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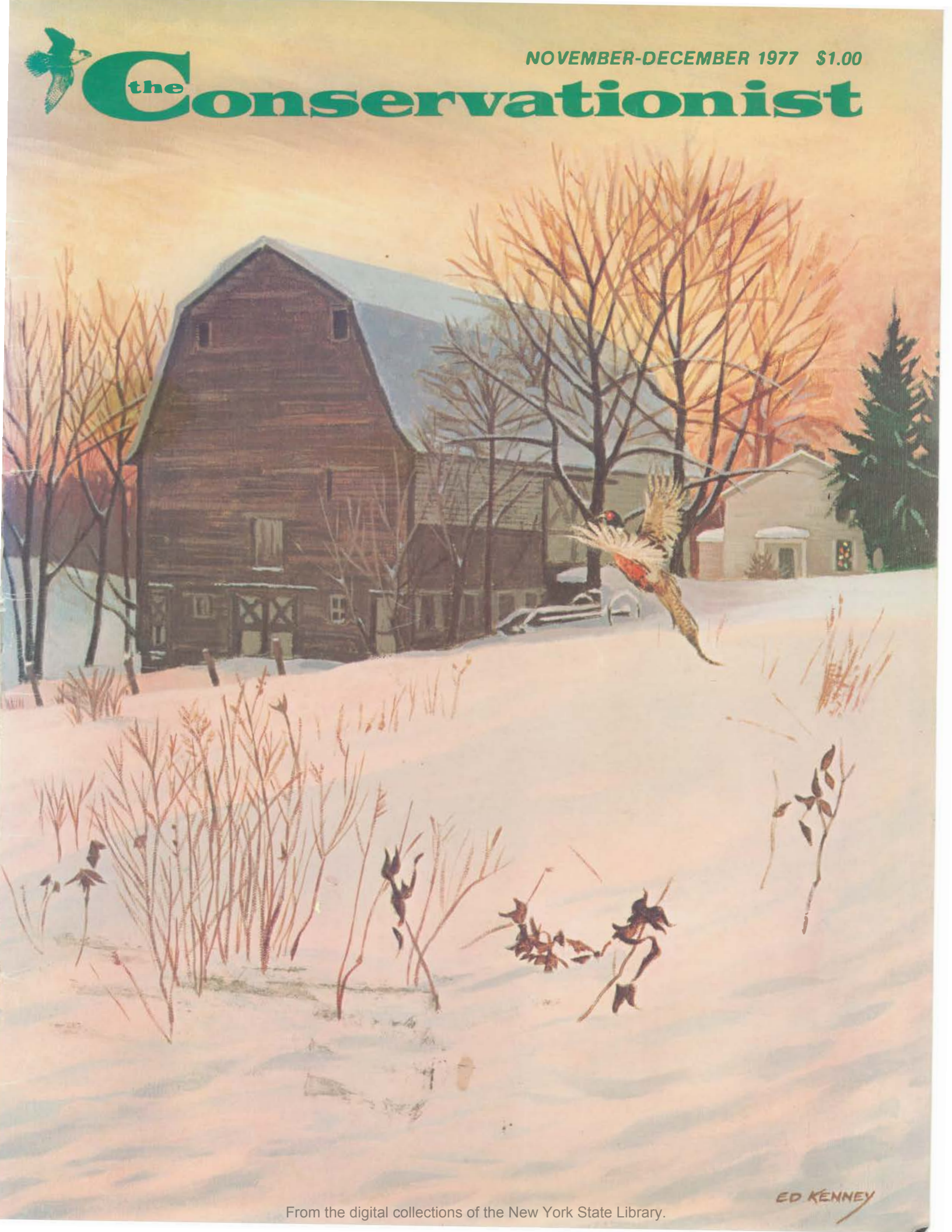
the Conservationist



Volume 33, Number 3 / November-December 1977

Editorial and Publication Office: 50 Wolf Rd., Albany, N.Y. 12233 / Circulation Office: P.O. Box 1500, Latham, N.Y. 12110.

The Conservationist is an official publication of the N.Y.S. Dept. of Environmental Conservation, published bi-monthly at the department's office, 50 Wolf Rd., Albany, New York 12233. Subscriptions $3.50 per year, 2 years $6, 3 years $9. Special rate of $2 per year for subscriptions received by a primary or secondary school in New York State, or at such schools by teachers. CHECKS OR MONEY ORDERS ONLY. Magazines not delivered through failure to send change of address six weeks in advance cannot be replaced. Second Class postage paid at Albany, N.Y. and additional mailing offices. Printed in U.S.A. POSTMASTER (Re undeliverable Second Class matter); Send form 3579 to THE CONSERVATIONIST, P.O. Box 1500, Latham, N.Y. 12110.

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EDITORIAL

More Than Half a Loaf

THE story is attributed to President Lyndon Johnson when he was majority leader of the Senate. A reporter, in discussing the failure of the Democrats to achieve most of their goals during that session of Congress, remarked: "Well, Senator, half a loaf is better than none." To which the celebrated Texas arm-twister replied, "Half a loaf, hell! — sometimes even a damn slice is good." With this homely analogy Mr. Johnson expressed an idea which lies at the heart of a working democracy — that because there is always another point of view which must be presented, discussed and even fought over, the whole process takes longer, and what finally emerges is a compromise, a reconciliation of opposing viewpoints. And if the party doesn't get exactly what they wanted — well, there's always next year.

So, despite some defeats and delays, environmentalists have managed to get a few more slices from the environmental loaf in 1977, particularly on the state level.

On the national scene, the biggest disappointment involves the powerful, if not unexpected, opposition to the administration's energy-saving program, a program so comprehensive, so urgent in its necessity that we personally fail to see why some of its provisions have failed to be enacted even as of this writing. John Gardner, chairman of Common Cause summed up the ferocity of the opposition to Mr. Carter's program when he remarked, "The President's energy program requires sacrifices by everyone—yet each special interest is clawing away at the program to eliminate its particular sacrifice." But we do not think that Americans, with memories of the bitter winter of 1976-77 still fresh in their minds, will suffer the Congress to drag its feet too long on this all-important issue. Despite some very fundamental differences in opinion, who can doubt that 1978 will see the emergence of a viable energy program.

In New York State, there have been a few setbacks, most notably the Mirex contamination of Lake Ontario which had led to widespread restrictions on fishing. And despite a settlement with General Electric, there is still a problem with PCB's settling on the bottom of the Hudson River, a problem that at present does not admit of easy solutions.

But there have been some important gains. Completion of a survey of toxic substances used in New York manufacturing and the collating of this information into the existing industrial waste permit program will prove to be of immeasurable value in toxic substances control. And in a settlement of a proceeding against Agway and the Felmont Oil Corporation of Olean for pollution of ground water, DEC has firmly established the principle that "the public should not have to pay for the removal of pollution caused by private firms which damage or destroy public resources."

In addition over one million dollars in construction grants were processed as part of the state's Clean Waters Program, another step forward in the solution of source pollution problems. And finally an amended State Environmental Quality Review law (SEQR) puts new teeth into current regulations requiring developers and municipalities to prepare comprehensive environmental impact statements.

All this is good. But to return to Mr. Johnson's analogy, we should not feel satisfied until we get the whole loaf. Maybe 1978 will be the year.

American Rough-legged Hawk

Painting by Wayne Trimm

Winter Hawk

by James F. Traynor

Photos by Author

FOR three or four years we lived on a farm whose fields had lain fallow for a number of seasons before our arrival. By then they had become populated with the creatures and plants common to that type of habitat. Gray dogwood had filled in some of the corners and bobolink and vesper sparrows sang in season. Not far from the house a solitary elm stood in a fence row, a strategic position taken advantage of each winter by several rough-legged hawks. Because of the different color shading ranging from very light to almost black, I was able to tell that at least three and possibly more hawks made seasonal use of the elm as a hunting perch. There was a clear view of the tree from our bedroom window and I would watch as during the mornings and evenings the hawks hunted the fields. There is something about raptors in general that attracts me but for the rough-leg I have a particular affection; they are formidable but amiable, alert but not suspicious, and given to a sometimes remarkable exuberance.

