on nitrogen oxide emissions, and studying the feasibility of establishing national emission standards for sulfates. These actions alone would be major steps in reducing sulfur and nitrogen emissions to the atmosphere, and thereby in curbing acid deposition.

As these issues are debated in the Congress, New York will continue several other efforts to combat the problem. On a short-term basis, the state's lake liming program will be continued to preserve fish populations threatened by acid rain. Although this is a limited program which can only be applied efficiently to selected lakes, it is a step toward preserving some of our more important fisheries while a longer term solution is found.

Depending on funding capabilities, DEC fisheries staff will continue other ongoing research to provide details on various waters, both for management and resource user information as well as to compile additional scientific evidence on the impacts of acid rain. These research efforts, some of which are being conducted jointly with private research units, include:

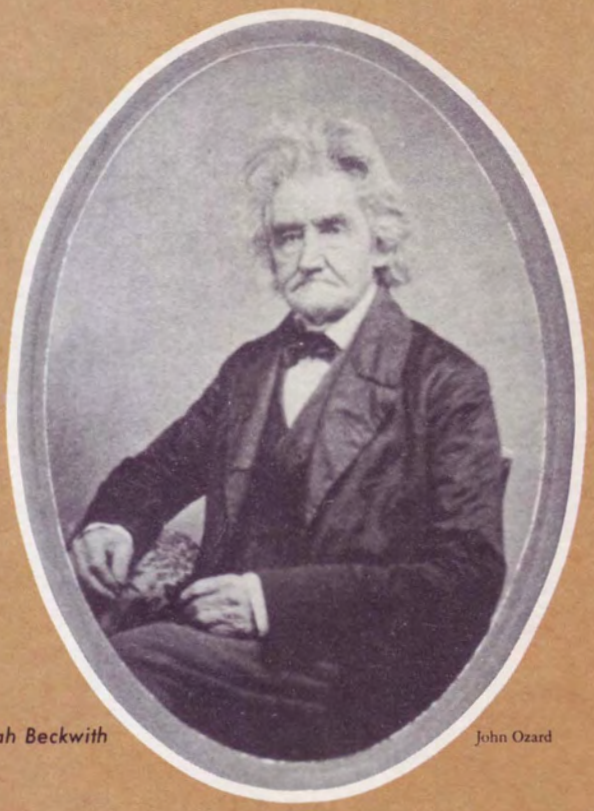
- inventories and computerization of ponded waters;
- field surveys on Adirondack lakes and ponds;
- long-term monitoring of selected lakes;
- liming of selected lakes and ponds to maintain or restore fish populations;
- studies to determine feasibility of liming sections of lakes for maintenance of fish populations;
- pH monitoring of Adirondack and Catskill streams;
- development of acid-tolerant fish species;
- smallmouth bass studies to determine effect of pH on survival of larvae and fingerlings;
- studies to determine tolerance of various fish species to acidic waters;
- sampling of sulfates and nitrate aerosols at Whiteface Mountain in cooperation with the Atmospheric Sciences Research Center;
- studies to determine amount of sulfate uptake by vegetation.

As this field and laboratory work is being carried out, Governor Carey and DEC will continue to press the Congress and the federal government for action to stop continued destruction of this state's bountiful natural resources.

Robert F. Cross is a science editor with DEC in Albany. He holds B.S. and M.A. degrees in biology and is a former award-winning legislative correspondent in Albany for Ottaway News Service and *The Wall Street Journal*. He also has written for *The New York Times*, among other publications.

Introducing

Abijah Beckwith



Abijah Beckwith — John Ozard

We are indebted to Grace Brown of Voorheesville, N.Y. and her son, Lawrence P. Brown, Supervising Biologist with DEC's Significant Habitat Unit, for introducing us to their lively and energetic ancestor, Abijah Beckwith, who lived from 1784 to 1874. We also wish to thank the John M. Olin Library at Cornell University and Alice B. Grant of Rochester, N.Y. for their permission to present these heretofore unpublished excerpts from Abijah Beckwith's journal of which the "True Hunting Stories" are a part. (We have made minor changes in punctuation to facilitate the reading.)

Abijah was a farmer-politician having been elected to the New York State Assembly in 1817, 1823 and in 1847. In 1835, he was elected to the New York State Senate. He voted "Yea!" on the most controversial bills of the day: construction of the Erie and Champlain Canals and the abolition of slavery in the state. He was also active in community affairs, serving at various times as a deputy marshal, county clerk and town supervisor.

Abijah's journal, which he kept for 20 years starting in 1846, is almost as interesting as his "True Hunting Stories," which form the latter part of the journal. More a series of reminiscences than diary, it reveals him to be a practical philosopher.

For example, the entry for March 1, 1853:

"I am now 68 . . . . and the time is fast approaching when I shall cease to write [he lived to be 90!] Altho the majority for the time being have full control and a clear right to regulate their own concerns, they have no right to do that which will prove injurious to those who are to come after them. . . . . Should we settle down on the principal and practice of providing only for our individual and immediate wants we should run into a savage state. To prevent this . . . each has an important duty to perform and should look well to it that he performs well his part. Who planted the trees the fruit of which we ate while children? Certainly those much older than we were, and who perhaps died without tasting the fruit and before we were born. Let us then plant for those who are to come after us. This is the only way we can pay an honest debt."

We hope our readers like Abijah as much as we do. In addition to what we believe is their intrinsic literary worth, the stories provide an insight into life in rural New York during the 1800's as seen by a shrewd observer and active participant.

—J.J.D.

A FOX HUNT

From "True Hunting Stories"
of Abijah Beckwith

Cedarville [N.Y.] March 1866

To my grandson Abijah Beckwith,

Your Father while living asked me to write some stories about hunting & some other things which he had heard me tell, he said these would be pleasant & gratifying to our family decendents, & he was very anxious that I should promise to write them.

Being now in my 82nd year pretty much housed up, and not attending to any regular business, I will make the trial. This light train of thinking will be better for me than to be studdying the complicated political questions which now agitate the minds of our whole people.

I will now write a short biography of myself. This is always an unpleasant task & had better be done by another. But as what I write is intended for my family decendants only, & not for [others] I will venter the trial. All most all men have some peculiar qualities which to a greater or less extent controll their action. The two leading traits with me were first a fondness for field sports such as hunting and fishing, ball playing etc.

I never lived where large game was plenty, still foxes, coons, rabits, squirrels, partridges & wood cock were plenty. When a man is fond of hunting, altho he prefers large game, he will hunt such as he can find. This seems to be a trait of character in our hounds. They leave the fox track for that of deer, and the coon & rabbit for that of the fox but their propensity for hunting is so strong that they hunt the small game if they cannot find the large. Our streams were formerly well stocked with brook trout, and afforded excellent angling. In these sports I spent quite too much time, & played ball until I was 45 & hunted foxes until 55.

The other great trait in my character was a fondness for the political studdy, for dabling in & debating political questions. These two traits had a tendency to make me popular, & the consequence was that for the major part of my life I held some office. Was first elected to the State Legislature in 1816 & the last time I believe in 1847. & was a delegate to the electoral college at Lincoln's first election I believe in 1860.

Before commencing the hunting stories, let me say that I am a poor skollar, never got a lesson in grammar or geography, shall write awkward sentences & spell bad. Besides I am a poor story teller, can only narrate facts without much colloring or embellishment.

In order to a good understanding of the stories it is necessary that I describe a man by the name of Pierce, who was my hunting companion for some fifteen years. He was a small sized compact wiry made man & very spry, & possessed great powers of endurance. was of a very excitable temperement & when after game was as fierce and unyielding as a spartan hound. He did not use foul language, but in the room of swearing outright used such old fashioned words as "zounds, zommakins, by jinks" & from his own story he was reared in the Town of Bennington Vermont near the Green Mountings. That his father & unckles were hunters that he was trained to hunting while a boy. He could capture more game by dint of hard work in running it down or getting [it] out [of] the rocks or the ground than any man I ever knew. But altho he kept his gun in a first rate order, & the best of ammunition he was not a first rate marksman. The sight of game excited him too much, in all our hunts he was commander in chief.

In these stories I shall give all the little incidents in detail. These are necessary to show the nature of the game & the sagacity of the dogs & the strategy of the hunter, & altho these happened many years ago, when I think them over all these little things come fresh into my mind.

PIERCE & a man by the name of Cummins & myself were out & the Dogs run one into the rocks. When we came to the place, there was a crack in the rock some twelve inches wide extending in some twelve feet and upwards some 8 or 9 feet.

. . .At the further end the two doggs were crowded together & evidently near the fox & trying to get hold of him. We went on to the top. The surface of the rock was smooth. On looking down we saw the doggs. Just forward of their heads the large crack terminated. But there was a small one thr'o which the fox had got & in a nick in the rock had turned with head toward the Doggs. we could see but little of him except his head & when the Doggs tried to get their head th'ro to get hold of him, he busied himself biting their noses.

I had a small hunting rifle carrying 80 balls to the pound & said I will shoot him thr'o the head & we will twist a stick into him & pull him up. Pierce said no, you will spoil his skin. The fact was that he seemed to think more of a dollar got by the sale of a fox skin than two got in any [other] way & was verry particular to save them in good order.

He took off his hat tied a handkerchief round his head took off his coat and boots & put on a pair of buckskin mittens got down on his hands & knees with his head over the crack & told me to take hold of his heels & let him down. I said let Cummings take hold. "No, zounds, he hasn't got the grip, I won't risk him, you take hold." I slipped up his drawers & his socks down & took hold of his naked leggs just above the ankle bones, & let him down as far as I could reach by being on my knees. He cried lower, I then got my breast on the rock & let him as low as I could. He still cried lower. Cummings then stood astride of me & raised me so that I put my head into the crack, & lowered him. He said that will do. We then heard him scolding the dogs & he cried hoist. Cummings was a strong man & hoisted both until I could help & we pulled him up thinking that he was very heavy, but he had in his arms a stone that would weigh some twenty pounds. He said he had to get it out of the way before he could get the fox, & that he could not move it down there without moving it onto the dogs.

We then partook of some refreshment we had with us, & let Pierce down the second time, process same as before, except that he pulled up much easier & this time he had the fox. By the time he got onto his feet the Dogs came round & he held the fox over his head with both hands & both Dogs were jumping to get hold of it & Pierce was staggering. I thot they would have him down & said let them have it. he said no they will tare the skin, catch them & hold them. We were laughing so heartily that we did not succeed very quick & he scolded hard. We finally held them & he killed the fox.

Pierce put his boots on, his socks soaking wet for it was thawing. We started for home. When we parted he walked lame. This was in the spring & our last hunt for the season. I did not see him for some two weeks. He then told me that when he got home his feet were so swollen that he had trouble to get his boots off & that his wife had to get astride his legg & hold the heel with her hands & he put his foot against her & that by great exertion in this way they got them off & that he could count my thumbs & fingers on his ankles & plain as on my hands, by the black & blue streaks round them & that he did not sleep during the night that his wife kept his feet & ankles bathed with warm vinegar & water & wrapped in flannel cloths, that he slept but little for several nights & did not get his boots on for more than a week. "Zounds" said he, "you don't get hold of my heels again."

AN UNPROFITABLE FOX HUNT

PIERCE called on me very early in the morning. We drove thru Elizabeth-town & over the hill & into the woods as near the hill along Steels Creek as the ground would permit, tied our horses to the sleigh put on their blankets & let our Dogs out before it was fairly day light. They had a Fox under way before sunrise & followed him faithfully until near sundown. We then succeeded in getting them off & started for home.

When Pierce left me at my house, said be ready I shall be here early in the morning, we will have the fox. He came with a man with him & three hounds, mine made the forth, & we were on the ground we left the previous night by break of day, & let out the two Dogs that run yesterday, thinking they would get up the same fox. This they did by sunrise. We knew him, he was the largest size & the lightest collored one I ever saw. The other two dogs we left chained to the sleigh. The fox was thor'oly drove until twelve o'clock. We then went to the sleigh, took our lunch & let out the fresh dogs. They of course immediately went a head & made a good run. They were powerful Dogs.

The fox held out until four o'clock & then holed. During all this time we had not been able to get a shot at him. We went to the hole he had gone into, a very steep hill & under the roots of a large Birch tree. I said we will now give him up. But Pierce true to his unyielding instinct, said "give him up no, by zounds. he has cost us too much. he never gets out of this hole till I pull him out."

He left a mitten in the mouth of the hole to keep him from coming out during the night and we drove to a small Tavern in the gulf near where Fishr's mill now stands. Put up, got tools together, had a warm supper & ordered our breakfast at five o'clock. and we were at the hole by the time it was light enough to see. We had a basket of food & a jug of cider, & with our coats off commenced opperations, Pierce acting as chief ingenier.

He first run a stick into the hole some twelve feet directly into the hill. We then went up some twelve feet from the mouth of the hole & on a level and commenced by digging a hole some seven feet long and four wide. It was sand with a small mixture of clay just enough to keep it from caving, & spaded very easy. We went down with this some nine feet perpendicular, the sides smooth & no caving. It was then hard work to throw out & we made an ofsett of three feet & went down with a hole four feet square.

One dug & threw the sand onto the ofsett & one threw it out, & the one on the top kept it scraped down the hill, so as to give a good chance to thr'o it out. On going down four feet below the ofsett, struck the hole.

Pierce was at the bottom of course, cleared it out & we handed him a stick. He run it directly into the hill some nine feet & reached the fox. We then handed him a Dog. He worked himself into the hole by Pierce's help quite a bit & was soon in some five feet, then when he worked back to clear the hole behind him Pierce got him by the legg pulled him out & handed him up & we put down a fresh one, & by Pierce howing [hoeing] the sand out of the hole behind him he soon reached the fox & backed out with him.

he had not hold of the fox, the fox had hold of his nose & on coming to the light let go & cut back the dog following him. he soon backed again in the same way, but Pierce got him by his hind legg and pulled him out & said "By zounds, take him up [the dog] and hand down old Ben (this was a splendid Dog bro't from Vermont, in fact we got our best hounds from there). He went into the hole & backed out with the fox in his mouth. Then a quarrel took place Pierce trying [to] get the for [fur] for fear his skin would be torn but could not make him loose his hold until he was entirely dead. He then handed up the fox & Dog. We soon had the foxes skin, & drove to the Tavern, returned the tools & paid our bill & started for home. They left me at my house about sundown.

Now for the bill of profit & loss

Dr., We had two men the first day & three the two next making eight days work by able bodied men at seventy five cents per day	$ 6.00
A span of horses & sleigh three days	3.00
Bill at the Tavern	3.00
	$12.00
Credit, by one Fox skin	$ 1.50
Out of pocket	$10.50

& this is saying nothing about the expense of Dogs.

HUNTING has been a favorite sport in all ages, with the exception of the large ferocious animals in which personal safety is endangered (and of this I know nothing except from reading). The Fox chase seems to me to afford the best sport. His great speed and powers of endurance, his cunning and strategy in evading the dogs and the great exertion necessary to capture him. Together with the sagacity and aparent judgment of the Hounds in scenting out and following his track and the persevering and unyielding disposition they show to capture him, and continious yelping they keep up has a tendency to excite and stimulate the hunter. and when there are several of them together, it makes good music. we have the shrill yelping sound, the round coarse bark, and the long hooting roar. Shakespear who had great sleight at describing a thing and of telling it in the verry best way & by the most appropriate words calls it musical discord.

On hilly lands the fox will frequently run in circles, so that the hounds will be in hearing of the hunter six or eight hours, and when one stands at a runway and hears them comming and expects every minute to see him come and get a shot at him, it becomes verry exciting. And take it all in all I think the fox chase the best sport the hunter gets.

I have frequently asked myself what it is that causes men to undergo the great fateague of a fox chase. They generally act from some motive, usually that of profit or pleasure. In this case the former is out of the question, & the latter is, in most cases, overbalanced by the pain & fateague.