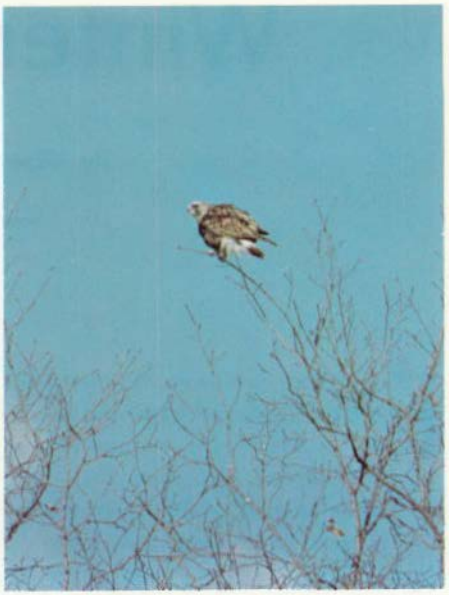
On one windy day in early November, I watched five of these birds engaged in what seemed to be a kind of good natured, brawling roughhouse. In one maneuver, as a hawk plummeted down on another, the lower bird suddenly swung over on its back, thrusting out its talons: catastrophe seemed to be avoided only by inches. Meanwhile the others skimmed close to the ground at great speed suddenly darting upwards, sometimes circling each other as they rose into the sky. There were just five but the air seemed full of hawks. It was certainly not the breeding season and their intentions toward each other were not hostile although there may have been and probably were gestures of courtship and aggression involved in their behavior. The combination of a mild, windy day perfect for flying and bellies full from the morning hunt were probably what caused them to indulge in their antics. They were simply playing, celebrating the moment with aerial abandon.

Rough-legs are normally more sedate in flight. Like marsh hawks they often skim low over a field, cutting back and forth on the hunt but they do not display the virtuosity of the smaller harrier; a rough-leg's flight is more purposeful, more businesslike. This difference and the slimmer wings and tail of the marsh hawk make it easy to tell the two species apart. Frequently the rough-leg will hover low over a field, wings outstretched and beating with short, rapid strokes much like a sparrow hawk as it watches for movement below. The sight of such a large bird suspended in the air is arresting and it is a distinguishing characteristic of the species.

The principal component of the rough-leg's diet in his winter range is the meadow mouse or, more correctly, meadow vole. Buteos, the broad-winged soaring hawks of the sub-family Buteoninae, to which the rough-legged hawk belongs, are all rodent specialists. But like many animals hawks will adjust their habits somewhat to take advantage of a promising situation.

Near where we live now there is a nursing home with spacious grounds, around the wooded edge of which I regularly walk my dog. For awhile last fall it was not uncommon to see four or five rabbits foraging in plain sight and to hear the sounds of others running into the woods as I passed. Suddenly they became scarcer or more cautious and I noticed evidence of the remains of at least three rabbits, all marked by tufts of fur attached to very small pieces of hide, a good sign of a raptor kill. The question was, which raptor?

Rough legged hawk in dark phase



and in normal phase

A barn owl was in the habit of using our willow tree as a dining room to which its shed feathers and regurgitated pellets gave witness but I doubted that it was the rabbit hunter. An examination of the fresher pellets crammed with the discarded hair and bones of its prey showed no evidence of a change from its normal diet of mice and rats. Either a great horned owl or a red-tailed hawk were more likely possibilities but I was surprised that either would hunt so close to houses and, particularly, the nursing home with its round-the-clock activity. The mystery was solved when near dusk one day I heard the mobbing caws of crows and saw the familiar upright shape of a rough-leg perched on the limb of a dead elm. While I was concerned with other things autumn had sneaked up on me and I had omitted including the rough-leg in the list of possibilities. Comparatively less wary of man and attracted by rabbits that were probably unused to effective predators, I believe this rough-leg found the pickings easy and was hunting right in the middle of town. A few weeks later its forays ceased. I assumed it had either returned to its customary haunts outside the village or been shot by someone ignorant of the law and the bird's ecological benificence.

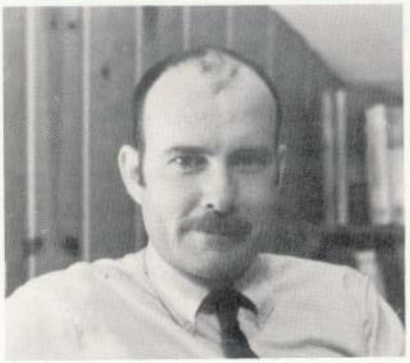
The snows come early in northern Canada, the breeding range of the rough-leg, making it more difficult for it to capture the lemming, its principal source of food. With the increasing cold the hawks are probably unable to maintain their energy balance and so must gradually move south following the edge of winter. They reach our latitude in late October or early November concentrating locally, usually not far from water, and where the supply of meadow mice is abundant. The Ontario lake plain is reported to be one of their favorite winter homes but my experience with them has been in the Albany area.

The farm I mentioned earlier is located on the plain just north of the Helderberg escarpment in the Town of Guilderland near Albany. It is there that I have made my lengthier observations of individual rough-legs but the place where I have seen them in greatest concentration is along I-787, the superhighway running along the Hudson river between Albany and Troy. The two sites could not be more different from a human point of view: the first bucolic, serene; the second industrial, frenzied. But the rough-legged hawk is concerned with meadow voles not with the vagaries of man. The larder must be full to bursting in this narrow strip of open land between Albany and Troy because I have seen as many as six or seven birds along the road at one time. Frequently there will be two or three within a very short distance of each other. Whether they actively seek each other's company or are merely sharing a heavy concentration of mice I don't know but I suspect it may be a combination of both.

I once saw a rough-leg leave its perch and fly across a field to a tree occupied by an exceptionally large red-tail, probably a female. On landing above and to one side of the larger hawk the rough-leg gave a not unfriendly cry, cocked its head to one side and peered down at its hostess. The red-tail at first ignored this unseemly intrusion into her affairs and then, shifting position in apparent irritation, gave a short and angry sounding response; the rough-leg, after a moment of uneasiness, flew back across the field.

The rough-legged hawk, or *Buteo lagopus* as it is scientifically named, is circumpolar in distribution with the North American race given the subspecific designation *sancti-johannis*. The bird ranges from 20 to 23 inches in height with a wingspan of 50 to 54 inches, the female tending to be the larger of the two. There are two phases, light and dark, with gradation between these extremes. The lighter birds predominate in our area and can be recognized as they fly overhead by their dark belly bands and the dark wrist patches on their wings. Both phases have tail feathers that are white at the base with a dark subterminal band except for immature birds whose tails are barred. When seen from above as they wheel low over a field they show a white patch at the base of the tail.

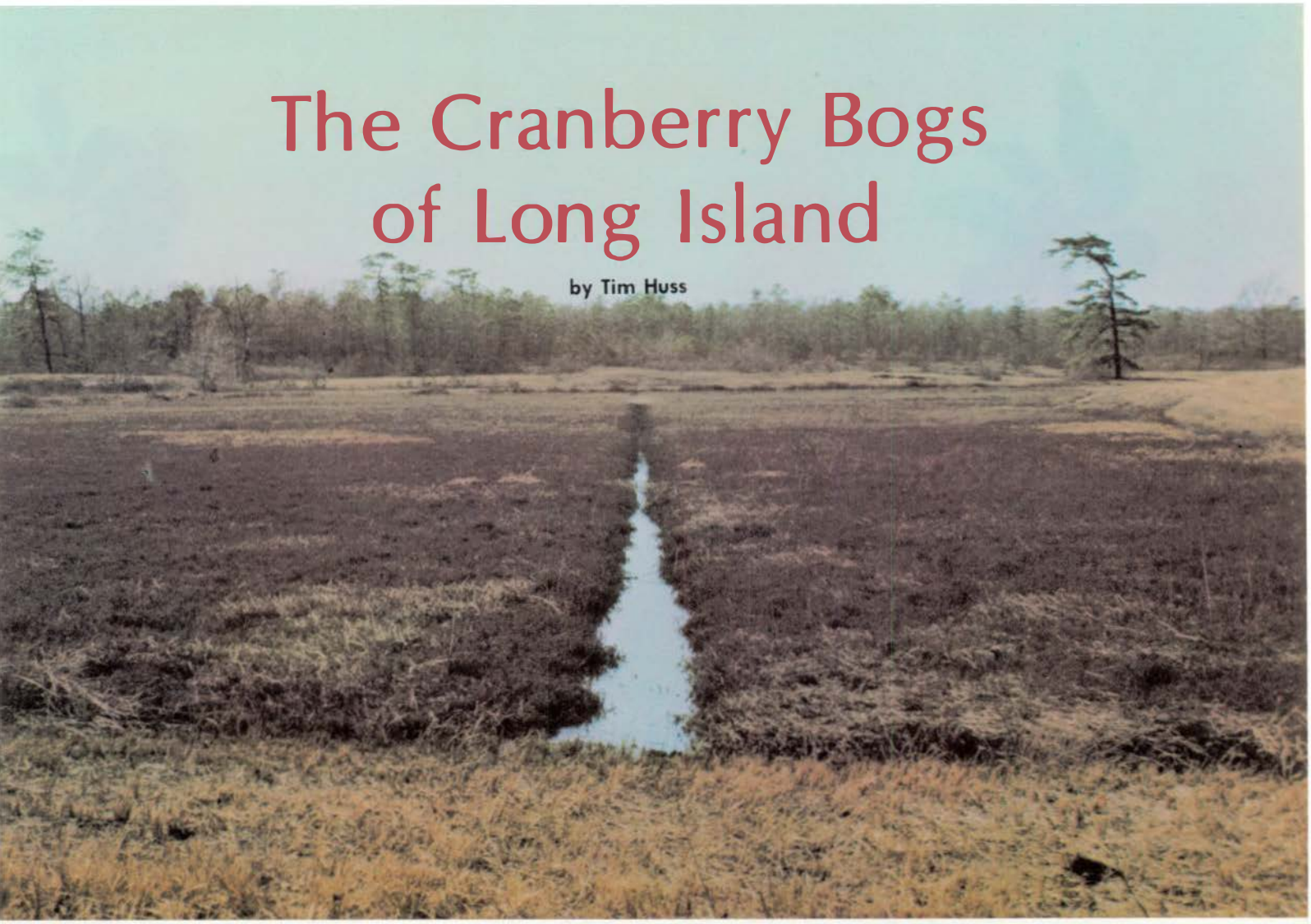
The common name rough-leg no doubt comes from the feather leggings that can be readily seen as the bird walks about on the ground. But I think of him as the winter hawk and when he appears I know the snow will soon be crunching under my boots.



James F. Traynor is a free lance environmental consultant with degrees in biology (CUNY) and ecology (Oregon State University). He teaches part-time at Hudson Valley Community College and lives in Guilderland Center, N.Y.

The Cranberry Bogs of Long Island

by Tim Huss



An abandoned cranberry bog Tim Huss

NEARLY everyone has enjoyed the several products derived from the fruit of the cranberry, but few people are familiar with the ecology of this interesting plant or the role it has played in many local economics and histories.

Today the cranberry industry is an important part of the agricultural economy only in Massachusetts, New Jersey, and Wisconsin. But many other parts of the country were at one time involved in cranberry production. New York State's easternmost county of Suffolk was once the third largest producer of cranberries in the nation. Although the Long Island cranberry industry was wiped out by a series of disasters culminating in the great cancer scare which removed the fruit from our Thanksgiving and Christmas tables in 1959, all is not lost. The Cranberry Bog Preserve near Riverhead is now a mecca for students of unusual plant and animal life, as well as a haven for people who simply enjoy a tranquil oasis in a rapidly growing population center.

The Pilgrims along the coast of Massachusetts were introduced to the cranberry by the Indians. Soon they were harvesting the fruit each fall. In addition to a delicious sauce, the Pilgrims made a brilliant red dye from the fruit.

Commercial cranberry farmers had to imitate what the coastal Pilgrims had naturally: flooding in early spring and in the fall to protect the blossoms and fruits from frost damage, and sanding in the spring to provide a good substrate for new shoots to root in and to keep down the number of weeds.

The cranberry has a large range extending from Minnesota to Newfoundland, and into Canada on the north, then south to Illinois, Ohio, New Jersey and the mountainous regions of North Carolina. Three different species cover this range: the mountain cranberry *(Vaccinium vitis-idaea)* of northern Canada and northern New England, and the small cranberry *(V. oxycoccus)* and large cranberry *(V. macrocarpon)* which cover the remainder of the range. The large cranberry is generally the more widespread species on the more southern coastal bogs and marshes. It is also the species from which most modern commercial varieties have been derived. Being members of the heath family Ericaceae, these plants are tolerant of sandy, acid soils typical of the bogs in northcentral and northeastern North America. So it was here in the wetland habitat of the bog that early settlers found the cranberries to be most abundant, its low creeping evergreen vine traversing the surface of the bog floor among the sphagnum moss, and other unique, rare and beautiful bog flora.

Bog habitats were a common site on Long Island when the first Europeans arrived in the 17th century. But, while

Large cranberry

the early settlers of Massachusetts, and later New Jersey, were soon developing a cranberry industry, Long Island settlers showed little interest in this fruit, other than occasional household ventures into the bog each fall to collect the berries for their homemade products. Islanders were more interested in farming other crops and developing their milling industry along the banks of Long Island's numerous coastal streams and rivers.

The relatively large areas of low-lying, freshwater wetlands along the banks of the Peconic provided ideal conditions for the creation of mill ponds. Consequently, the milling industry became a major part of the economy in Riverhead, a community that developed along the Peconic's banks. The water mills were used to power sawmills and grind grain.

But with the advent of the industrial age, gas and coal began to replace water

Painting by Adrienne Crawhurst

as a source of energy. Engines began to do the work of the old water mills, and by 1870, the local millers along the Peconic were desperate for an alternate source of income.

In 1870 Warren Hawkins and Bull Overton of Bayport experimented with cranberry plant cultivation with highly successful results, and the news spread quickly to the millers along the Peconic. By 1875, many of them went to work preparing their lands for cranberry production.

The requirements for cranberry production include an abundant supply of flood water from either a natural or artificially created body of water, an irrigation system of ditches, weirs and pumps, and low, level wetlands.

Once a source of flood water was established, the backbreaking task of ditch digging, dike building, and dam and weir construction had to be initiated. Generally, ditches were dug around the perimeter of the wetlands. This served to drain the wetlands so they could be worked more easily. All vegetation was then cleared away and the wetland was scalped, removing the upper four to six inches of vegetation and organic material, leaving a bare muck and sand substrate behind. The material that was removed from the wetland was used for creating dikes around the bog. Additional drainage ditches were then dug across the bogs, and the bog floor was graded to assure even flooding and to facilitate drainage. A weir was placed at each end of the bog, and flooded bogs were drained either by allowing the water to flow naturally downgrade to the Peconic or by pumping the water back into the main pond. When finished, the larger cranberry farms consisted of 10 or more separated bogs.