Perhaps it is the thing, call it what we may, which causes our little boys to chase the Butterfly. When we see them start a large one, we see them running at the top of their speed, cap in hand, heads up their eyes fixed on the game, barefooted stubbing their toes & pitching face foremost to the ground, scrabling up quick, catching sight of the game going ahead thr'o thistles, nettles and briars, no small things stops his progress, he shows the same excitement that men do when in persuit of larger game, & when they capture it, it is of no use to them & they care but little about it.

Still if you see them the next day, some will be limping from stubbed toes & scratched ankles & leggs. But see a large butterfly & the limping ceases and the chase commences same as the previous day. This is the same with men who are fond of hunting.

This trait of character is shown in an eminent degree in the Blood-hound. He will follow a Fox for twenty-four hours, without food or rest, keeping up a continous yelping & occasionally a roar at the top of his voice, thus showing greater powers of endurance & greater strength of lungs, than any other animal. If he succeeds in capturing it, it is of no use to him, if ever so hungry he never eats it. He has killed it & cares no more about it than any other lump of dead matter.

He then takes a direct route home perhaps ten or a dozen miles, & when there he is a contented docile & lazy animal. It is only when he gets the scent of game that he becomes excited & roused up and this may be the case with some hunters. it is frequently said that they are a lazy class of men except when after game.

The Deer Camp

by Lee Chamberlaine

EACH fall thousands of deer hunters take to the woods for their annual pilgrimage to that sacred place called the deer-hunting camp. This is not a last minute decision, but a well-planned trip with hours, if not days, of intensive decision-making including lists of supplies, clothes and hunting equipment. Much of the planning began at the close of the big game season of the previous year and continued through the winter, summer and up until opening day.

Groups vary from a single party of two or three to as many as 50 or more from large rod and gun clubs who lease land in the Adirondacks from paper companies. In some cases, the deer camp is a family affair consisting of uncles, sons-in-law, grandsons, cousins, brothers, grandfathers, and invited guests. During the big game season most of these camps are males-only domains, although women are allowed at almost any other time. They attract men from a wide variety of occupations and backgrounds—doctors, lawyers, bakers, factory workers, businessmen, foundrymen, auto mechanics, clergy and law enforcement people. But in the deer camp, all are equal; for the time being their economic status or profession is of no importance.

Hunting camps are as variable as the individuals involved. Some are beautiful examples of classic camp construction and design that with today's high prices could not be duplicated. The other extreme is the surplus army tent on a platform or the ground. Conveniences and amenities run the gamut from elaborate to barely basic.

A section or "territory" of the camp structure is assigned to an individual as his bunk, corner, room or portion of a room. Other areas are set aside for eating, card-playing, and story-telling. As a visitor, you do not use an individual's bunk, room or section of the room without some form of permission such as "sit anywhere" or "put your things in that room over there," or "anywhere but so and so's bunk; he's very particular about who uses it." Novice or old timer—all must abide by the camp rules. Some of these were formulated by long-gone members to cover a particular situation that no longer applies or even makes sense anymore. Nevertheless a violation of these rules is deemed very serious and may result in expulsion from camp for the season or forever.

Each camp is a composite expression of the individuals who make up the group. However, in shucking off the courtesies of everyday behavior most individuals in the group assume a "camp personality"—a role usually the direct opposite of their normal everyday personas. By this I mean: the man who is normally a bit on the messy side will be the neatest in camp and even pick up after others. The pickiest eater at home will eat anything in camp from half-cooked deer liver to semi-raw boiled potatoes.

Here are some of the most easily recognized characters:

CAMP COOK—Never does any cooking at home. Can, and does, cook anything, and makes it taste good—or at least it seems that way to other hunters who have spent the day tramping over stream, mountain and through swamps. Hunts very little himself.

CAMP CLOWN—Never does anything wrong either at home or at work. At camp does everything wrong. Everyone picks on him, and he loves it. Usually gets his revenge on group by taking biggest deer in front of camp.

CAMP CARDPLAYER—Goes to camp to play cards, eat, sleep and play cards. Hunts very little and ends up losing about $10.00 to almost everyone in camp, but in particular to novice card players.

CAMP HUNTER—Goes strictly

Camp Cardplayer

Camp Hunter

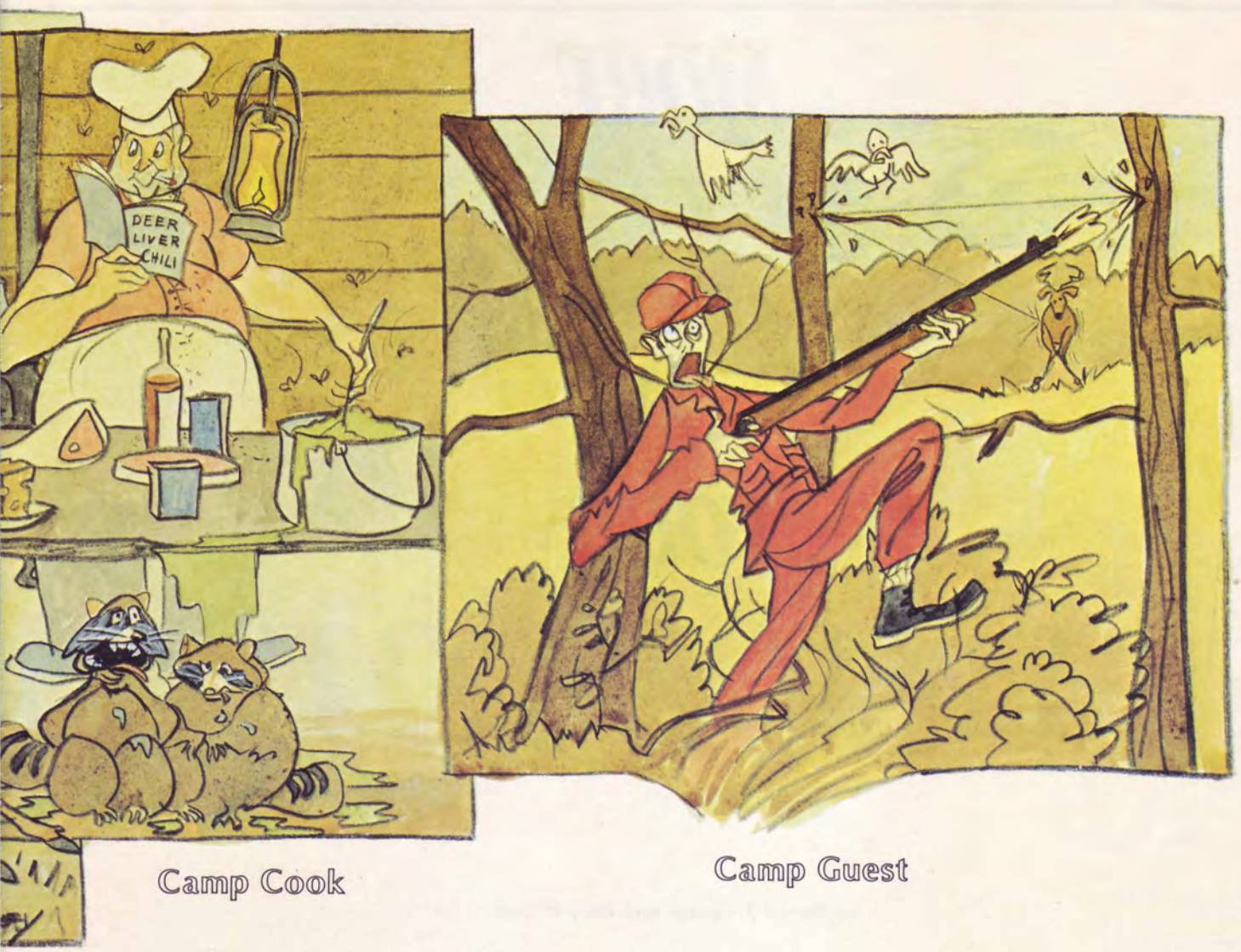
for the deer hunting. Gets up first in the morning and is the last to come in at the end of the hunting day. Usually gets a deer every year and occasionally a bear.

CAMP EATER—Eats any and all food, including foods that he will never eat at home. Is always hungry. Carries candy bars, apples, oranges and anything else edible while hunting. Leaves for hunting late, returns for lunch and well before sundown. Never puts on weight and eats like a bird at home.

CAMP GUEST—First time hunter, at least for deer. Has borrowed gun. Clumsy and awkward in the woods. Usually gets biggest deer or only deer and also usually sees and shoots only bear seen during the season. In future will assume one of the above personalities.

What draws men to a hunting camp? Escapism, withdrawal from the mainstream of life for a short period of time, a chance to relive a bygone era when life was simpler and less complicated? Perhaps it is deeper than any of these—that is, an unconscious desire to return to the life of primitive men where, huddled around a camp fire, they can once again enact the ancient rites of the hunt. Whatever the motivation, the camps enable an individual to detach himself from the everyday pressures and enter into a group effort with the hunting instinct as the driving force. The roles are simple compared to the complexities of the "real" world. To many individuals, the escape is more important than the hunt; hence many individuals do little or no hunting.

Sinclair Lewis summed up the feel-



Camp Cook

Camp Guest

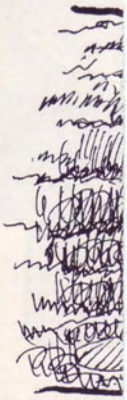
ing when he has George Babbitt wistfully exclaim, "I'd like to beat it off to the woods right now. And loaf all day. And go to Gunch's again tonight, and play poker and cuss as much as I feel like, and drink a hundred and nine-thousand bottles of beer."

I am sure that the annual trip to the deer camp provides an annual renewal of the soul to many individuals who, without this catharsis, would become frustrated and withdrawn. The good times, the friends, the tall tales, the reminiscences of past years' hunts, friends no longer around, father and son experiences—these are all a part of the deer camp experience. Many young men grow up at the deer camp. They are given responsibilities and tasks that are important for them to carry out. The success and future of the group is dependent upon the task assigned to each member. A shirker of assigned duties will not last long, and will soon be replaced by a worker.

The mystique of the deer camp may remain an enigma to many, but long may it survive! For without it, our world would be a sadder place. Many a boy has become a man, and many a man becomes a boy again. The transformation makes one more humble, more tolerant and more human. May the deer camp remain a part of our American heritage.

Lee R. Chamberlaine is a senior wildlife biologist working out of DEC's Region 6 office in Watertown. A 1963 graduate of the College of Environmental Science & Forestry at Syracuse, he began his career as a park ranger and naturalist at the Everglades National Park in Florida. Before assuming his present position he worked as a biologist aid at DEC's Region 4 office in Stamford.

MORE WILDLIFE ON YOUR WOOD LOT



by Daniel J. Decker and Gary R. Goff

AS autumn progresses and days shorten, many of New York's woodlot owners sharpen axes and check chainsaws. The same forests where our families watched wildlife during warmer months will soon supply the wood to fuel our stoves and keep us comfortable all winter.

But, have you considered the effect of your fuelwood gathering on wildlife? You should, because depending on how you go about it, firewood cutting and other woodlot management activities can either seriously harm or markedly enhance the wildlife inhabiting your woodlot.

About 85 percent of New York woodlands are controlled by private landowners. Consequently, the quality of the state's woodland wildlife habitat depends on the management interests of these owners. For this reason, they should be aware of approaches for managing their woodlands specifically for wildlife and for enhancing wildlife habitats in woodlands where forest products are the primary consideration. Fortunately, management for such products does not preclude complementary management for wildlife.

A woodlot must be viewed as a type of ecosystem—a group of interacting plants and animals, plus their physical environment.

The health of wildlife populations on your land depends on the quality of the four components of an animal's habitat. Food, cover and water usually can be manipulated directly in your woodlot, whereas space requirements are often affected indirectly. The amount and quality of these habitat components determine the *carrying capacity* of the land for a wildlife species. This important concept in wildlife management generally refers to the number of animals that an area of land can support during the most critical time of year for

Illustration by Wayne Trimm

its survival (e.g., white-tailed deer in late winter). The carrying capacity of land fluctuates in response to environmental changes on it—be they natural or human-induced.

You can accommodate wildlife food needs when getting firewood simply by not cutting "wolf" trees. Wolf trees grow with little competition from other trees; hence, they have large, widespread crowns with many branches. Such trees usually produce low quality timber and are typically eliminated from a woodlot in a commercial forestry operation. But they may produce more fruit or nuts than a marketable timber tree of the same species. Identifying wolf trees that are good food producers and maintaining them in a woodlot or hedgerow will greatly benefit wildlife.

Food: Sometimes lack of wildlife can be linked to scarcity of food. Even if your woodlot has adequate food, it may be located a considerable distance from cover. Where this occurs, it is useful to provide travel lanes of protective shrubs between food and cover. Patches of food or cover vegetation can be established by planting shrubs from wildlife habitat improvement packets available from some commercial nurseries and the State Nursery.

Cover: Cover is the protective component of an animal's habitat. It may be a hedgerow for a rabbit or a spruce tree for a golden-crowned kinglet. Regardless of form, cover is used for breeding, nesting, hiding, loafing, sleeping, feeding and traveling. Many kinds of wildlife are found in habitats having cover of diverse plant species, shapes and sizes, whereas fewer kinds of wildlife occur in monocultures of single plant species. Consequently, clearing a mixed hardwood woodlot and replanting to an extensive red pine plantation would cause a loss of wildlife species, though conifer specialists such as red squirrels

Nick Drahos

DEC photo

Raccoon

Cutting trees opens up dense stands and increases wildlife use.

probably would appear. However, if a patch of conifers were planted within or adjacent to a hardwood stand, it would increase overall diversity in the woodlot, providing habitat for conifer specialists and protective cover for other wildlife, like deer, grouse, and wood thrushes.

Increasing the variety of wildlife in your woodlot is readily achieved by manipulating vegetative cover. For example, if you modify an 80-acre hardwood stand by firewood cutting, timber harvesting, or conifer plantings so that various ½- to 2-acre patches with different vegetative characteristics are established, the resulting plant mosaic would increase the kinds of animals in the woodlot. Blackburnian warblers and golden-crowned kinglets should colonize the conifers, while song sparrows and towhees would find cover in the cut area. Creating and maintaining edges and open spaces is an important and easily accomplished wildlife enhancement practice. Brushy fence rows and hedgerows are special edges that provide cover for wildlife. These are particularly valuable as safe travel lanes between woodlots. If your woodlot is small and surrounded by open fields, providing a travel lane between it and other woodlands may result in increased use of your woodlot by wildlife. Additionally, the hedgerow itself provides cover for catbirds, cardinals, pheasants, rabbits and other species preferring this type of habitat.

"Snags" (dead trees that are still standing) also are a valuable asset to wildlife in your woodlot. Snags are used primarily as nesting, feeding and perching sites. Until recently, foresters would routinely remove snags because of their potential for harboring disease and insect pests. It is now recognized that many birds which nest in snags eat insects and help prevent serious insect outbreaks. Many others use tall snags for perches, especially hawks, owls and vultures. Some mammalian snag nesters, such as squirrels, provide recreational hunting and meat for many people. Others, like raccoons, provide revenue from trapping. And still others, like flying squirrels and deer mice, are unique and functional elements in a woodland ecosystem. All contribute to an interesting and exciting woodlot.

You may want to create nesting cover by building and placing nest boxes or by girdling trees, causing them to die and eventually become snags. Nest boxes are especially valuable for wood ducks and bluebirds. Screech owls, wrens, chickadees, and crested flycatchers also will use nest boxes of the correct dimensions, as will gray squirrels and raccoons.