The final step before planting was to haul in sand and lay it on the bog floor to a depth of at least four inches. In this sand substrate, the cranberry vines were planted.

The laborious and time-consuming nature of the process is documented in the following from records of the Cranberry Bog Preserve Committee.

In 1885, two brothers, M.H. and S.H. Woodhull, purchased land near present day Sweezy's Pond and Wildwood Lake in Riverhead and began preparing it for cranberry cultivation. In the first year, working until the Christmas season, a small crew was able to prepare 10 acres, which were not sanded until the following spring. The cranberry vines were set in May 1886. During that same year, 15 more acres were graded. In the spring of 1887, these additional acres were sanded, using the muscle of as many as 35 men who were paid $1 a day to move sand in wheelbarrows which they pushed along planks out onto the bog. Once sanded, the 15 acres were then planted with vines imported from New Jersey and Cape Cod at a cost of $4 per barrel.

Not until 1889, approximately four years after the Woodhulls' first planting, was the first harvest made, and only 10 bushels were harvested and sold locally. In 1892, however, 21,600 bushels were harvested and sold for $2 per bushel—a huge success for a new industry. By the 1920's ten major bogs were in operation, employing 50 people year-round and many more during the harvest season.

From spring to fall the bogs along the Peconic bustled with activity. In the spring, winter flood waters were drained and vegetation was evident one or two weeks later. Flowering began toward the end of June and continued until full bloom was reached around the 4th of July. During the spring, protection from frost had to be afforded the blossoms. The flowering period was critical because the extent of pollination would determine the size of the fall crop. For this reason, honeybees were particularly important to the cranberry grower, and a bee's nest in the adjacent oak woodland was a cherished resource.

Although sanding in the spring helped to keep down the weeds on the bog, weeding was still an important job. It was a common sight in the old days to see gangs of weeders crawling over the bogs on hands and knees, pulling out weeds and throwing them into their weed baskets or using scythes to mow them down. As late as the 1930's these weeders were paid as little as 10¢ an hour. By the 1940's extensive use of chemical weed killers greatly reduced

Harvesting cranberries

the laborious task of weed control.

Several variables could affect the size of the harvest. Poor pollination during the flowering season, fungus diseases, viral diseases and insect attack were all potential threats to the cranberry farmer. Viral diseases like "false blossom of cranberries" could adversely affect fruit development. The black-headed fireworm *(Rhopobota vacciniana)* and the cranberry fruit worm *(Naevana vaccinii)* were well known for their respective foliage and fruit damage which could literally wipe out a year's crop. Up until the 1930's, however, there were no major problems with the Long Island cranberry crops, and autumn along the Peconic would find the bogs covered with harvesters. In later years a motorized picker resembling a gasoline powered lawn mower would rake through the vines and force the berries back into the catcher. Since there were no local processing plants, the berries had to be sold locally or rapidly trucked to New York City and other population centers.

Trucking and storage were critical operations. The stored crop was vulnerable to fungus rots and to breakdowns in temperature control. Optimum temperature for storage was 36 to 40°F, but this range was far from easy to maintain in the early 1900's. Crop losses of 30 percent or more were sometimes experienced by unlucky farmers. For these reasons, long distance shipment by truck was not possible.

After reaching its peak in the 1920's, the cranberry industry on Long Island began to decline. For one thing, the smaller bogs of the island could not compete with the larger operations in Massachusetts and New Jersey, and without a local processing plant the Long Island growers could not get as much money for their crops as could the growers in other parts of the country. By 1936, the number of major bogs in Suffolk County was down to about six. Then disaster struck.

The fireworm was suddenly a major problem. This insect would lay billions of eggs on the bogs in spring. The defoliating capability of the larvae was devastating, and elaborate spray systems had to be established to carry insecticide to all corners of the bog. Such a system was too expensive to be practical, so many of the remaining farmers gave up the fight.

A few growers managed to keep going but rising labor and trucking costs made it difficult to show a profit. Then, on November 9, 1959, the final blow was delivered when the Department of Health, Education and Welfare announced that the weed killer amino triazole, used extensively on cranberry bogs throughout the country, had been shown to cause cancer in laboratory mice. The cranberry industry all over the nation went into shock on "Cranberry Black Monday." The Long Island industry was all but finished. By 1965, only the old David marsh in Calverton was still in operation. In 1974, this bog also ceased commercial production. Long Island's cranberry days were over.

Drive the roads along the Peconic today and you can still see the remains of the old bogs. The Woodhull bog at Sweezy Pond is now a part of the Suffolk County Park system. The old David bog at Swan Pond is visible from River Road near the present day site of the Grumman plant in Calverton. No longer managed or harvested, the cranberry plants in the bogs have decreased as the other naturally occurring species have seeded in, taking their natural place in the bog ecosystem.

The naturalist finds these bogs unique and interesting habitats. Many species of plants that flourish on the bogs are difficult to find elsewhere on Long Island. There are the insect-eating pitcher plants and sundews, for example, and the rare and protected white fringed orchid. Animal life is equally unique, especially for an area where habitats are rapidly disappearing. The old ponds that were once so important as a source of flood water now support sunfish, chubsuckers, pickerel, and others. Amphibians and reptiles, like the large spotted salamander, pickerel frog, dusky salamander, green frog, hognose snake, milksnake, musk turtle and painted turtle, commonly use these wetlands for breeding and feeding areas. Song birds, shorebirds and waterfowl also find the bog and its surrounding aquatic and upland areas a reproductive feeding and nesting habitat. The list of mammals living on or near the bogs is long and varied—mink, skunk, weasels, muskrats, bats, and flying squirrels.

Besides providing habitat for a number of rare and unique species, the bog vegetation and soils act to filter out potential water pollutants and stabilize the watershed, thereby helping to maintain the water quality of the Peconic River.

For these reasons, environmentalists argue that the bogs should be preserved, and protected from development. The bogs that are still in private ownership, however, are subject to development and, with no other way to use these lands, many owners are looking for buyers. The fate of these bogs will be decided by the New York State Department of Environmental Conservation in hearings held under the present Freshwater Wetlands Law.