Water: Water is essential for wildlife, though not all species need standing water. For those that do, a stream, pond or spring in or near your woodlot will serve them well. Sometimes it is necessary to enlarge a spring seep to provide adequate water. Creating a small pond is effective in attracting many kinds of wildlife. Ponds with vehicular access near your woodland can also be important for fire protection.

Space: Of course you cannot create more space, but it is possible to increase

Squirrels sometimes use dead snags for nests.

Dave Spier

the numbers of wildlife on your land by reducing the amount of space they need to thrive. Generally, as the "richness" of a unit of land increases by having all habitat requirements adequately distributed throughout, home ranges of wildlife decrease and population densities increase. Thus, while a 15-acre tract of hardwoods with a closed canopy and little ground cover may be incapable of supporting ruffed grouse, the same tract after thinning and creating a small clearcut might support a brood of grouse.

To help illustrate how wildlife enhancement can be combined with other woodland uses, let's look briefly at timber, maple syrup and Christmas tree production.

Timber management is the manipulation of forests to produce a commercial timber crop. Management activities typically involve establishing, cultivating and harvesting desirable tree species. Each activity can be modified slightly to help wildlife.

Typically, woodlots in New York State are overstocked with trees resulting in the wood growth potential of the site being dispersed over many trees of variable timber quality instead of on those which would make the best timber. A management approach in this situation would be "weeding," or thinning. Opening the tree canopy by thinning allows sunlight to penetrate the overstory, promoting shrub and seedling growth. Remaining "crop" trees will grow faster and produce fruits and nuts at an earlier age.

The debris of tree crowns and small branches left from a thinning operation can be stacked into large brush piles throughout the woodlot. These will provide cover for many small animals. Additionally, you can create living brush piles by cutting part-way through a tree, toppling it over, and allowing it to remain partially attached to its stump. The downed top will continue to produce buds and foliage accessible to wildlife.

Clearcutting is a timber harvest practice where all the trees on a plot are removed. If a clearcut is made carefully with respect to soil and slope, the overall animal diversity in the area containing the clearcut is likely to increase afterward as young stages of tree and brush growth develop on the clearcut site. Clearcuts should be small (½ to 10 acres), dispersed throughout the woodland, and irregularly shaped to produce the most edge. Leave snags in your clearcuts and build brush piles.

Another use of woodlots is for maple syrup production. Maple sugaring in early spring is a popular activity for many New Yorkers. Our native sugar maple, also known as rock or hard maple, is the best tree for this purpose. Managing a sugar bush is quite different from managing for timber production, since wolf trees are favored. Maples with broad, deep crowns tend to yield more sap of a higher sugar content than do crowded trees.

Basically, the goal in sugar bush management is to convert an entire stand into sugar maple by thinning. Thinning can be accomplished by girdling or tree-felling. Killing trees by girdling creates snags, while felling trees results in brush piles and stump sprouts. Obviously, development of wolf trees,

creation of snags, and construction of brush piles will benefit wildlife, especially if productive nut or wild apple trees are also preserved in the sugar bush.

Christmas tree farms are yet another common use of New York's woodlands. A stand of Christmas trees provides cover for many birds and mammals, while producing a valuable, short-term tree crop. The key wildlife consideration here is to plant in areas where the cover afforded by the plantation will be most useful to wildlife.

When managing your woodlot for any purpose, remember that diversity attracts wildlife. A mosaic of several practices is easy to accomplish and effective in enhancing the lives of your wildlife tenants. Management by compartments, or forest units, based on tree associations, age or size classes, soils, topography, and site productivity is a technique well suited for timber production and is beneficial to wildlife. Since thinning is usually needed every 5 to 10 years, a woodlot of 20 acres divided into about 8 compartments of 2 to 3 acres gives you a manageable unit to work in each year over an 8-year cycle. Such a schedule of cutting keeps the woodlot in varying stages of succession, thereby maintaining its diversity.

Remember, too, that managing a woodlot for wildlife is a long-term activity. A clearcut patch will not remain such indefinitely, nor will a useful snagstand forever. Thus, for the future benefit of wildlife in your woodlot, careful planning should be done before starting your chainsaw. This will ensure efficient use of your time and money.

New York's woodlands provide many economic, ecological and social benefits for people. Woodlot owners often take a multiple-use approach in managing their woodland, reaping many products—timber, firewood, maple syrup, Christmas trees and various wildlife-related recreational opportunities. These economic and aesthetic returns from your woodlot all add to its value for you and your family. The firewood to heat your home, the meals supplemented with wild game or maple products, and the poles used in the outbuildings all represent tangible advantages of wise woodlot management.

Daniel J. Decker and **Gary R. Goff** hold the positions of research associate and extension aide, respectively, in Cornell University's Department of Natural Resources. Mr. Decker's research has focused on the human behavioral dimensions of fish and wildlife management and outdoor recreation; he also holds an extension appointment at Cornell working in the area of fish and wildlife.

Mr. Goff's position deals entirely with private woodlot management and forest resources extension. He recently worked for DEC as a wildlife biologist. Both authors received B.S. degrees from Cornell in 1974. Mr. Decker received an M.S. from Cornell in 1976, while Mr. Goff received an M.S. from SUNY College of Environmental Science and Forestry, Syracuse, in 1979.

The Chain Saw: Wildlife's Best Friend

Wayne Trimm

MANY who have a strong tie with the creatures of nature find it hard to accept the view that tree-cutting operations actually improve wildlife habitat. Indeed, we have equated wildlife abundance with dense forests since colonial days. "If there are so many deer and partridges around our clearings," reasoned the settlers, "how much more plentiful game must be in the deep woods."

But the deep woods is one of the poorest places to find wildlife—virtually a biological desert.

Solid stands of mature trees form a closed canopy overhead, shutting out life-giving sunlight. Snuffed out are the plants and shrubs which make up much of wildlife's bread basket. Cutting and clearing open up sections to the sun again, starting a new round of forest succession—a long growing period from the seed to the fully-grown tree. That growing period whose early stages of new plant growth bring the seeds and fruits which make up wildlife's food supply for much of the year.

The farm woodlot has always been the best game breeder this country has ever produced. Every year, after the crops were gathered until it was time to tap the maples for syrup, a farmer clearcut part of his woodlot, stacking the firewood to season for next winter's use. Cutting in this fashion not only assured a steady supply of firewood but a stable crop of wildlife.

By cutting on a rotation basis, the farmer unwittingly practiced a sound management technique, creating a constant supply of edges, the vital life-support system for many kinds of wildlife.

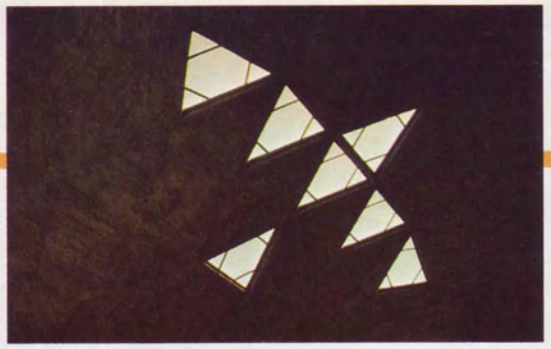
Fifty years ago, Aldo Leopold, forester, game manager and pioneering ecologist, noted the close correlation between edges and wildlife abundance. "Game is a phenomenon of *edges*. It occurs where the types of food and cover which it needs come together, i.e. where their edges meet."

With the revival of the woodlot, woodland rambles bring us new rewards. After winter snows have melted, nature shares a new kind of poetry, the woodland floor now covered by a verdant fresh growth. A clearing becomes an amphitheater: in the spring, the male woodcock performs his spiraling sky dance—part of the courtship ritual of this pint-size, long-billed gamebird; later, with elegant grace, a fox comes on stage, red coat burnished by the morning sun, to feast from blackberry bushes born of seeds long dormant in the shade of the woodlot, now sprawling abundantly in the new sunlight; in the fall, a doe deer enters the scene, white flag flicking, as she wanders from patch to patch, daintily browsing on the tender shoots of young plants and shrubs.

In the renaissance of the woodlot, we have a showcase example of ecological serendipity—its time-honored harvesting practices reaping not only the winter's wood supply but the unexpected dividend of acquiring new wildlife neighbors and bringing new joys to country living.

—Cecil E. Heacox

The fierce looking Turtle Building faces the Niagara River.



Skylight of the Turtle

The TURTLE for the Living Arts

by Wayne Trimm

Photos by Author

AFTER years of dreaming, planning, and work it was really happening. To the sound of drum and song and dance the Turtle in Niagara Falls, N.Y. was open. Poised on a rise overlooking the Niagara River the fierce looking head of the Turtle is turned, appropriately enough, towards the water. Unlike the real snapping turtle that was the model, a creature considered a sacred representation of earth by Native Americans, this turtle is made of steel and stone and wood and glass. But this one too is important to Native Americans. The Turtle building is now the focus of activity of the Native American Center for the Living Arts, a permanent national organization dedicated to Native American art and culture and directed and staffed by Native Americans.

The center organization was incorporated in 1970 in New York City by Cree folksinger Buffy St. Marie and maintained a store and office there for several years. The board, composed of dedicated Native American specialists, felt it was time to project a new and positive image to promote better understanding and respect between people.

The center moved to Niagara Falls in 1975 and soon, through exhibits, crafts demonstrations, arts festivals, dances, and classes in Indian culture was reaching more than a million people a year. Many of these programs were coordinated with major institutions such as the Smithsonian, State University of NY and the International Native American Council of the Arts.

With a background of such successes the center was awarded a grant of nearly five million dollars to construct a 60,000 square foot permanent multi-purpose cultural, educational, art and tourism facility.

Working with Duffy Wilson, a well-known Indian artist and other members of the board, an Arapaho Indian architect, Dennis Sun Rhodes, designed the three-story turtle-shaped building. After several frustrating delays it was officially opened May 17, 1981. Under Duffy Wilson, executive director, and Huron Miller, cultural director and president of the board, the center has grown, receiving financial help from many sources including the NYS Council of the Arts, the National Endowment of the Arts and Humanities, Ethnic Heritage Trust Foundation, Niagara County Manpower, City of Niagara Falls, and Chase Manhattan Bank.

In addition to its other functions the center serves as National Office for the North American Indian Museums Association and is responsible for the steadily growing library and collections of slides, tapes, contemporary, historic and prehistoric Indian art and artifacts. But the real charm of Turtle as far as I am concerned is its vitality. Not only is the building exciting in design but it houses some excellent paintings and sculptures, reflecting a great variety of styles and techniques of many Native American artists. The museum rooms of culture and artifacts are too small to do justice to the Indians but there are many other museums throughout the country that meet these needs. This center was designed for and is dedicated to Native American living arts. During performances and dances even the sun shining through the stylized eagle skylight onto the main floor moves its bright pattern across the scene. Here a visitor may see Native Americans from tribes all over the country at work in special craft demonstrations, showing films and slide programs on Indian culture, conducting tours of the galleries, and performing traditional dances and music.

The Turtle Center is an important contribution to maintaining a native culture. It promotes understanding and gives Native Americans a sense of pride and identity. Watching the opening ceremonies I had a good feeling about the Turtle being part of New York State but also sensed the pride of what the Native Americans have done by and for themselves in preserving their heritage.

Between dances

A dancer in full regalia

A social dance, everyone welcome

A young admirer

Eagle dancer

Capturing an historic moment

The art gallery displays the works of contemporary Native American artists.

Silver pipes fascinate a visitor.

Visitors chat among art objects in the main hall.

A small museum touches on cultural heritage of Native Americans.

MUSKRAT RESEARCH in NEW YORK

Tonawanda wildlife management area.

(Inset) Muskrat house

by Dan Carroll

(Photos by Author)

ITS Indian name was "ondatra" and its scientific name remains the same. The muskrat, *Ondatra zibethica*, is the most common furbearer in New York State. Even so, it is probably one of the least well-known because it is semi-aquatic and mainly nocturnal. This expert swimmer inhabits a variety of aquatic habitats where it feeds mainly on plant material such as cattails.

The muskrat has much in common with rabbits in size and in proverbial fecundity. Breeding season begins in April, and adults can produce more than two litters per year with more than four young per litter. Young mature in less than a year and can breed during their first summer. No wonder the muskrat is the "bread and butter" of the North American fur industry. During the 1980-81 trapping season, trappers of New York State sold between 700,000 and one million muskrat pelts for 5 to 7 million dollars. The value of this fur was multiplied several times in New York City by the garment industry.

These high stakes are the reason that New York State trappers have a vital interest in the welfare of muskrats. In response to a steady rise in pelt prices over the last decade, the number of trappers has tripled. This increased number of trappers has caused many to feel that muskrats are being overharvested and declining in numbers. On the other hand, some biologists and trappers contend that muskrats are not likely to be seriously over-trapped because most trappers lose interest as their success per night decreases.

To learn more about the effect of trapping upon muskrat populations, DEC initiated a study in the fall of 1977 at the Oak Orchard and Tonawanda Wildlife Management Areas which include over 9,000 acres of marshes and swamp forest north of Batavia and about midway between Rochester and Lockport. These large wetland areas are managed primarily for waterfowl production, but they also provide excellent habitat for muskrats.

The primary objective of the study was to determine the effects of trapping seasons of different durations upon muskrat populations living in similar marsh areas. Three 500-acre marsh zones were delineated for the study. Two zones separated by a buffer area were located at the Tonawanda Wildlife Management Area and a third was located at the Oak Orchard Wildlife Management Area. The muskrat trapping season opened on the third Saturday of November in all three experimental zones. It closed on January 15 and April 15 at the two zones on the Tonawanda Area and on March 15 at the study zone on the Oak Orchard area. It was felt that a muskrat population would be more likely to be overharvested with a spring trapping

season. Such a season allows trappers to take adult muskrats which have survived the winter and are likely to become part of the breeding population.

Each fall trappers applied for permits to trap on the two Wildlife Management Areas. By lottery they were assigned in equal numbers to the three study zones. During the four-year study numbers of trappers in each zone increased from 18 to 30 because of the increased interest generated by the rise of pelt prices and local publicity of the study. Each week trappers who used the study zones were required to report their trapping effort (numbers of traps set each night) and the numbers of muskrats they caught. After their catches were skinned, they were required to deposit all muskrat carcasses in 50-gallon drums at each Wildlife Management Area headquarters building. The drums were marked to represent the zones in which they trapped. Biologists examined each carcass to determine its sex and age. Sex was determined by examining the reproductive tract of each muskrat. The age of males was indicated by the appearance of testicles (those of adult males are large and dark). The age of females was identified by the size and condition of their uteri (those of adults are larger and have placental scars from pregnancies). About 14,000 carcasses were examined.

The productivity of the muskrat population of each zone was determined from the ratio of males to females and the ratio of juveniles to adult females.

The male to female ratio averaged 53:47 in all muskrats examined during the four years of the study. This closely approximated the desired 50:50 sex ratio. The numbers of juveniles per adult female averaged 12. This indicated that each adult female had produced two or more litters during the previous spring and summer. These sex and age ratios further indicated that the muskrat populations of all three zones were normal and productive.

Trapping records revealed that 60 to 70 percent of the muskrats harvested were taken during the first three weeks of the open season, regardless of season length. In extreme cases up to 90 percent of the muskrat harvest took place during this period. Weather appeared to influence the minimal trapping effort that was made during January, February and March.

The number of trap nights required to capture a muskrat varied from 5 to 18 depending upon water levels and the amount of experience and skill of individual trappers. Drought (low water) increased trapping success by concentrating muskrats so that a greater catch per trap night resulted if the trapper recognized the concentrations. The harvest of muskrats per acre of flooded marsh varied from 1.6 to 5.6. A drought during the summer and fall of 1978 reduced the number of acres of flooded marsh but resulted in the highest take of muskrats per acre of flooded marsh in all three study zones.

Annual harvests of muskrats in each of the three study zones varied during the past four years but there was no pattern related to the length of the open season. Prior to the study, only 27 trapping permits had been issued for the two Wildlife Management Areas. During the study, as many as 90 permits were issued for a single trapping season. Despite tripling of the number of trappers, the muskrat harvest on the Oak Orchard Area averaged about 1,000 during the four years of the study. This was consistent with the annual harvest before the study. At the Tonawanda Area, however, the muskrat harvest was substantially greater than all previous muskrat harvests on that area.

These results suggest that the greater number of trappers on the Oak Orchard Area simply took smaller shares each of fairly constant harvestable muskrat levels. However, greater numbers of trappers on the Tonawanda Area harvested higher than average numbers of muskrats. Apparently, competition between adult females for area of flooded marsh, before greater trapping pressure occurred, had inhibited productivity. Reduction of the breeding population increased productivity and juvenile survival. Hopefully, this high rate of harvest can be sustained.

Much has been learned about the effects of trapping of muskrats on the Tonawanda and Oak Orchard Wildlife Management areas. Some modifications will be made in the study which is planned to continue for another 2 or 3 years. The open season in at least one zone will be extended to see if the harvest can be increased above the average of the previous four years. A well-documented answer to the question concerning the impact of trapping on muskrat populations will result from this research project.

This knowledge of muskrat harvest effects is important to trappers and to many landowners. The production of harvestable surpluses of muskrats on a sustained-yield basis is an important goal of all state wildlife managers. A major economic asset of wetlands can be realized by maximizing the muskrat harvest which will provide additional benefits from preserving and maintaining our wetlands.

Dan Carroll is a Senior Wildlife Biologist at DEC's Region 8 office in Avon. He has a B.S. in Wildlife Science from Cornell University. He lives in Alabama, N.Y. with his wife and daughter.

Autumn Fungi

by Fred Knauss

Photos by Author

IT might be thought by some that if there were such a thing as a drab season for hiking, then either late fall or late winter might be such a season. In the former, the foliage has gone and colder temperatures have moved in. In the latter, trails are filled with mud and buds have not yet blossomed. If you are an avid hiker as I am, I am sure you would seize any opportunity you could to get out there and search for whatever might be new and exciting.

See those fallen logs and mossy stumps with tiny feathery protrusions? See the concentric colored areas within? Now look up. See those larger nodules circling up trees like alternating steps or shelves?

In each instance, what you have seen are relatives of the common mushroom. They are referred to as bracket fungi or polypores and they are among the most unobtrusive group of fungi in the woods of North America during all seasons of the year. It is only when the forest appears naked of most greenery that their presence is quite striking. Although most mushroom-like fruiting bodies appear, mature, and die in the space of a few days, many bracket types are perennial; thus their fruit persists for several seasons.

By and large, most polypores are inedible, though few if any appear to be poisonous, and of the edible species, most are tasteless.

All bracket fungi are leathery, woody or fleshy. Most are either parasitic (subsisting on live mature trees) or saprophytic (subsisting on decay, debris or dead matter). In the former, many of the major tree species (ash, beech, birch, elm, oak, pine—to name only a few) have their corresponding parasitic fungi. Often it is possible to identify and observe stump or log by the fungi associated on and around it.

Of the parasitic polypores, "true

Only when the forest appears naked of greenery is the presence of bracket fungi most striking.

Polyporus Parquaminus *is typical of bracket fungi—leathery, tasteless and inedible.*

Polyporus Squamosus *frequently shows abstract designs of marked beauty.*

tinder fungus" *(Fomes fomentarius)* is the earliest fungus known to have been used by man. A woody perennial, it was discovered in an excavation in a Mesolithic camp in Yorkshire as early as 8000 BC. Found on birches, it has been used for tinder, as a styptic for wounds, and formerly as a drying agent for tooth cavities before filling.

Another parasitic bracket fungus, "dryad's saddle" *(Polyporus squamosus)* is the most artistic as its large cap often shows abstracts of brown configurations. Unlike the tinder fungus which is more compact, the dryad's saddle is fleshy, infects elms, and decays easier than most polypores. Often the irregular but fascinating growths resemble miniature staghorns.

Three of the prettiest and most decorative bracket fungi are the Ganoderma tsugae, the "beefsteak fungus" *(Fistulina hepatica)* and the "artists conk" *(Ganoderma applanatum)*. The tsugae is red, woody, shiny, very durable, and is often found on beech trees. The "beefsteak fungus" has an even brighter red color, has the texture of beef, and lives on oak trees. The "artists conk" on the other hand, although lacking the red coloring, is shiny and woody in appearance, and is popular for its smooth brown underside which artists use to sketch drawings.

One of the most common saprophytic polypores is the *Polyporus versicolor*. Arranged in fan-like rows along fallen timber, these leathery and much smaller fungi are accentuated by their multi-colored symmetrical zones or rings. When young, wet and in good light these zones often resemble a series of semi-circular rainbows. Well shaped specimens are sometimes made into costume jewelry (such as brooches).

We cannot overlook the fact that in some areas, widespread forests are wiped out by some parasitic fungi. Dutch elm disease, a most destructive plant blight in recent years, is caused by a parasitic fungus carried by a beetle. Countless numbers of elms are killed each year in North America and Europe as a result of infestation.

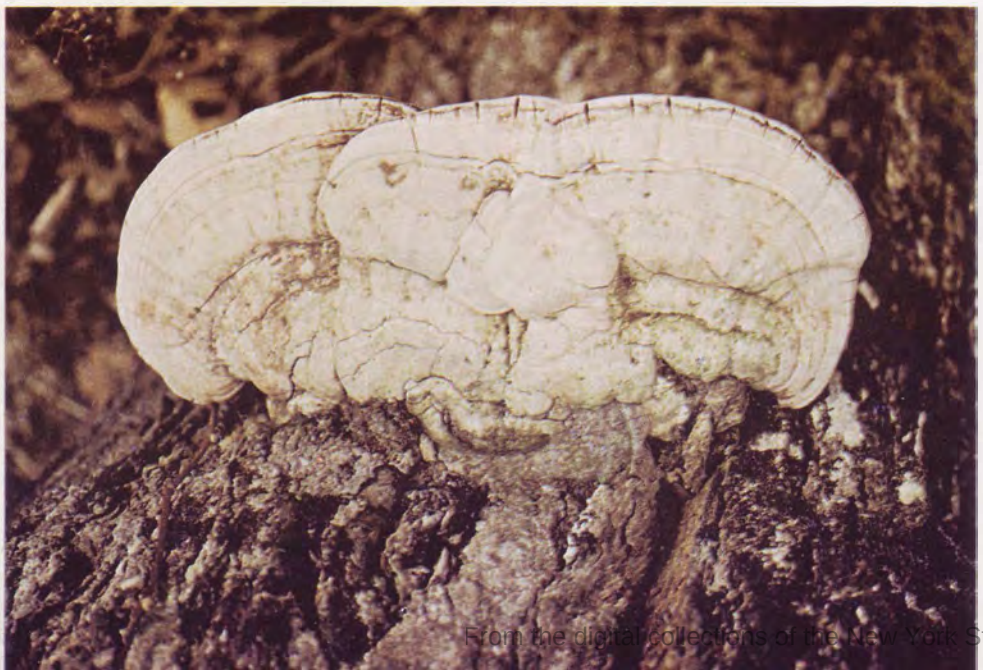
Contrary to a former belief that all fungi are a "vegetative vermin" and as such, are a degenerate group of plants, modern day botanists realize that mycorrhizal fungi play an important

Polyporus versicolor *(top) and* Coriolus versicolor *(above) resemble a series of semi-circular rainbows.*

Gonoderma applanatum *or "artist's conk" whose smooth brown underside is used for sketching.*

Polyporus pergaminus *(top) completely covers this piece of wood. Ganoderma tsugae (above) or "beefsteak fungus."*

Fomes fomentarius *or "tinder fungus" was used extensively by early man.*



role in the balance and interdependence of plant life. Remains and debris are broken down by the combined activity of fungi, bacteria and microscopic animals. Without these "decomposers," nutrients required by plants would remain unobtainable, as forest floors would become huge receptacles of waste material. (It is estimated that about 10 million leaves fall on an acre of forest ground in one autumn and that three inches of that soil contain at least 100 billion tiny organisms, many of which are mold and mushroom type fungi.)

Mycorrhizal fungi form an intricate root system with that of the host tree, and in so doing help the tree take up minerals from the soil. This appears especially true in soils deficient in particular minerals. Why these specific roots have been shown to have better absorption of certain nutrients (e.g. phosphates) is not certain.

The fungi also gain from this partnership. Along with the moisture and protection from their host trees, radioactive experiments have shown that they absorb sugars directly from the root system. Competition with other soil microbes is thus lessened.

Trees with mycorrhizal roots actually appear to grow faster than uninfected trees. For this reason, commercial foresters now artificially infect young saplings with certain fungi in order to promote growth which may retard the development of the sick trees.

Who knows what lies ahead with polypores in particular, or fungi in general? People have come far in harnessing fungi chemical processes to make products in furthering a better and healthier life. Antibiotics and cheeses are just two examples. Perhaps polypores have a yet undiscovered extract which would help with growth of hair or weight reduction. Perhaps a synthetic hormone from its derivative may aid in a cure for some cancers. Whether these fungi be perceived as being beautiful or grotesque, delicious or inedible, simple or complex, take that nature walk and look them over.

Fred Knauss is a school psychologist with the Hamilton-Fulton-Montgomery Board of Cooperative Educational Services. He has done extensive nature photography in the Mohawk Valley and the Adirondacks.

DAIRYING IN NEW YORK STATE

by Kelly Davis

THE dairy farms scattered picturesquely across New York state seem not to have changed in a hundred years. The red barns, survivors of another century, the black and white Holsteins grazing in the pastures, look like 19th century landscapes. But behind this bucolic scenery lies one of the three largest industries in the state. Along with manufacturing and tourism, cows are big business in New York.

New York is the second largest dairying state in the country in the number of cows (Wisconsin is first) and third largest in volume of milk sold (Wisconsin and California are ahead). More than 900,000 cows in New York produced a whopping 10.7 billion pounds of milk in 1979, with a cash value of $1.3 billion. Farm economics experts say the average farm investment in 1980 is $285,000 and each cow represents a cash outlay of $4,750. The reason for the high tab? Pipeline milking, expensive tractors and harvesters as well as computerized management techniques common on many farms have made dairying a costly business.

But dairying remains a curious mixture of the old and new; technology has not uprooted the old farm way of life. Dairy farms are still run by small families who enjoy the challenge of working along with nature. Both parents and children say it is an arduous life but one that fosters close family ties and teaches the children a sense of responsibility. While farms have undergone vast economic and technological changes in the past 20 years, they are still family-operated, a trend farm experts say will continue.

"The family farm will not disappear," George Conneman, professor in the Department of Agricultural Economics, Cornell University, said. "Many New York farms will be incorporated by the year 2004, but they will be family corporations."

Some 25,000 small farms disappeared from the scene in New York State between 1960 and 1980, according to Professor Conneman. While farms declined 65 percent in that time, those that stayed in business doubled in size. The average number of cows per farm increased from 30 to 60, and farms will continue to get bigger, Professor Conneman said.

"Small farms with less than 20 cows will essentially disappear in the future," Professor Conneman said. "The number of herds with 100 or more cows will nearly triple by 1985. New technology will continue to make it difficult for small operators to make satisfactory incomes from dairy farming."

The new technology—milking machines, mechanized crop harvesting and storage equipment, computer-designed feed programs—have increased the capital investment in a farm but enabled the larger farms to be man-

New technology has enabled dairy farms to increase in size with the same number of workers as years ago. The Potter farm, Truxton, N.Y.

W. Trimm

Beauty is part of the modern dairy farm.

aged by the same number of workers as were the small farms years ago. On the average, two workers today can handle a farm with twice the number of cows and produce 200 percent more milk than 20 years ago. In 1960, 158,000 pounds of milk were sold annually per worker; in 1980, it will amount to about 400,000 pounds.

The cow is the essential part of the sophisticated equipment that makes this high milk production possible. Dairy cows are bred and fed to be efficient milk manufacturing machines. In 1960 the average cow produced 8,000 pounds of milk a year; in 1980, the average is 12,000 pounds, with many cows able to produce much more. (2.2 pounds of milk equals 1 quart.)

The more protein a cow eats, the more milk she produces. And it is this process of getting the raw material to the factory—the cow—to produce a profitable product—milk—that makes dairying a business like any other. Dairying takes the same management techniques, skills and decision-making ability as any other large corporation. The business cycle on a dairy farm starts with the growing of crops.

Cows have two major forms of diet: forage and grain. Forage, or fibrous hay and corn is usually grown by the farmer. It supplies the cow with roughage and produces milk with a high butterfat content. Corn is a major source of food for cows except in areas such as the North Country where heavy soils limit corn production. There, farmers tend to pasture their cows instead.

Unless hay is cut early in its growing cycle, it is low in protein. Although cows have four stomachs, they are limited in the quantity of hay they can consume. For this reason, farmers will often supplement the cows' diet with purchased grain.

Grain is a high-energy, concentrated food made up of wheat, oats, barley and by-products. It can be purchased in bulk and pellet form and blown by machine into the barn for storage. The grain contains a concentrated mix of vitamins, minerals and various protein levels, depending on the cows' needs. The Agway Corporation's Farm Planning services will analyze farm crops and compute the quantity and type of grain feed needed to bring the cow's total diet up to the desired protein level. Printout sheets show the amount of feed required for the specific breed of cow according to her body weight, the cost of the feed, and the expected income from the milk production.

To produce about 45 pounds of milk daily, a high production level, an average cow will consume 24 pounds of hay, 44 pounds of corn silage and 10 pounds of grain. The trend today is to feed the cow totally in the barnyard. Barn feeding allows for a controlled, balanced diet that gets more protein into the cow. The cows grazing in the pasture are likely to be light milkers, at the low

W. Trimm

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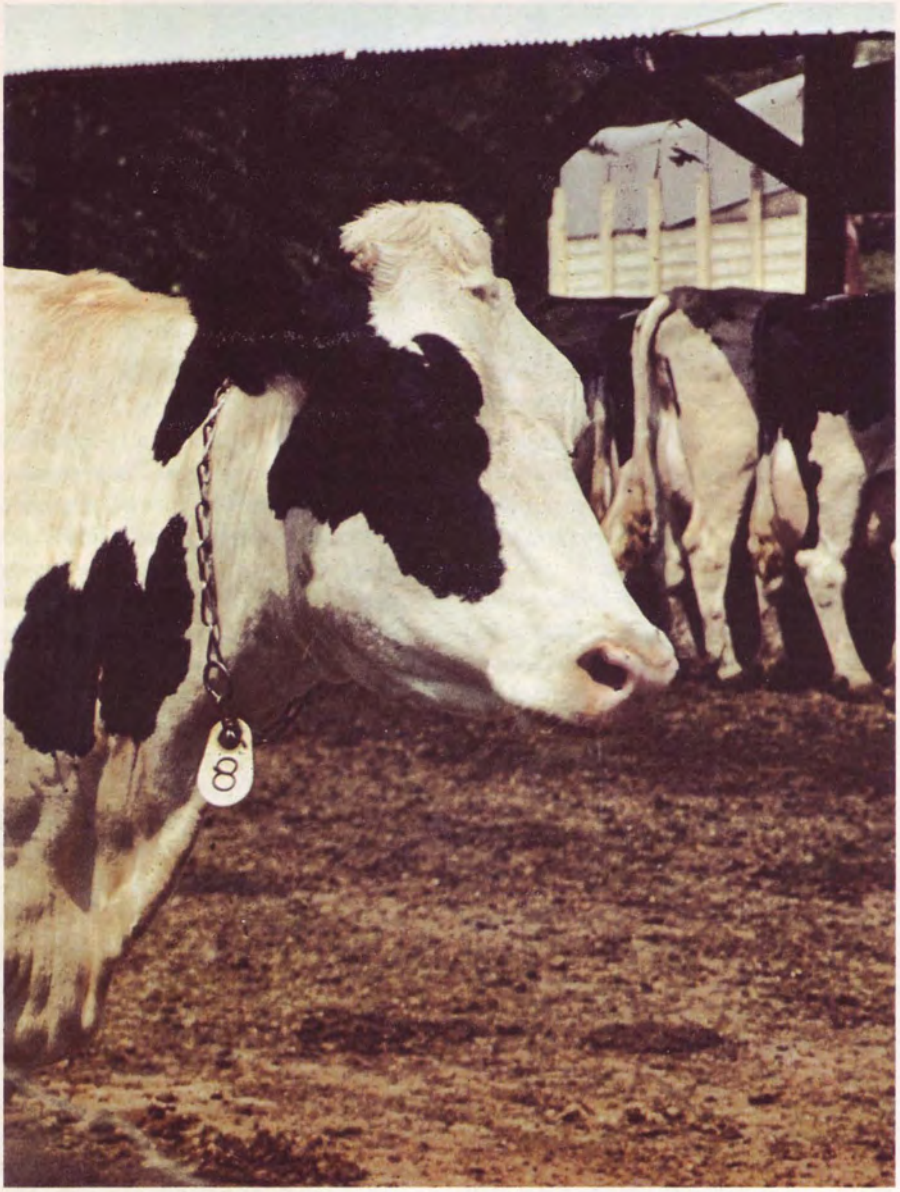


B. W. Potter's herd of prize Holsteins. An average cow produces about 45 pounds of milk a day.

end of their lactation cycle, or cows that have been "dried off," that is, in the non-milking stage before the brith of a calf.