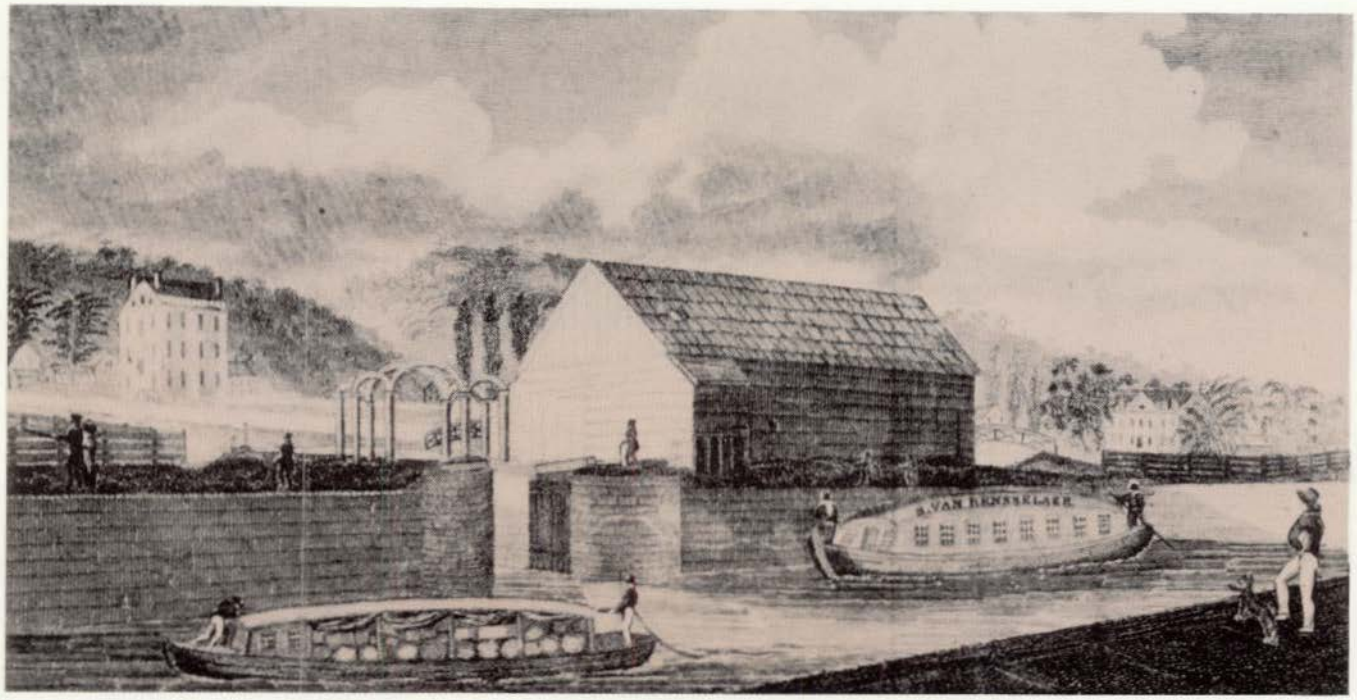
Fortunately the park system of both Suffolk County and New York State will protect many of the bogs. In addition to the County Park at Sweezy's Pond, a state park soon to be established in East Hampton at Napeaque Meadows will protect some last remaining patches of natural cranberry bogs. It is good that these wetlands are protected, for whether one is a naturalist looking for rare and unique species or just someone looking for a peaceful walk in the outdoors, the cranberry bogs are a beautiful and fascinating place to visit. Here during the season one can sample the fruit that was once so important to the local economy of eastern Long Island. The decaying weirs and dams serve as reminders of days gone by, when a few Long Island millers had to dramatically change their lifestyles and the shape of the land around them in order to survive along the banks of the Peconic.

Tim Huss is an Environmental Conservation Officer with DEC. A native Long Islander, Mr. Huss graduated from the SUNY College of Environmental Science and Forestry, at Syracuse and worked as a terrestrial ecologist before joining the department. Currently he is a part-time graduate student at Hofstra University.

A Special Section

The Wedding of the Waters

by Donald Tuttle



Entrance into the Canal in the Hudson at Albany

From Cadwallader Colden's memoir on the New York canals, 1825

ALTHOUGH it was a fine April day in 1817, the outlook for the Erie Canal bill was anything but bright. The majority of the state's Council of Revision wanted to scuttle it. Daniel Tompkins, Vice President of the United States and former Governor of New York, had come uninvited to deliver a lengthy tirade against this preposterous scheme which would consume resources needed for resumption of war with England. At last Chancellor James Kent had a bellyful of Tompkins' warmongering. Kent, after all, was the author of "Kent's Commentaries," which advocated an orderly approach to an orderly society, and he did not suffer fools gladly. Rising to call for a motion to order, he shouted: "If we must war, or have a canal, I am in favor of the canal, and I vote for the bill!" Truly one of America's unsung heroes, the chancellor carried a majority of the elder Supreme Court justices on the council with him, and the Canal Bill became law. And so thousands of men began to dig.

A map of New York State shows what they were up against: nothing less than a "Grand Canal," an ax-straight cut all the way west through the Mohawk Valley to the Genesee Valley, to join the waters of the Atlantic Ocean to the waters of Lake Erie. The Hudson River part of the route was all a traveler could ask for: nature had made it deep, wide, calm, with little current. The Mohawk River was just the reverse—dangerous during spring floods and impassable in summer droughts. Even when it was on its best behavior, everyone had to disembark while the boats were hauled around the falls. When the river became too shallow, wagons were hired and everyone rattled

Map by Amos Eaton from Cadwallader Colden's memoir on the New York canals, 1825

overland to Lake Ontario, there to pile into a lakeboat headed west.

As early as 1792, the Western Inland Lock Navigation Company had dug and blasted away with great zeal at Little Falls, but soon the enthusiasm and money were gone. The company did manage to construct small locks and dig a narrow canal which considerably eased the passage. The work was crude and never really completed, but it gave a hint of what a real waterway along this route would mean. For the first time, 10-ton flatboats could easily be floated past the rapids. This further increased westward travel through the Mohawk Valley, and sparked interest in an even cheaper inland route.

New York played with the idea of a lakes-to-the-Atlantic canal for two decades, and good men got themselves laughed at for their pains. An Irish immigrant named Christopher Colles first proposed inland navigation to an unenthusiastic New York Senate on November 3, 1784. In 1785 the Assembly voted $125 to Colles to draw a plan for removing obstructions from the Mohawk River. When he recommended river improvements costing £13,000, the lawmakers quickly changed the subject. Jesse Hawley's 1807 essays on the subject lost him his newspaper job because the publisher feared his readers would laugh his ragsheet out of existence. Legislators called the canal a "gutter," a taproom pipedream and, to a man, voted it down.

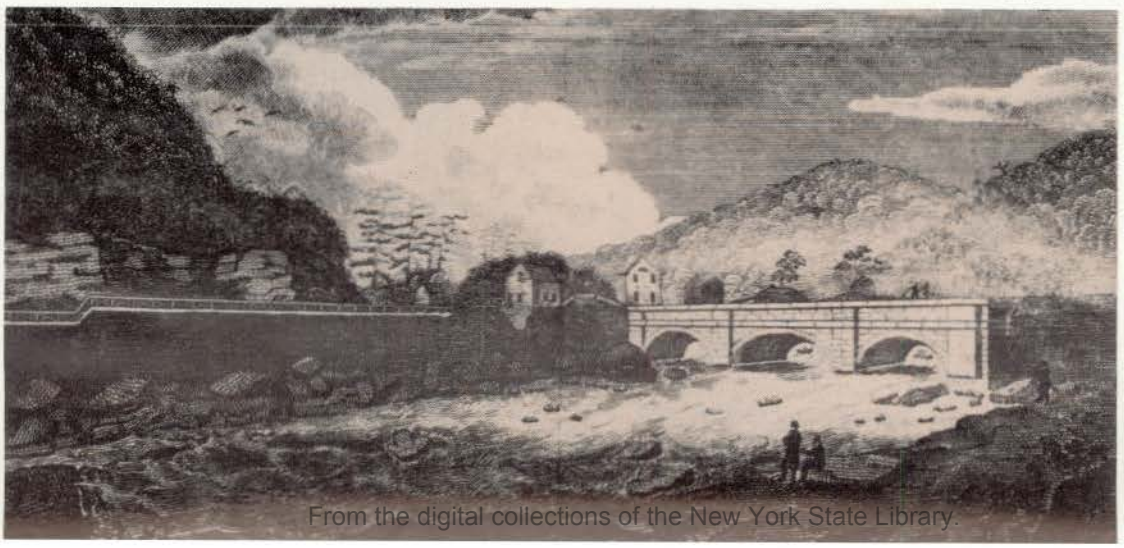
Despite ridicule the idea would not die, and in 1808 the New York Legislature voted $600 for a survey of the route, generously concluding: "It could do no harm and might even do some good." Equipped with maps, construction schemes, and land profiles, two legislators called on President Jefferson, who was rumored to be looking for a dramatic project which would stimulate the commerce of the country. New York got a robust and terse "No!" from the White House. Jefferson, usually several light years ahead of his time, perhaps favored his home state's bid to route all Lake Erie commerce through the Potomac River. Be that as it may, it was undoubtedly a mistake to include in the plans Gouverneur Morris' lunatic idea of an elevated inclined plane from Lake Erie to the Hudson, a river on aqueducts across valleys and punched through inconvenient mountains. Morris, a member of the First Continental Congress, waxed exuberantly of the day "when the waters of the western inland seas would break through their barriers and mingle with those of the Hudson." Under this scheme the waters would in some areas be coursing along an aqueduct 150 feet above the heads of the natives, and the thought frightened sensible men.

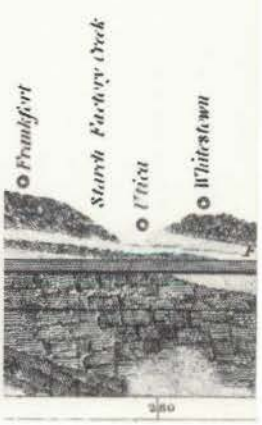
The War of 1812 revived the old arguments of national security and commerce, and the canal idea became public property. But what it needed most was a

N.Y.S. Office of General Services

DeWitt Clinton, sixth Governor of New York and Father of the Erie Canal Painting by Asa W. Twitchell

Aqueduct at Little Falls Courtesy N.Y.S. Library

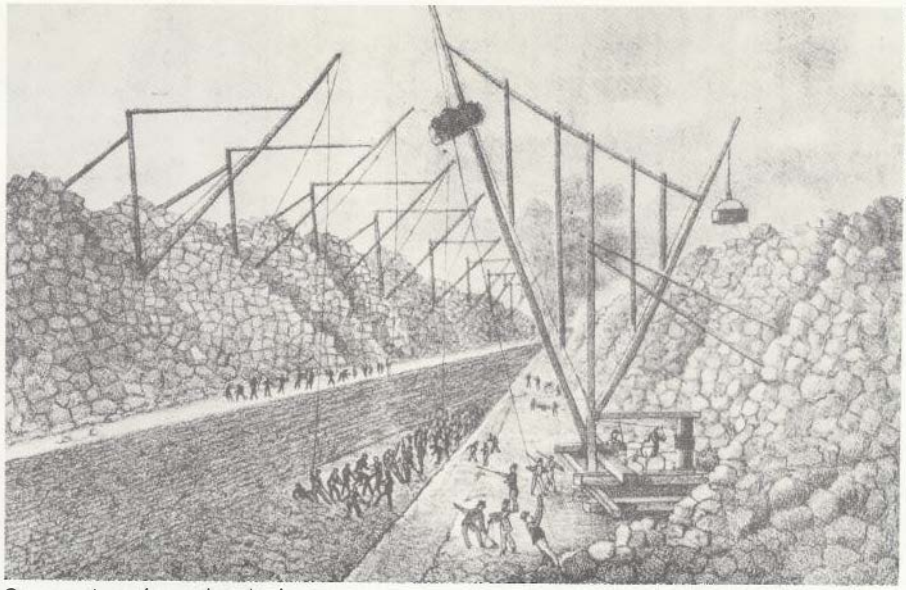




smart politician, and it finally got one in DeWitt Clinton. Then one of the most active New York mayors the city would ever see, Clinton was the Democratic leader of the state. He was not much interested in the canal at first, but Jonas Platt, an ambitious state senator from Herkimer County, persuaded him that it would be politically advantageous to take the lead in backing the canal. So Clinton accepted a seat on the new committee, along with Robert Fulton of steamboat fame. Another member was the author of the dead river-in-the-sky plan, Gouverneur Morris—a little grayed by now but still bubbling with moonbeam ideas.

Unfortunately, the war also gave the opposition time to gather its forces. People complained that a 363-mile canal was fiscal suicide. If a 26-mile canal near busy Boston went broke, the critics complained, what chance had a ditch that would run hundreds of miles through the wilds of upper New York State? Farmers along the Pennsylvania border saw no reason to pay taxes to help build a waterway that wouldn't benefit them. The whole scheme, some were saying, was a ruse of the Clintonians to capture the state. "Vicious, tax-burdening plan!" they shouted.

But in spite of the opposition, the pressure was becoming stronger all the time. Thousands of people along the proposed route signed petitions. Mass meetings, memorials, stirring oratory in the grand manner climaxed the spring of 1817, when the people elected De Witt Clinton governor of New York by a vote of 43,310 to 1,479. It was the most lopsided vote the state had ever seen. In voting for Clinton, who had made the canal a major issue, the people were really voting for the canal itself.



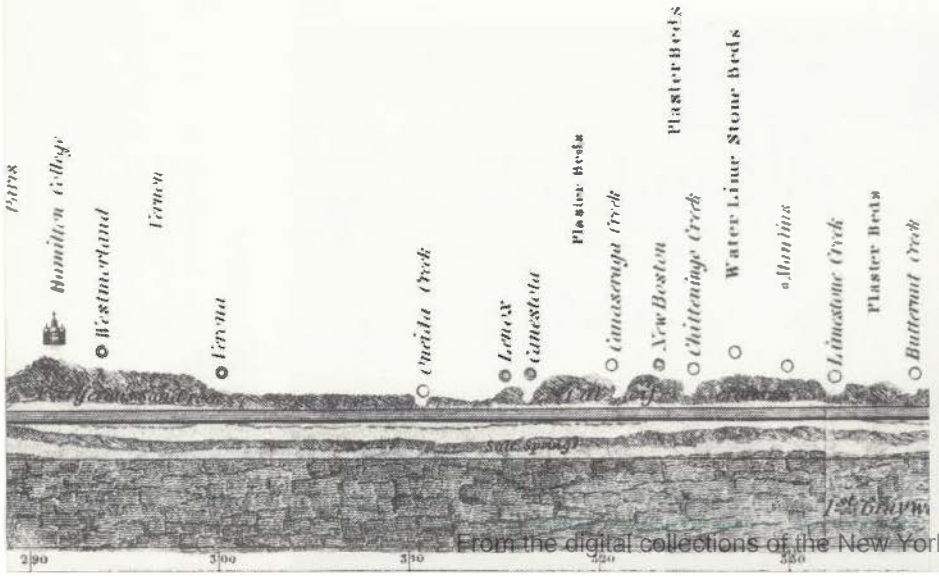
New York Historical Society

Construction of canal at Lockport

Later that year, the all-important bill for funds came up in the legislature during the final hour of the session. Amid a wave of opposition heartburn, the bill passed. And then the Council of Revision had its turn. Two of the five members were completely opposed; Chancellor Kent thought the canal might be a fine thing "some day." But Tompkins' unexpected visit changed the course of history. And so, by a margin of one vote, the Canal Bill became Canal Law. It was one of the most important votes in American history. The oratory and politics were done. Now the job was up to the engineers and the men with the picks and shovels.