New York state farmers plant more corn than hay, for corn stored as silage will produce more nutrients per acre than other forage crops. Corn is harvested once a year, chopped and fed through mechanical loaders into a silo where it ferments, producing silage, in about two weeks. Currently, dairy farmers grow about one acre of corn silage for every 3.5 acres of hay. Hay yields average two tons and corn silage yields average 12 to 13 tons per acre.

Hay (alfalfa and timothy grasses) can be harvested as often as four times a year; the more often, the better. Hay must be cut in the bud stage for the highest protein content. Timing the harvest for dry weather is critical as well; if hay is cut and baled with too high a moisture content it will be spoiled by mold and, through spontaneous combustion, can ignite and burn down the barn.

In another management decision, farmers are increasingly producing haylage i.e., hay that is chopped rather than baled. Haylage requires less hand labor and can be stored with moisture content at 50 percent rather than the 15 to 20 percent required for baled hay.

Good soil and crop management pay off with higher yields of forage per acre. An added bonus of more productive land is that less of it is needed; with land costs soaring, this tends to bring the dollar investment down. Farmland decreased 33 percent in the past 20 years, from 15,000,000 acres to 10,000,000 acres.

The growing season from planting to harvest is a busy time on any farm, but dairy farms have an additional, twice-daily harvest. Cows have to be milked 365 days a year, including Sundays, Christmas and the Fourth of July. Fourteen-hour work days that start at 4 or 5 a.m. help explain why farming is a family business; if you are working that hard, you want to work for yourself.

The B. W. Potter farm in the central part of the state is picture-pretty. A white clapboard, 1860 farm house with closely clipped lawn and trim flower beds lies close to rural Route 13, in Truxton. The red barns beyond the house nestle against the hillside. A sense of neatness and order prevails; no machinery, no rusting spare parts are left lying about.

Bernard Potter manages the 540-acre farm with more than the average two workers. Carole Ross, milk manager, and two full-time workers help take care of the 100 milking herd, plus 100 cows and heifers. Mr. Potter, however, is clearly the executive director of the farm; decisions about what and how much to plant, when to harvest, the size of the milking herd, are his. Mr. Potter has been farming all his life; first in partnership with his father and brother, then as sole owner since 1967. His daughter Bernice, a junior at Cornell's School of Agriculture, helps during school vacations, and is planning to carry on the family tradition of farming.

The Potter's milking parlor in the pre-dawn hours is an island of light and activity. Starting at 5 a.m., Ms. Ross assembles the milking equipment and takes in the first of the 90 cows she will be milking. The bovine traffic jam outside the milking parlor gate looks like a haphazard jumble, but the cows are in fact lined up in systematic order, with the heavy milkers first—those producing 75 pounds of milk or more, and the light milkers—45 pounds or less—coming along behind.

Standing in a waist-deep pit that puts her at udder level between two rows of five cows, the petite Ms. Ross washes the cows' udders with water from a hose, wipes them dry, then gives them a hand

squirt to "let-down" the milk. The process of giving milk is not completely mechanical: bossy has to be in the mood. When Ms. Ross attaches the vacuum tubes of the milking machine to the udders, milk is drawn with a rhythmic, pulsating sound into eight-gallon glass storage jars and from there, through plastic tubes and glass pipes, to a refrigerated storage tank in a separate section of the milking parlor. In the journey from udder to steel tank, the milk travels in a sealed, sterile atmosphere.

The entire milking process takes three hours (and will be repeated at 3 p.m.). Ms. Ross finishes milking just as the milk producer's tank truck pulls up in front of the barn on his every-other-day collection route. The driver uses a calibration chart to weigh the milk, takes samples that will be tested in the lab for bacteria and antibiotic levels and butterfat content, and siphons the milk from the farm storage tank to the truck.

After each cow is milked, she is directed back to her place in the barn through a series of gates and doors opened by pulley ropes. The heavy and light milkers are kept separate so they can be given different diets, with the light milkers allowed to graze in the pasture. The Potter's barn uses a free-stall system; the cows wander at will between their stalls and the feeding trough in the barnyard.

Cleanliness and constant vigilance against disease keep the Potter's cows healthy and milk bacteria levels low. Carole Ross disinfects the udders after each milking and the cows walk through a copper sulfate bath on the way to the barn to prevent hoof problems. Keeping the barn clean is no longer the Herculean task it once was; the barn floor is scraped with one sweep of a tractor. The manure is usually spread on the fields daily. The heifers' stalls, however, must be cleaned each day by hand, and given a fresh supply of sawdust, a chore performed by Bernice Potter when she is home on vacation.

Bernice also takes care of the calves on the Potter farm. "Some people think it is tedious, but I love the babies," Bernice said. The calves are taken from their mothers about six hours after birth and the cow calves kept in stalls in the calf barn for eight weeks. The bulls are sold for veal when they are two days old. The mothers' milk, heavy with colostrum, is kept separate during the milking process and bottle-fed to the calves. The calves are gradually given small amounts of hay and grain—"led in to a regular diet," Bernice said, "because a cow has only one stomach at birth and needs time to grow the other three."

W. Trimm

Carol Ross, milk manager, checks clients in the milk parlor.

Bernice watches the calves carefully for signs of "scours," a disease that causes mild diarrhea. Scours is treated with special diet and sulfa pills that Bernice thrusts down the calf's throat, but any respiratory illness calls for the attention of a veterinarian. After eight weeks in the stalls, the calves are moved to another section of the barn and ten weeks later, allowed to graze in the pasture. The calves are bred at 15 months and produce a calf at the age of two years—and start earning their keep by producing milk.

The calves are ear-tagged at birth with a registration number, and cards with their date of birth and sire hang above their stalls. The cows are artificially inseminated, a process that usually costs between $10 and $15 per cow. The Potters are trying to breed better milk producers and have spent $100 and up for semen from bulls with records of siring high milkers. "Glen Valley Star," who sired two of the Potter's calves last July, produces large heifers with long legs and broad hips, indicators of heavy milkers.

The farm tries to produce calves in July, Bernice Potter said. "When a cow 'freshens' in July, her milk production will peak two months later and remain high during the fall when milk prices are highest," Bernice said. "The following May we stop milking her, when her milk production falls to about 30 pounds a day, and let her dry off for two months in preparation for her freshening again in July. It doesn't always work that well, but that is the ideal we aim for," Bernice said.

Bernice is studying theories of farm management at Cornell, and has taken courses such as agricultural economics, dairy science, chemistry and genetics. She acknowledges, however, that she has learned a great deal about the practical operation of a dairy farm from her father.

According to George Conneman, financial management will become the most critical farm management factor during the next 25 years. "Understanding and using credit/debt records, performance analysis, financial control systems, cash flow and discounted returns and tax management will be extremely important," Professor Conneman said.

Many farmers would argue that good herd management is the most important element in the operations of a profitable dairy farm, and the best way is still through the apprentice system. While financial management skills can be learned through study, the look and feel of a healthy animal, the judgment and timing involved in the handling of crops, can best be learned from experienced hands. In this day and age of large corporations and conglomerates, it is comforting to know that farming may be big business, but it must still be maintained through family tradition.

Kelly Davis received a B.S. in magazine journalism from Syracuse University in May 1980 and has published articles on environmental issues. She is a freelance writer, and director of Council of Park Friends, Inc., an environmental education group.

Gatehouse/blowout tower in Van Cortlandt Park, Bronx, N.Y.

The Old Croton Aqueduct

by George Profous

(Photos by author)

IN the heart of the Bronx and Westchester Counties there lies a little-known trail that is at once an outdoorsman's delight and an important part of the history of New York City. Once the access road over the aqueduct below, it is the Old Croton Aqueduct Historical Trailway.

Completed in 1842 and fed by waters from the watersheds and reservoirs in Dutchess, Putnam, and Westchester Counties until abandoned in 1955, the aqueduct is largely unknown to the millions of people living nearby.

(Top) Ten-foot columns at intervals along the trail served as aqueduct markers. (Center) An occasional exposed section allows one to view the horseshoe shape of the masonry pipe. (Below) The gentle slope of the trail offers easy hiking and scenic spots for picnicking.

The trail weaves its way from New York City to Croton-on-Hudson, 42 miles to the north. Its gentle slope rarely exceeds one foot per mile, and there are no sharp twists where it can be lost. This nearly straight path was a necessity because the masonry pipe below the trail used only gravity to carry 60 million gallons a day of desperately needed water to a growing New York City and surrounding communities.

Construction began in 1837, and the 1842 completion was celebrated by parades and the splashing of the first public fountain at City Hall Park.

The aqueduct was first proposed as a long overdue solution to the water needs of the then 360,000 people of lower Manhattan. In addition to the unpleasant taste of the water available at the time, there were frequent shortages during summer droughts. Diseases such as typhoid fever spread throughout the city every few years because raw sewage found its way into many of the wells and springs.

The earliest attempt to solve the problem failed when the British occupied New York in 1776 and the city's first public water project fell into ruins. Numerous other schemes using groundwater and wells were doomed to failure as the cities and towns which later became parts of New York City continued to grow. By 1829 the first successful public municipal waterworks contained water unfit to drink and useful only for fire extinguishing purposes. Its location was "far uptown" at 13th Street west of Broadway.

Despite continuing deterioration of the quality of life in the city and repeated warnings by doctors, construction on a large freshwater system was not begun until repeated fires in the warehouse district began to threaten the livelihoods of the merchant class. Indeed, the Old Croton Aqueduct was not begun until after the great fire of 1835 burned nearly 700 buildings including most of the prominent Dutch architecture. The disaster, directly attributable to the shortage of water, bankrupted the city's insurance companies.

Following this prime example of "learning the hard way," a popular vote of 17,330 to 5,963 authorized the issue of $2.5 million of water stock for the aqueduct. John B. Jervis was appointed

chief engineer and director of the project, which eventually cost $12 million.

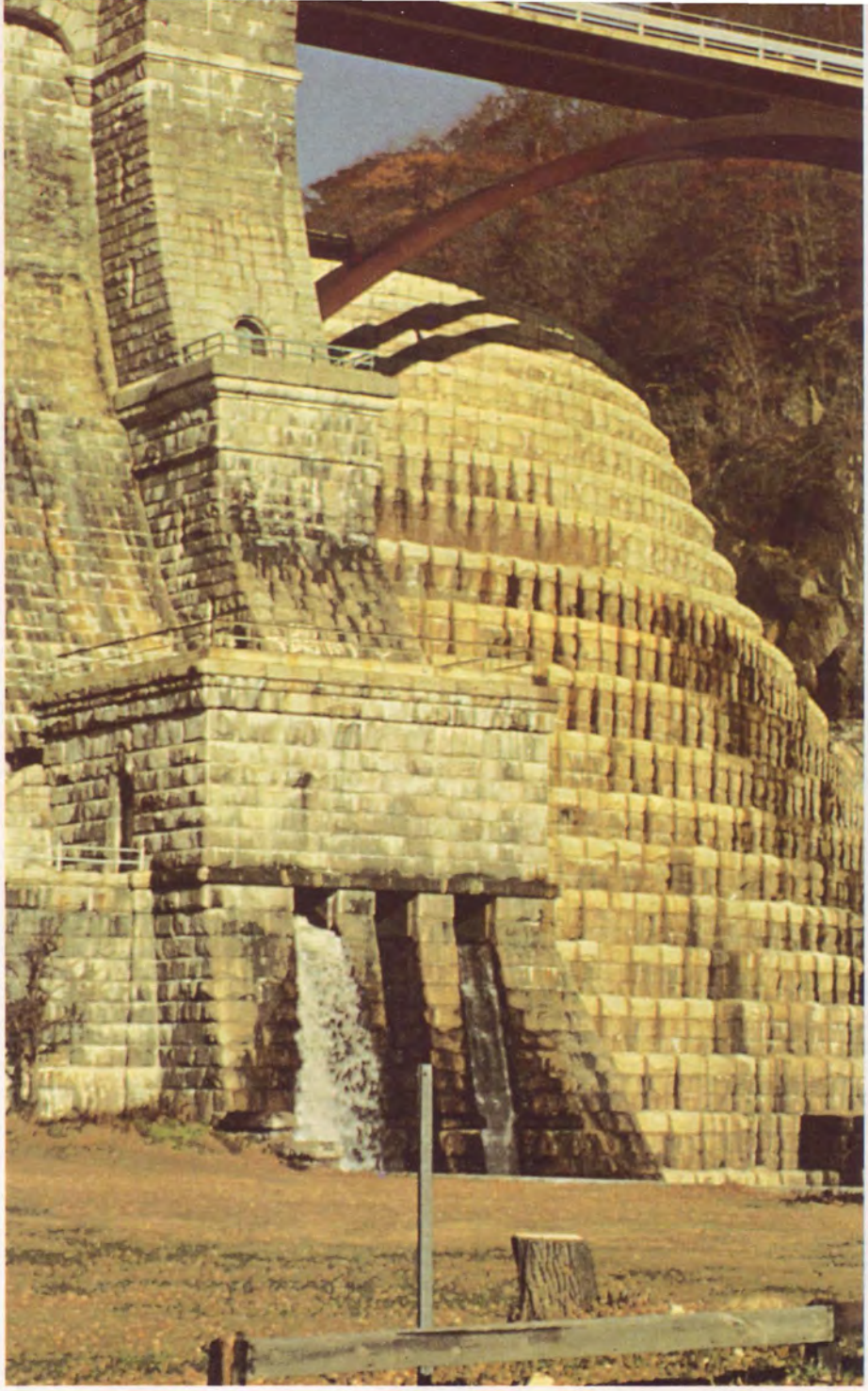
Supplied by a receiving reservoir north of the city, the Croton Distributing Reservoir was the endpoint of this new system. From here, the water was distributed throughout the city. Now it is the site of the New York Public Library on Fifth Avenue at 42nd Street. The receiving reservoir has been preserved and can be seen in Central Park near 86th Street. South of this point, no above-ground trace of the aqueduct remains visible.