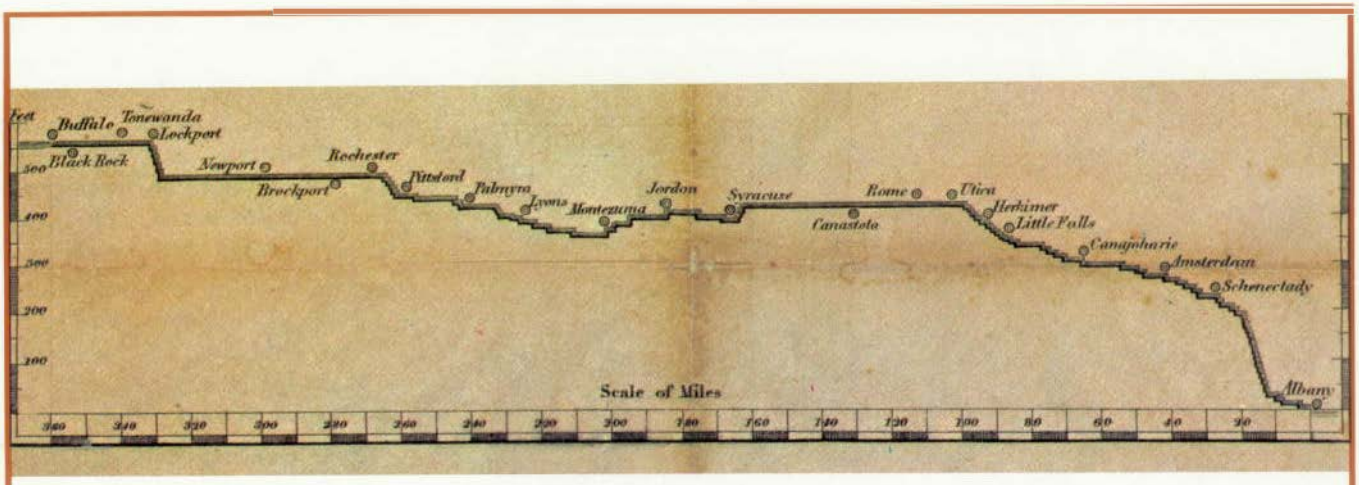
Digging of the canal began at Rome and went west to the Seneca River and east to Utica. Rome, at first glance, might seem an odd place to start digging a canal, but it was the town nearest the upper limit of navigation on the Mohawk River, right in the middle section where digging was easiest; it was level country where no locks would be needed. Still, there was a lot of dirt to be shoveled out of the "prism," the V-shaped notch four feet deep and 40 feet wide. Slowly the ditch inched east and west through timber, through swamps, and through a tangled mass of roots which nature had been weaving into a nearly impregnable barrier for centuries. In spite of all the blueprints and brave talk, no one knew enough about canal building to begin yet on the eastern and western portions.

Finding workers for the canal was no problem. Men came from miles around, eager to make big money on the Big Ditch. Recruiters were sent to New York City to meet the immigrant boats from Ireland. "Roast beef twice a day, regular whiskey rations, and wages 80 cents!" The Irish were ready to take almost any work, but they wanted to be sure they heard right. "Them wages," they asked, "they be 80 cents a week?" When they found it was 80 cents a day,



Clinton Square, Syracuse

Courtesy Canal Museum



Profile of the Grand Erie Canal. Note the drop in elevation between Buffalo and Albany.

Courtesy of Walter Bundy

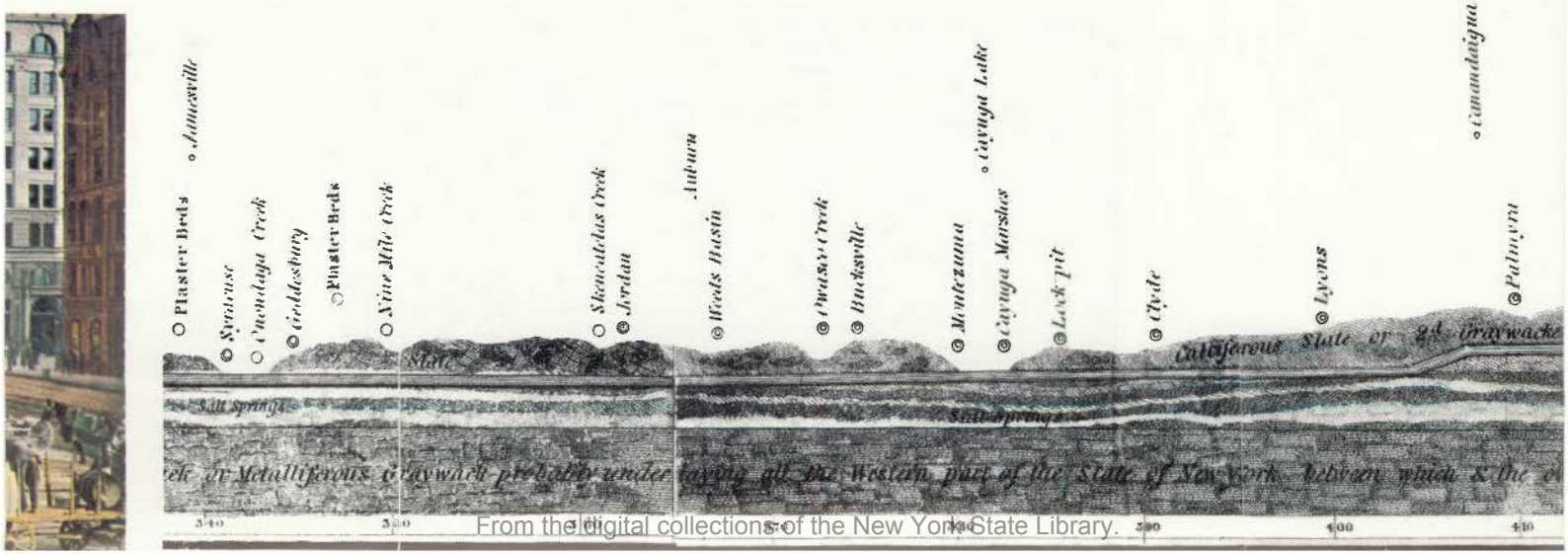
it would have been impossible to keep them away from the Erie with clubs. As the Irish picked up the pickaxes and shovels most of the natives were glad to put down, the singing started. Long before the towpath songs there were the diggers' songs, full of nostalgia for an Ireland few of the singers ever saw again.

When I came to this wonderful empire,
it filled me with the greatest surprise
To see such a great undertaking,
on the like I ne'er opened my eyes.
To see a full thousand brave fellows
at work among mountains so tall,
To dig through the valleys so level,
through rocks for to cut a canal
So fare you well, father and mother
Likewise to old Ireland, too,
So fare you well, sister and brother,
So kindly I'll bid you adieu.

In ingenious ways, the problems of making a canal were met and conquered. A freak accident gave the canal's stonemasons the first hydraulic cement. Common quicklime was the binder they expected to use, but it wouldn't slake. Canvass White, then an assistant engineer, took some of this ill-behaved lime to a "Dr. Barto, a scientific gentleman from Herkimer County, [who] burned a parcel, pulverized it in a mortar, and in Elisha Carey's bar-room—mixed it with sand, rolled a ball of it and placed it in a bucket of water for the night. In the morning it had set, and by Dr. Barto, pronounced cement."

At Little Falls, where the old Western Inland Lock Navigation Company had once done so much for travel on the Mohawk, the planners brought their waterway up the opposite side of the river—ignoring the old locks and channel. They asked a consulting engineer how long it would take to hack a new channel through the solid rock and to build a set of locks. He looked over the situation, checked the plans, inspected the primeval cyanite rock, and made a pronouncement. "Three years," he said. They thanked him, paid his consulting fees, and then hired hard-rock miners to teach them how to use explosives. In less than three months the channel was dug.

East of Little Falls the river became the builders' worst enemy. They ran survey after survey, hoping to bypass the whole lower valley on their way to the Hudson, but the Mohawk, which gave the gateway to the west, had also given them the only possible route to the tidewater. Stone embankments had to be laid up against the spring floods. From Schenectady to Cohoes the glacial Iromohawk, draining the Great Lakes, had cut itself a deep gorge about four miles beyond Schenectady, and then had gone on to carve out the wide Cohoes Falls a mile or so above its junction with the Hudson. Canvass White, now chief engineer for this section, shaped the canal to suit the will of the ancient river, crowned the gorges with aqueducts—tiaras of Roman arches, ty-



Munson-Williams-Proctor Institute

Lockport on the Erie Canal, 1832

Painting by Mary Keys

ing it all together with a shimmering ribbon leading off west to a new land and a new life.