To the north the aqueduct crosses over the Harlem River at Highbridge, a monumental bridge with 15 semicircular arches. With its gatehouse tower rising high over the river the aqueduct can still be seen from many highways and bridges such as the Cross Bronx Expressway and the Major Deegan Expressway.

Gatehouses located at intervals kept the flow of water constant and controlled air in the pipes. Because they prevented the large pipe from being damaged or "blown up" by large pockets of air, they were also called "Blowout Towers."

The present-day aqueduct trail runs from Highbridge and stretches through backyards and parks up to the North Bronx and then crosses Van Cortlandt Park. Up to this point it runs through highly urban territory, but at Van Cortlandt Park and north it is still possible to see the old fields and stone fences of abandoned farms now grown over with dense woods. The large stone fences once separated the farms from the aqueduct, and the smaller ones separated farm fields from one another.

Here, still a mile and a half into the city, are found oak and hickory woods on the ridge which parallels the aqueduct, along with the marshes and Tibbet's Brook in the valley below. The nearby New Croton Aqueduct, old tree-lined farm roads, and the ruins of houses and mansions contrast with the encroaching wildness of the area. Here in the park near the aqueduct gatehouse one is surrounded in spring by the chirping of hundreds of spring peepers. In the summer it is a place where skunks still visit, and in the fall and winter an area where red-tailed hawks are easily sighted.



(Above) The Cornell or New Croton Dam is the largest masonry dam and spillway ever built. (Below) Highbridge, where the aqueduct crosses the Harlem River, has 15 semicircular arches.

Here also are solitary oaks, tuliptrees, and Norway maple—some of them planted before the Revolution—all just a few minutes away from millions of people, and the noisy subways, streets, and apartments of the city.

Along the trail north, eroded soil sometimes allows a glimpse of the way the pipe was built. On any given day, the upside down horseshoe shape of the masonry could carry up to 90 million gallons, although it was never used to its full capacity. The shape of the pipe allowed for the harmless passage of air through the top portion until it was allowed to escape at intervals from the blowout towers. The pipe is 7½ feet wide by 8½ feet tall—easy enough for a man to walk through if its access points were not sealed.

Walking the length of the trail reveals that it is raised above the surrounding woods and often has a ridge along its side. Now covered by many types of trees, this ridge was created when soil left over after burying the pipe was thrown to one side.

The entire length of the Old Croton Aqueduct was the work of thousands of laborers, mostly Irish. The work progressed as slowly as 25 feet a day, with workers often living in primitive conditions alongside the trail. The huge scale of the project—in the course of its 42 miles the aqueduct crosses 25 streams below grade and has 16 tunnels from 160 to 1,263 feet in length—proves the genius of its planners.

Hailed as one of the greatest achievements of its time, the project was also mistrusted by some New Yorkers. As late as the 1850's, many people refused to drink the water, using the few remaining corner pumps rather than the Croton hydrants. To add to this, plumbing was not yet mass produced, and for many people too expensive to buy. A young lawyer of the time, G.T. Strong, wrote:

> "There's nothing new in town, except the Croton Water, which is all full of tadpoles and animulculae, and which moreover flows through an aqueduct which I hear was used as a necessity by all the Hibernian vagabonds who worked on it. I shall drink no water for some time to come. Jehiel Post has drunk some of it and is in dreadful apprehensions of breeding bullfrogs inwardly."

The hikers, joggers, bicyclers, aqueduct-walkers, and birdwatchers who use the trail today come from hundreds of communities along the route. Nearby are the mansions of the wealthy Dutch families such as the Van Cortlandts and Phillipses; and Sleepy Hollow, on which Washington Irving based his famous short story. The Hudson River and the Palisades of New Jersey are visible from parts of the trail.

The trail passes through the Bronx, Yonkers, Hastings-on-Hudson, Dobbs Ferry, Irvington, Tarrytown, and Ossining in addition to many smaller communities on its way to the New Croton Reservoir. At times it is cut by streets and major highways, but it can still be followed its entire length to Highbridge. In many places it serves as an excellent linear park connecting larger parks such as Tibbet's Brook Park in Yonkers and Van Cortlandt Park in the Bronx.

The old aqueduct continued in use until well after World War II, its capacity greatly reduced by leaks. In 1955 it was closed. The various localities nearby are now considering using sections of the old structure to again carry water or other utilities by using its right-of-way.

The old aqueduct's lands became a State Trailway Strip in 1968. In the city they are administered by the City Department of Parks and Recreation (212) 360-8141. Along the rest of its length the trail is managed by the Taconic State Parkway Commission (914) 245-4434. Yellow trail markers and wood post fences blocking the aqueduct to automobiles have been put up by the commission.

The New Croton Aqueduct

Just above Tibbet's Brook Park in Yonkers the old aqueduct cuts eastward toward the Hudson River following the ridges along its course much of the remaining way to the reservoirs. At this turning point, one of only a few, the New Croton Aqueduct is visible above the ground. Off Midland Avenue, the Old and the New Croton Aqueducts pass within a few hundred feet of each other. The old structure, the only major fresh water supply to New Yorkers until 1892, can here be compared to its "new" counterpart, still in use despite its nearly 90 years of service.

Unlike its buried predecessor, the second aqueduct was tunneled. It is about three times the size of the old structure—large enough to drive a small car through. It originates at the New Croton Reservoir, although at a different point from the old aqueduct. Walking by its gatehouses there is a noticeable smell of chlorine as on an average day in the fall it carries 200 million gallons to cities and towns along its route. The waters take about six hours to reach their final destination in New York City.

At the New Croton Reservoir we find one of the most massive structures in New York State—the New Croton, or Cornell Dam. Completed in 1906, its stone masonry rises 300 feet above the hidden, artificial foundation. What cannot be seen is the smaller dam, 50 feet high, which originally supplied only the Old Croton Aqueduct and was flooded by the new dam. The new dam created a 10-mile lake in this highland area of oaks, pines, and hemlocks on Route 129 off Route 9A.

After the immense New Croton Dam was built, the State Legislature passed laws "forbidding New York City from ever penetrating the counties [Dutchess and Putnam] in search of water again." It was these laws and the potential of other upstate areas which led to the development of the water supply systems to the west of the Hudson River in the Catskills and the headwaters of the Delaware River.

The Old Croton Aqueduct is a romantic precursor of the great systems which now feed New York City and surrounding communities with some of the best water on earth. The newer parts of the system are the Catskill and Delaware Aqueducts. These life-lines from the woodlands and watersheds up north also bring nature to the center of our cities. Just as central New York has its Erie Canal, the southern area has the Old Croton Aqueduct.

George Profous is a 1978 graduate of the SUNY College of Environmental Science & Forestry and works with classes and community groups in teaching the resources of parks in the Bronx and surrounding areas. His background in ornamental horticulture and photography has led him into the preparation of pamphlets on natural beauty within city limits.

Bruce Baker

Cold evening

LETTERS

Loves Robert Bateman Portfolio

What a wonderful surprise your July-August issue was. To find the works of Robert Bateman adorning your pages was a thrill to me. What magnificent paintings!

As a portrait artist myself I can really appreciate Mr. Bateman's talent. Your photos are terrific, and now this fine art—you really outdid yourselves this time.

Mrs. Florence Fauser, Freeport

Kudos for July-August Issue

Hallelujah! Your July-August, 1981 issue has finally brought back the types of articles which prompted me, and I suspect many others, to subscribe to THE CONSERVATIONIST in the first place.

I will be extremely pleased if you continue on this path and leave the environmental politics, opinions and statistics to the EQ News section.

Thank you for a long-awaited, excellent issue.

Martin Newborn, Brooklyn

Milan Fiske's Snake Bite

The doctor mentioned as the staff physician at Albany Medical Center Hospital who had become interested in snakebite poisoning, is my niece, Dr. Amy Dunn. Dr. Dunn is a pediatrician, but had done research on snakebites and was, therefore, called to the emergency room when Mr. Fiske was brought in. Dr. Dunn is now working on a special fellowship at the University of Iowa Medical Center, Iowa City, Iowa.

Claire Dunn, Albany

Having just read and looked (there was an exceptional amount of good "looking" this time) at the July-August 1981 CONSERVATIONIST from cover to cover, a burning question remains: in the excellent article "Snake-Bit!" by Milan D. Fiske, I was left wondering what happened to the snake? Did it die, forgotten, in the garbage can?

William F. Davis, M.D., Kingsville, Ohio

• *According to Mr. Fiske when he realized the bite was for real, "We dropped everything, slammed the cottage door shut and drove to the nearest physician." We assume the snake must have wandered off. Editor.*

Objects to Beach Property Rights

I was disturbed by your reply to the person in the May-June issue who inquired about hiker's rights on beaches and shorelines. The attitude that those with the money can appropriate exclusive rights to coastline waterfront and beaches, seems to me backward, down-right wrong, and badly in need of changing. Yes, I know all the arguments about the "absolute" right of private property—it's as much a part of America as the automobile and apple pie (though I might add, strangely lacking from the mores of the first, *native* Americans) but that doesn't mean it is infallible. Witness Oregon's progressive ocean coastline policy (it is *all* open to the public) or Norway's, where all private holdings must be a certain distance from the shore to allow everyone access. If we are to save our shorelines from ecological destruction, awareness to the worth of what is there must be fostered. And if people cannot walk and see

what is there (or are crowded into a few designated "public" areas—heavily-trammeled and over-used) we cannot expect them to appreciate (or work to save) it! I agree that sensitive wildlife breeding areas or delicate ecosystems might need to be protected, but to post a shoreline, beach, or tidal area "off-limits" and reserve it for the exclusive use of the folks (often not even permanent residents!) wealthy enough to "purchase" the privilege—I will never acknowledge the rightness of such action. No littering, no camping, no clamming—yes—but no *walking*? Such absurdity is a sure symptom of a sick society.

Peggy L. Oines, Whallonsburg

Northern Brown Snake vs Garter Snake

I would like to offer a quick comment on one of the questions in Paul Kelsey's Questions and Answers column in the July-August 1981 CONSERVATIONIST.

Reader Bradley Radka asks about a small snake (p. 45) he found, and it is identified as a northern brown snake, *Storeria dekayi*. The description given does match quite well this species. However, a photograph immediately below the question—apparently the snake being identified—is not a northern brown snake. It is a juvenile garter snake (*Thamnophis sirtalis)*. The "spotted" pattern seen on the pictured specimen is not uncommon in Michigan, and would probably occur in New York also. A good field mark for the brown snake is a black mark on the side of the head, behind the eye area—lacking in the photo specimen. (Check plate 22 in Roger Conant's *Field Guide to Reptiles and Amphibians of Eastern and Central North America*, Houghton-Mifflin.)

We enjoy your magazine very much, and find the Questions and Answers section informative and interesting.

James Harding
Cranbrook Institute of Science
Bloomfield Hills, Michigan

Where Was Rockaway?

We enjoyed the coastline issue very much, especially the perceptive depictions by Ed Kenney and your other contributors.

But—your emphasis was a little lopsided toward Fire Island! Where was the Rockaway Peninsula in your coverage? My family and I summered at Breezy Point in the 1950's and I recall a magnificent beach and a very ambitious rock jetty at the point. Since I have not been back in the intervening years, I would have liked to read what has happened there since.

Also, in fairness to the function of barrier beaches, Rockaway ranks right up there with Fire Island, and should have been included in your survey.

Anne Hallowell Obuck, Pleasantville

Incomplete Metamorphosis

Please refer to Paul Kelsey's dragonfly note on page 46 of the July-August issue. I would point out that the use of the term "larva" implies a complete metamorphosis whereas the dragonflies and damselflies undergo an incomplete metamorphosis. To reflect this difference, the immature instars of the aquatic stoneflies, mayflies, and dragonflies are called naiads. For a detailed discussion of this point I would refer you to J. H. Comstock's *An Introduction to Entomology*.

Ordinarily I would not write you on this point, but as your most excellent magazine is widely read and used by both teachers and students you might, in the future, want to consider a more strict usage of the terms in question.

C. H. Daniels, White Plains

A Mocker Doing Its Thing

I believe the answer to a recent inquiry from a woman in Rockland County may have been in error. She has been annoyed by the constant chirping of an unknown bird during the night. I think that instead of the English sparrow suggested by Mr. Kelsey, the bird may be a mockingbird.

We live in the same area and have a number of mockingbirds living in our yard. They are the last to quiet down in the evening—well after sunset, and are the first to start singing before dawn. I have not personally seen them at night, but the midnight song is suggestive of the mockingbird. While not constant, I have heard them numerous times well after dark. The yard lights are out at that time and there appears to be no other disturbance.

Isaac Siskind, Spring Valley

Shed Antlers Found

Early last December I witnessed an eight point buck shed his left antler, a sight I have never had the privilege of seeing in over 50 years in the woods. Needless to say ever since then while walking around my 20 acres I had high hopes of finding the right side, but of course knew the possibility was practically nil—it could be *anywhere*!

March 31st, my first day home from a stay in the hospital, you guessed it—my dog, Sissi, brought me the missing antler. It was in perfect condition and water marks prove how it was preserved all those months from mice and the elements.

I now have them mounted and relish the thought that some buck will still be around next year.

Cappy LeClair, Nassau

The Balm of Simplicity

My cabin is deep
within these woods
beside this stream that flows
so placidly
my resting here
dispels my mental woes.

Whenever I can
I seek it out
for resting and renewing,
and storing the strength
to bear the stress
from tasks I shall be doing.

Progenitors
of mine, no doubt,
thought their life here mundane,
no dreaming sons
would seek this place
to keep their thinking sane.

Grant D. Morse, Saugerties

BOOK REVIEWS

CONDUCTED BY JOAN TAYLOR

A Life Outdoors, by Wayne Hanley, 114 pages, The Stephen Greene Press, Brattleboro, Vermont 05301, $5.95, paperback.

THE fortunate among us at some point in our lives get to know somebody like Wayne Hanley—fascinating, forthright, knowledgeable in a field which interests us personally, and a little crusty. All of this and more comes through in a splendid little book which is disarmingly sub-titled, "A Curmudgeon Looks at the Natural World."

This 1980 volume of the Man and Nature Series of the Massachusetts Audubon Society (Hanley served as editor of publications for the society for 16 years) is composed of some of the naturalist's best weekly newspaper columns. What sets Hanley's observations apart is a freshness of expression, a bone-deep sense of humor and not an ounce of phoniness in a ton of writing.

The "essays"—too tepid a word for this rich fare—in *A Life Outdoors* are liberally interspersed with pithy vignettes culled from his earlier years. These gems of recollection serve as a quasi-autobiography which illuminates what Hanley calls "the experiences in natural history which make up the more valuable passages of this volume." That may be, but when he writes about his great uncle Rabbit Green, or describes his career in the Boy Scouts—he says he did a two-year "stretch"—one wishes he would devote an entire book to such matters. This reviewer would go out and buy a copy the day it hit the stands.

The text is liberally illustrated by pen and ink drawings done with great charm and skill by Michael DiGiorgio.

There must be a legion of Wayne Hanley fans in New England. Now there is one more in New York.

— Alvin S. Fick

Nature Drawing, A Tool for Learning, by Clare Walker Leslie, 206 pages, Prentice-Hall Inc., $19.95.

THIS book has been in preparation for several years and represents a well arranged compilation of examples of drawing of nature subjects by a large number of artists, including the author. Using these drawings the author has shown examples of how to draw or sketch (sometimes with paint) a wide variety of subjects including rocks, mountains, streams, the sea, flowers and trees, insects, mollusks, fishes, birds, and mammals. Besides actual field drawings there are excellent diagrams on most of the techniques used in field sketching, including quick sketches and designing of more finished pictures.

This book will be useful for artists who want to do more field drawing as well as for scientists, students or anyone who wishes to learn more about the natural world around them. It has been said that people really see something only when they try to draw it. The drawing then becomes the catalyst to seeing and seeing is a step to better understanding. This book will start that process.

A shortcoming is that the illustrations are reproduced only in black and white. The beautiful color rendering of some of the subjects has thus been lost in this publication. However, the source for each illustration is given with the picture so a person can seek out the original if they wish.

I highly recommend this well-written, intelligently organized and profusely illustrated book. I expect to use it myself and in my teaching.

— H.W.T.

Sea Mammals, by Dorothy Childs Hogner, 71 pages, Thomas Y. Crowell Pub., $7.95.

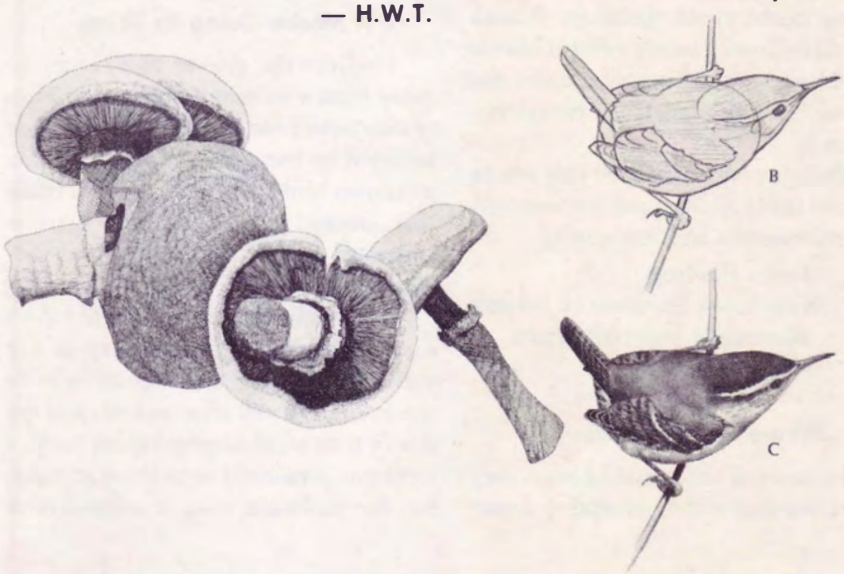
THE sea has been described as the last frontier on earth. This factual book affords an opportunity to penetrate this dark realm and examine the mammals who inhabit it.

Dorothy Childs Hogner seems to have geared this book to children between the ages of 10 and 13. Her subjects include whales and dolphins, sea cows, pinnapeds, polar bears and otters. She very neatly ties in man's needs, abuses and projects to the existence of these mammals. Interwoven in the narrative are legends and interesting side lines that keep the factual material from turning off young minds. Her inclusion of Latin names gives the book a scientific approach that may appeal to aspiring scientists. It also makes the book a valuable resource tool for older students.

The one drawback of the book is its art work. The animal descriptions are very hard to visualize, especially for animals like the whales. We all have a pretty fair image of a polar bear or a seal. Our mental picture of whales, however, tends to be in silhouette. The illustrations are of no assistance in helping to differentiate these titans. Some of the pictures are confusing even after the caption has been read.

Ms. Hogner's writing style is very graphic and succinct. She also handles repetition very successfully, which is a must for this age level. It's regretable that the illustrations do not complement her prose.

—Nancy M. Payne



Guide to Adirondack Trails—High Peak Region, Tenth Edition, and **Guide to the Northville-Placid Trail,** both published by the Adirondack Mountain Club, 172 Ridge St., Glens Falls, N.Y. 12801, $9 and $5 plus postage and handling respectively.

NEW YORK'S 2.3 million acres of forest preserve lands in the Adirondacks are laced with hundreds of hiking trails luring thousands of hikers and other recreationists every year.

The "Guide to Adirondack Trails," published by the Adirondack Mountain Club, has been showing people the way and keeping them on the trail since 1934.

The guide has been revised and is now in its tenth printing with new information on trails, regulations and other changes that have recently taken place in the High Peaks Region in the Adirondacks. This latest edition features larger, easier to read type; a bright red, sturdy soft cover and a sewn binding. A map pocket contains a four-color topographic map, "Trails of the Adirondack High Peak Region."

As pointed out in the preface, there are three major changes included in the tenth edition. The Northville-Placid Trail section, which appeared in previous editions of the guide, is now available as a separate volume. It deals with a separate area of the Adirondacks and is concerned with a different manner of hiking and camping.

A second major change is a complete revision of the Upper Ausable Lake Region of the guide. This revision was necessitated by the state's acquisition of more than 9,000 acres of land in the High Peaks Region.

Also, the section on the Trailless Peaks has been rewritten for this edition.

The Northville-Placid Trail guidebook is a completely revised publication describing in detail the 132-mile long footpath which travels through the heart of the Adirondack wilderness.

The guide contains detailed trail descriptions, maps, mileage charts, photographs, interesting events pertaining to each section of the trail and offers suggestions for optional side trips. There are also chapters in the guide designed to help backpackers organize and prepare for their trips.

While DEC publishes less detailed guides and maps for trails in the Adirondacks and elsewhere on state lands, hikers will find the two new guides published by the Adirondack Mountain Club an important part of their equipment and well worth the cost.

— Arthur Woldt

Books Received

How Did We Find Out About Coal? by Isaac Asimov, 64 pages, Walker & Company, $6.95.

The Natural Vegetation of North America, by John L. Vankat, 261 pages, John Wiley & Sons, no price listed.

Environment, Ideology and Policy, by Francis Sandbach, Allanheld, Osmun & Company, $26.50.

Ascent, the Mountaineering Experience in Word and Image, edited by Allen Steck and Steve Roper, 272 pages, Sierra Club Books, no price listed.

Beyond the Adirondacks, the Story of St. Regis Paper Company, by Eleanor Amigo and Mark Neuffer, Elwood Maunder, gen. ed., 219 pages, Greenwood Press, 88 Post Road, West., Westport, Connecticut 06881, $22.95.

One Earth, One Mind, by Michael W. Fox, 263 pages, Coward, McCann & Geoghegan, $9.95.

The Natural World Cookbook, Complete Gourmet Meals from Wild Edibles, by Joe Freitus, 283 pages, The Stephen Greene Press, $15.

A Farm and Village Boyhood, by Fred Lape, 167 pages, Syracuse University Press, $9.95.

Incident at Eagle Ranch, Man and Predator in the American West, 297 pages, Sierra Club Books, $12.95.

Returning to Eden, Animal Rights and Human Responsibility, by Michael W. Fox, 281 pages, The Viking Press, $13.95.

The Life of the Hummingbird, by Alexander F. Skutch, illustrated by Arthur B. Singer, 95 pages, Crown Publishers, $15.95.

Environmental Education in Australia, by Russell Linke, 230 pages, Allen & Unwin, Inc., $17.50.

Ralph Edwards of Lonesome Lake, as told to Ed Gould, 293 pages, Universe Books, $12.95.

The Great Unwanted Want Us, Illegal Aliens: Too Late to Close the Gate? by Robert and Leona Rienow, 181 pages, Viewpoint Books, P.O. Box 1896, Monterey, California 93940, $4.95.

Handbook of Audubon Prints, by Lois Bannon and Taylor Clark, 122 pages, Pelican Publishing Company, $9.95.

A Search for Environmental Ethics, An Initial Bibliography, by Mary Anglemyer, Eleanor Seagraves, Catherine LeMaistre, 119 pages, Smithsonian Institute Press, 900 Jefferson Drive, S.W., Washington, D.C. 20560, $8.95.

The World of the Tent-Makers, a Natural History of the Eastern Tent Caterpillar, by Vincent G. Dethier, 148 pages, University of Massachusetts Press, $12.50 cloth, $5.95 paper.

Soil and Water Conservation For Productivity and Environmental Protection, by Frederick Troeh, J. Arthur Hobbs, Roy L. Donahue, 718 pages, Prentice-Hall, Inc., $24.95.

QUESTIONS AND ANSWERS

CONDUCTED BY PAUL KELSEY

T. J. Frutchey

Fox and Raccoon Population

I have been hearing of all the raccoon and fox that are being taken from the woods—35 to 40 per person by trap or gun. They say they are finding them in their homes or nests. Please push for a season on them, and work for its enforcement. Please stop these people before it is too late.

Unsigned from Brockport

You are unduly concerned about the welfare of the fox and coons. Hunters and trappers are not taking so many from the woods that their numbers are in jeopardy. We already have seasons which control when these, and other furbearers may be taken. If too many are removed, we most certainly will reduce or close the seasons, just as we have done in the past. The only time that fox have dens where they could be trapped is in the spring when they are rearing their young. At that time, the season is closed, and their fur is not prime, so it is of little commercial value. For years it has been unlawful to either cut down a den tree to get a raccoon, or to build a fire to smoke it out.

- Please *print* name and return address clearly on both letter and envelope.
- Mail all questions to 50 Wolf Rd., Albany, N.Y. 12233.

Trillium Mutation

Enclosed is a photo of a trillium I found this spring in our woodlot. We have three species of trillium, but I have never before seen one with green and white petals. Is this a different species, or just a mutation or sport?

T. J. Frutchey, Fairport

You have an interesting mutation or sport of the white trillium. During the last couple of years I have noticed more sports among trillium than among other flowers. Whether this is actually the case, or just coincidence, I don't know. Most of the trillium I have seen have been variations of the red trillium. Because of the proximity of the white trillium in the photo, I suspect yours is that.

Evergreen Patches

What is occurring in the Catskills that causes evergreens to grow in large separate patches along the top and side of the range? I noticed this splotchy effect while driving down into the Village of Maple Crest. It appeared that no other evergreens were growing outside these dark, distinctly separate patches.

Clare McDonald, Kingston

There are three situations where one can get plant patterns such as you describe. First, as the result of soil, drainage and slope aspect, different environments result in different plants growing. The different color of the foliage stands out to separate the different plant associations. Second, where fire burns through evergreens, it is followed by aspen and birch, which clearly show as different plant groups. In the first case the boundaries are very vague, while in the second the line between is sharp. What you saw is the third possibility, that of coniferous plantings in abandoned fields. Coming down into Maple Crest you can see some of the reforestation that was done on state land when it was acquired as part of the Forest Preserve. The ridges in that area are naturally covered with hardwoods. Reforestation areas normally take the shape of the rectangular or square abandoned farm fields, showing the straight line so characteristic of man's work.

Albino Canada Goose

We had a flock of geese land on our pond this spring. Five were normal Canada geese. The sixth appeared to be an albino with a few gray markings, and was the same size as the others. Is this unusual, or is it a cross with some other species of goose?

Mrs. Arthur A. Charron, Ancram

A white goose with a flock of Canada geese would be either a snow goose or an albino Canada goose. Statistically the odds are in favor of it being a snow goose, which is smaller than a Canada goose, and is easily identified by the black tips of its wings. Albinos do occur on rare occasions. I have seen just one in all my years of watching geese in the fields around Cayuga Lake during spring migrations. On that particular one, the dark neck and head showed through as a very faint gray, so it could be positively identified as a Canada. The snow goose and Canada goose are of two different genera, so there is no chance that it was a cross between the two.

Tree-Climbing Woodchuck

Recently while working in the woods I discovered a woodchuck in the upper branches of a black cherry, probably 35 feet above the ground. The tree was growing at an angle, which would have made it easier to climb. Have I seen the first tree-climbing woodchuck, or is this not unusual?

Van Vechten Graves, Bennington, Vt.

Woodchucks often climb short distances to good vantage points, such as the top of a fencepost. On several occasions I have seen them well over head-high in trees, but never as high as the one you describe. The fact that the tree was leaning probably was a factor in its being so far off the ground. Woodchucks are climbers, but they definitely feel more at home on the ground.

Light Sensitive Earthworms

In an old issue of THE CONSERVATIONIST *it says that earthworms have no eyes, that they only sense dark and light. When I shine a bright light on one, it quickly draws back into its burrow as though it could see. How can they sense light so fast?*

Wilma Gleason, Hunt

A worm's skin is sensitive to light, causing the muscles around the pores in their skin through which they breathe to constrict, thus making the animal feel uncomfortable. They respond by going back into their hole where it is dark and comfortable.

Ear-stones

As a youngster I used to remove a white stone from the temple area of sheepshead (drum fish). Recently I was given one which I have enclosed. Anything you can tell me about its function and composition would be appreciated.

Bradley Radka, Derby

The button-shaped white stone from the sheepshead is commonly called an ear-stone, for it is part of the inner ear of the fish, having a function in its balance or equilibrium. Scientifically it is referred to as an otolith. It is made up primarily of calcium and grows discontinuously, causing layers to form. When a stone is sectioned, these layers show as rings, just like the annual ring in a tree, and similarly can be counted to determine the age of the fish. In ancient times it was assumed to have medicinal effects, and was often worn on a string around the neck as a prevention or cure for colic. They have been found in Indian middens, showing that sheepshead was an important dietary item. The size of the otoliths found indicates that sheepshead in those days grew to be in excess of 100 pounds, which is much larger than any taken since they were subjected to heavy commercial fishing of the last hundred years.

Paul Kelsey

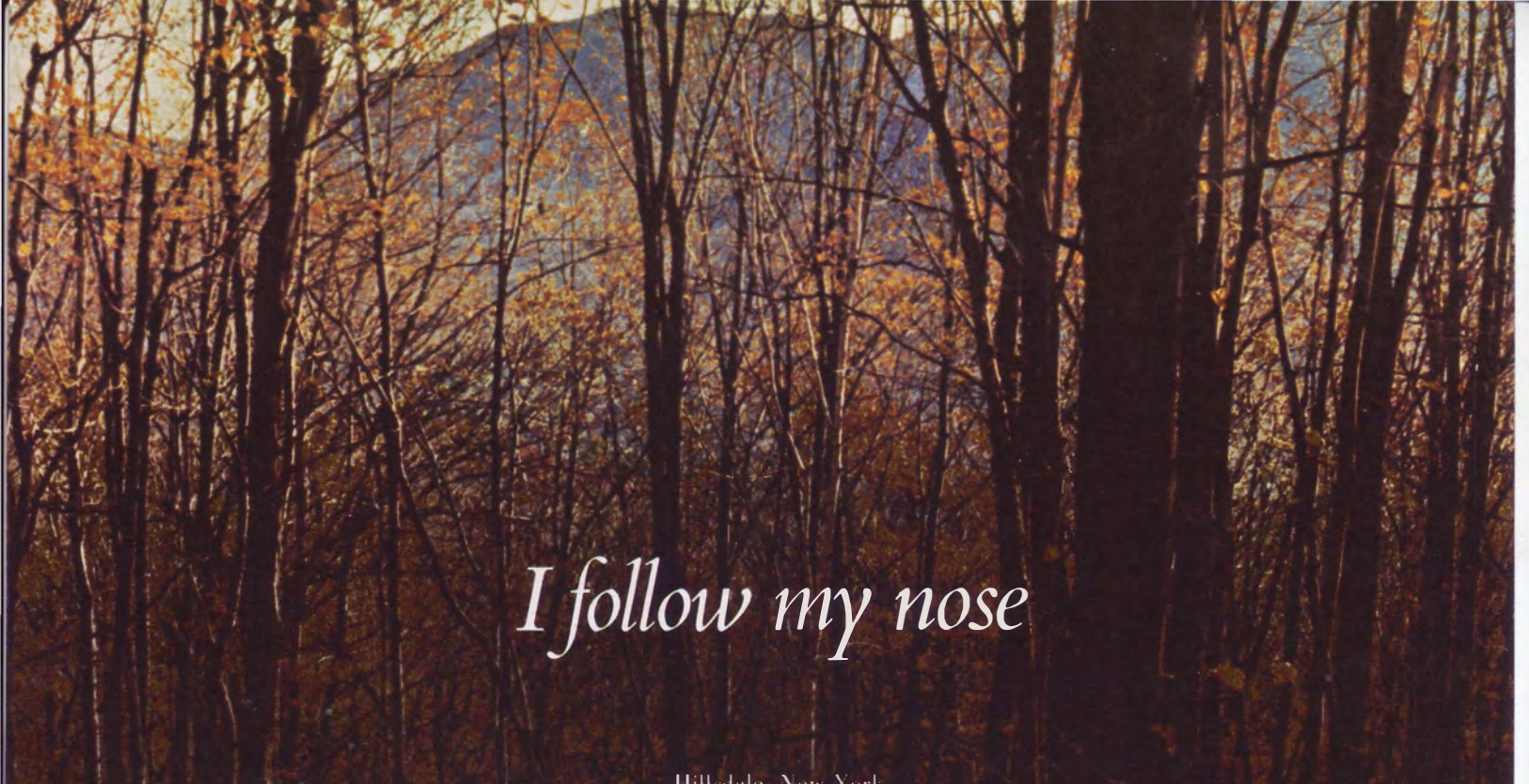
Ear-stone of sheepshead

Bat Control

We have a large number of bats living in the overhang of our roof right near the peak. I would like to have these non-rent payers evicted. Since they are environmentally beneficial, I don't want to do them any harm. I don't think I can do it myself because it is too high, and the little creatures scare the daylights out of me. Can you direct me to the Society for the Prevention of Cruelty to Bats, or give me help in some other way? Thank you!

David Parkison, Wolcott

Bats do not like the smell of naphthalene flakes or paradichlorobenzene. I assume that you have access to the area under the ridge where the bats are spending the day. Liberally sprinkle some of these moth and insect repellents in the area. Their fumes will quickly cause the bats to vacate. Three to five pounds will usually be enough for the typical attic. Since these dissipate upon exposure to the air, repeated applications may be required if no other action is taken. If you can find the openings through which they are gaining access, close them with wood, screen or metal. Bats can crawl through cracks as small as ⅜", so you should check old siding and cornices carefully. This type of opening can be filled with oakum, or similar packing material, and then sealed with caulking compound. The smell from an old bat roost persists and attracts new bats later. If you do not close all access to the roost, you may find them returning in the future.



I follow my nose

Hillsdale, New York

SOME there are who seek always with their eyes, and know happiness in watching the drift of clouds across the sky or the first faint suffusion of green among alder-thickets in the spring or the flash of a bluejay's wing in October woods. Others there are who seek with their hands, and know contentment in the feel of grass or of ripe apples or the pitch-fragrant bark of hemlock trees. But I am not like these. Mostly I follow my nose.

Yesterday I followed it, and it led me up the slope of the venerable mountain that rises behind my cottage and is called Phudd Hill, and it told me that autumn is here. I did not need to see the bronze leaves of the maples, or hear the queer little lisping notes of the first snow-birds in the blackberry tangle or mark the dropping of a thousand pine-cones in the woods. I could close my eyes to these and have my information still. Autumn had come and a horde of "wild scents and subtle essences" were its accompaniment and its symbols.

Predominant, as always it must be in the autumn scene, was the pervasive acrid-sweet of wood smoke. . . . But not alone by wood smoke is the coming of autumn made known. To that smoky fragrance there is a thin sweet undertone; it is the smell of apples. There is no subtler fragrance in all the countryside, and few closer to the heart of autumn, than this which comes in October days from the orchards. Even here, high on Phudd Hill, has come the scent of the pippins that are lying in the meadow grass far below, and it mingles with the smell of the junipers and hemlocks all around me. With the wood smoke it has saturated these crimson maple leaves, these crackling leaves of scrub-oak and these dry twigs of alder, until as I scuffle through them I can smell in the air the very heartblood of the season. He who stands upon a wooded hill, "solitary, smelling the earth smell," has no need of calendars.

There are white-throats in the birch thicket and they zig-zag and flutter in the gusty wind like withered leaves. The thin birch branches have never been as white as they are now, leafless against this blue October sky. In the wind they scrape and creak together, and tiny twigs and little stems of leaves patter on the floor of the woods.

But as I scuff through the dry leaves and send the white-throats veering away in frightened flight, my mind is not upon these things. The autumn shows to my eyes the frost-whiteness of the birches and it brings to my ears the rattling outcry of the lean crows that sail before the wind high over the tops of the cedars. But it is in neither of these fashions that autumn has suddenly brought an exultant happiness to my heart and exhibited to me her very kernel and spirit. No, it is not in these fashions. It is by this sudden scent that is in my nostrils, this scent that is as stirring as the fragrance of spring rain. It comes from this little clearing among the scrubby oaks and pines; I push through quickly and find—a hickory tree.

It is tall, as tall as a house, and the October winds have stripped the last brown leaf from its shaggy-barked branches. And now on the ground, in the great circle spanned by the spreading branches, the carpet of hickory nuts is ankle-deep. The gray squirrels, my co-tenants of Phudd Hill, have been here before me, and the kernels are few among the husks. But that does not matter. For it is from the green husks, drying there among the fallen leaves, that the warm autumn sun has evoked this smell which now is in my nostrils and my lungs.

I pick up a handful of husks and bury my nose in them: I have come as close as a man can come to the heart of autumn.

—Alan Devoe

Phudd Hill

Joe Tuton

Earth Almanac

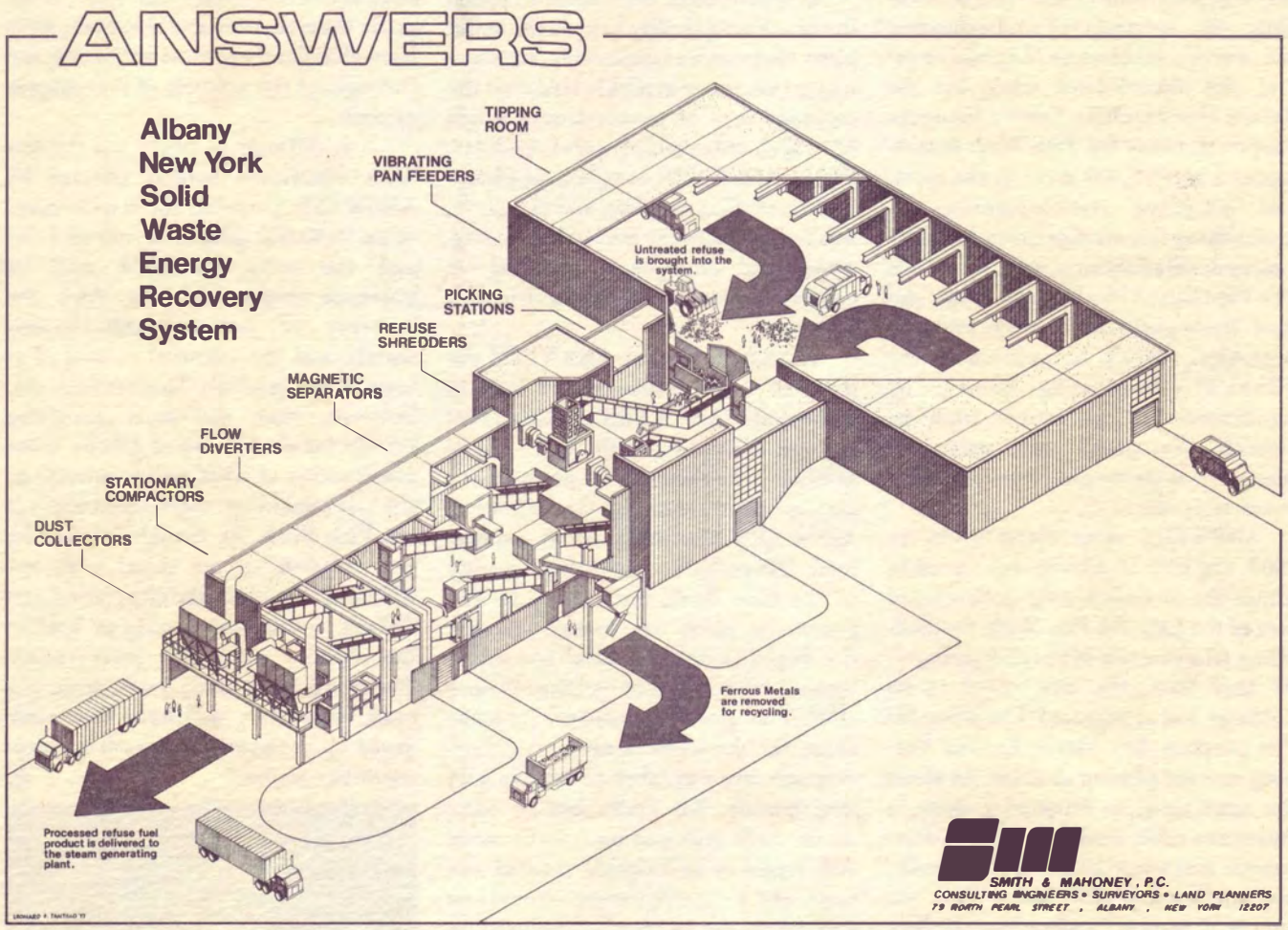
(Continued from EQN III)

cost-share incentives and technical expertise to install conservation practices which control runoff and reduce erosion. Because of success of the innovative MIP barnyard package in Delaware County, within a year the existing ACP was modified to include the barnyard package on a nationwide basis. Jim Crane, County Executive Director for the ASCS, who administers the county ACP stated, "The MIP provided broader interpretation for the existing ACP."

Too often, the old "economics vs. the environment" cliche is heard in rebuttal to policies and programs which preserve our soil and water resources for future generations. The whole MIP approach is to convince everyone that a volunteer cost-share program is a viable solution not only to non-point source agricultural pollution, but is also economically practical and beneficial.

Paul Mattern, Delaware County Cooperative Extension Agent, sums it all up, "It is a pleasure to be associated with a program that benefits all; by improving water quality while still having a practical pay-off on the farm."

Rick Weidenbach is employed by the Delaware County Soil and Water Conservation District as program aid for the West Branch MIP. A 1978 graduate of SUNY/Plattsburgh, where he specialized in planning and resource management, he lives in Mundale, a small hamlet in Delaware County.



ANSWERS for the Pine Bush

by Ellen A. Picotte

AT 8:30 a.m., a massive garbage truck rumbles along the newly paved one-way lane bordered by pitch pines, scrub oaks, and wind-blown dunes of eons ago. It winds its way through Albany's Pine Bush to a long, low, industrial type building where the round-bellied vehicle unceremoniously spews its cargo on the concrete floor. When empty, the truck moves on, only to return two, maybe three more times during the day to discharge society's castaways.

The packer truck is but one of over a hundred or so such vehicles transporting tons upon tons of ordinary residential refuse to the Albany Landfill site. But today, instead of unloading reams of paper products, plastic soda bottles, and obsolescent household objects atop one of New York's most unique ecosystems,

these items are turned over to machinery that grinds, slashes and shreds the stuff into a fuel used to heat and cool the monumental Empire State Plaza. The process is known as ANSWERS, the Albany, New York Solid Waste Energy Recovery System, and its use will preserve over 300 acres of pristine Pine Bush land.

The Pine Bush, like the Pine Barrens of Long Island, is a direct descendant of the last Ice Age. It supports an incredibly rare and specialized plant and animal wildlife including the majestic pitch pine *(Pinus rigida)*, shadblow or serviceberry *(Amelanchier canadensis)*, wild lupine *(Lupinus perennis)*, the elusive buck moth and the Karner blue butterfly. Once a 40 square mile tract, today the Pine Bush encompasses a mere 3,000 acres at the most, and on-going developments are diminishing this acreage every day. (For a more detailed account, see "Why Save The Pine Bush?" by Craig Doremus and Paul Kerlinger, THE CONSERVATIONIST, Sept.-Oct., 1979.) In addition to the "Bush's" fascinating beauty, its significance for us ranges from its superb biological and geological specimens to its natural water purifying characteristics.

ANSWERS came about when, in 1969, the City of Albany was forced to utilize the last remaining undeveloped area of the City, the Pine Bush, for landfilling (the practice of burying garbage). At that time, the city added to its holdings and designated 116 acres for this purpose, but Mayor Erastus Corning was not pleased about it. At about the same time, he initiated a study to determine other workable disposal alternatives that would be both economically and environmentally safe. With the help of 50 percent funding from the New York State Environmental Quality Bond Act funds, ANSWERS was the product of that study.

Today, ANSWERS is part of the emerging resource recovery industry in the U.S. (recovering energy from waste is not new, however; Europeans have been doing it for over 25 years). Sponsored and built by Albany and the State of New York's Office of General Services (OGS), ANSWERS involves the residents of Albany, Schenectady, Saratoga and Rensselaer counties. Fourteen communities within these counties daily transport 750 tons of refuse to the city-owned processing facility. The system at the plant is simple: waste is shredded and ferrous metals are magnetically recovered. Unburnables, hazardous and bulky items (tires, gas cans, and bedsprings, for example) are removed prior to shredding. The shredded material, the fuel, is then shipped to OGS's new Sheridan Avenue Boiler Plant in downtown Albany where steam is generated for heating and cooling purposes.

It would have been ideal to locate the processing facility next to the boiler plant. But this was impossible, for there was no vacant or available land, and the constant flow of packer trucks would have been unbearable for area residents. So the ANSWERS complex, an administration/office building and the plant, was built adjacent to the landfill on city-owned land. The spot was secluded, yet centrally located to all four participating counties.

From its inception, ANSWERS was destined to be different, not only in technology (ANSWERS' shredded fuel concept is the first in the U.S.) but in aesthetics. Armed with the notion that a garbage plant need not be offensive, ANSWERS was designed to complement and preserve the intrinsic quality of the Pine Bush, not destroy it. The processing plant was nestled amongst the dunes (a natural visual and sound barrier) in an area that had already been cleared by previous owners. To make room for the administration building, extreme care was taken to remove only that growth that really had to come down. Each tree and bush to be saved was tagged with brightly colored ribbons, and a snow fence was erected just a foot from the building's foundation to prevent construction workers from trampling the sensitive growth beyond that point. To unite the administration building and the plant, an 84-foot wooden bridge was built through the vegetation and across the dunes. This bridge has come to represent a link between the environment (the Pine Bush) and conservation of our natural resources (fossil fuels and virgin materials).

Visitors to the plant are never quite sure whether they are going to see a garbage plant or a nature preserve. They are greeted at the site by a number of informational signs describing the Pine Bush's origins, flora and fauna. Invisible to nearby residents and passing motorists because the color scheme of the plant was chosen to blend with the sandy loam of the Bush, even visitors do not get a glimpse of it until they step on the bridge.

The landfill site is closed for the most part: a portion must still be used to dispose of the rejected material from the plant, like tires, long, thick cables and the like. Nevertheless, in an effort to upgrade the area, trees and shrubbery have been abundantly planted at the site, and throughout the grounds of the complex as well.

It is difficult to single out the one most significant benefit effected by ANSWERS. Certainly the displacement of up to 40,000 gallons of fuel oil a day and the costs associated with its purchase ranks high, as does the recovery of non-renewable ferrous metals, and the eventual closing of at least 10 area landfills. There is no doubt, however, that the most gratifying benefit for the citizens of Albany is the preservation of what may eventually be the last remaining undisturbed lands of the Pine Bush. As though inspired by the decision to go ahead with the ANSWERS project, the city started purchasing contiguous parcels of land in the vicinity solely for preservation. These are lands that, years down the road, might very well have been swallowed up in the endless march of creeping urbanization.

Ellen A. Picotte received a B.A. from Marymount College in Tarrytown, N.Y. and is a technical writer and occasional photographer for Smith and Mahoney, Consulting Engineers, designers of the ANSWERS system. She also guest lectures for various schools, colleges and community groups.

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