Then there's the state of New York,
where some are very rich,
Themselves and a few others have dug
a mighty ditch,
To render it more easy for us to find the
way,
And sail upon the waters to Mich-i-
gan-i-a—
Yea, yea, yea, to Mich-i-gan-i-a!

Between Albany and Lockport near the western terminus there was a total land elevation of 688 feet and to compensate for this variation, it was necessary to build 84 locks, each 90 feet long and 12 feet wide. Four major aqueducts had to be built, one of almost 2000 feet near Crescent and Cohoes, one of 748 feet at Alexander's Mills (now Rexford), an 1184 foot "feeder" at Little Falls and an 804 footer over the Genesee River at Rochester. In addition there were more than 25 smaller aqueducts. The western end of the canal at Lockport was the last section to be completed, and it turned out to be the supreme accomplishment of the entire project. To raise the canal sixty-six feet, a double set of five locks had to be blasted out of an almost sheer rock face. All in all the entire canal had been a remarkable feat of engineering.

Three weigh-lock buildings at Troy, Utica, and Syracuse, in which boats would be weighed to determine toll charges, were completed. Here and there along the banks, small "occupation bridges" for farmers whose lands had been split by the waterway were finished. Since it was cheaper, these bridges were only seven and one-half feet above the water. Later, as canal travel increased, "Low bridge. Everybody down." became the catchword of the Erie; "canaul" entered the vernacular to replace "canal." There was even a ballad about a man who took a job on a bullhead boat (a vessel with little walking space around the sides of the boat) and promptly got knocked off by a low footbridge. It ends with:

So canaulers take my warning
Never steer a bullhead boat
Or they'll find you some fine morning
In the E-RI-E afloat
Do all your fine navigating
In the line barn full of hay,
And the low bridge you won't be
Hating
*And you'll live to judgement day.**

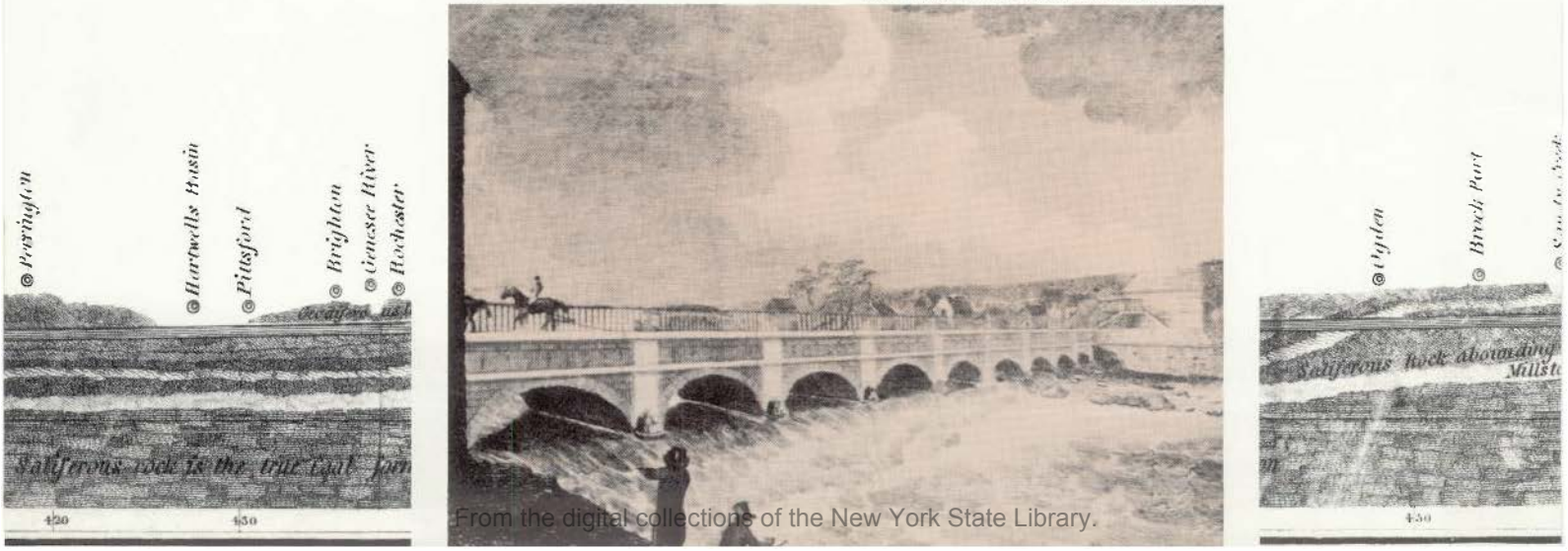
In the fall of 1825 the great day finally came when New York married her waters in a celebration befitting the Olympian occasion everyone agreed it was. The festivities began October 26 at Buffalo. A parade, led by a brass band, escorted Governor Clinton and other dignitaries aboard the *Seneca Chief*, brightly decorated with a huge painting of Clinton depicted as Hercules resting from his labors. On deck were two brightly painted kegs of Lake Erie water which were later to be poured into the ocean at New York with a mixture of waters from the Mississippi, Rhine, Orinoco, Amazon, Nile, Gambia, Indus, and Ganges Rivers in a royal "Wedding of the Waters."

The flotilla of five boats left Buffalo at 10 a.m. The red and yellow leaves reflected in the sparkling water as a cannon fired. A few moments later, another cannon a few miles down the canal fired, relaying the message from Buffalo to

*"The E-RI-E," John A. and Allen Lomax, "American Ballads and Folk Songs," Macmillan Company, New York, 1934.

Aqueduct at Rochester

From Colden's memoir on the New York canals, 1825



New York, 500 miles away. The last signal, which was fired at 11:20 a.m., triggered a rousing artillery salute from New York.

The boats, each towed by a team of horses, had a quiet trip because most of the country through which the canal ran was still wilderness. But at every town and hamlet there was food and speechmaking. Little Falls, as the boats pulled in at night, must have been an awesome sight. Great bonfires roared out of tar barrels placed in the potholes that lined the edge of the cliffs above the locks. At Fort Plain, the day Clinton's "nuptial party" arrived, Wagner's Hotel spread "a sumptuous dinner" the whole length of its ballroom. During the course of the meal there was the inevitable toast after toast. The local schoolmaster finished that part of the celebration by leaping onto the loaded table, which promptly collapsed, to the huge enjoyment of the guests. John Taylor, another schoolteacher, when he suddenly found himself pushed onto the deck of the *Seneca Chief* and standing in front of the governor, was the complete master of the situation. Behind a hand masking a mild hiccup, he said, "Governor Clinton, this is my friend John Wagner's store," bowed low, and toppled into the canal.

Next to New York, Albany turned out the most elaborate reception of the trip—processions of state officials, army and navy units, societies of every kind. More speechmaking was heard at the Capitol, where the canal backers had so long battled for their ditch. After that there was a parade, and then a dinner, served up to 600 on the gayly decorated Columbia Street Bridge. The celebrations lasted far into the night, and then, on November 2, the boats headed down the Hudson toward New York City. There, two steamboats pulled the entire fleet of canal boats down the Hudson into the harbor.

The final benediction on the wedding of the waters, of course, could only be pronounced in New York Harbor. When the naval pageant was ready, De Witt Clinton rose to the occasion:

"This solemnity at this place," he said, pouring his Lake Erie water into the Atlantic, "on the first arrival of vessels from Lake Erie, is intended to indicate and commemorate the navigable communication which has been accomplished between our Mediterranean Seas and the Atlantic Ocean. . . ." There was much more of the like about public spirit, the people of New York, and a plea "that God of the Heavens and Earth smile most propitiously on this work."

In the meantime a procession marched down Broadway to welcome the ships. Public buildings were illuminated that night; one, City Hall, was ablaze with 2,300 candles. A great ball was held where Governor Clinton found floating in a punchbowl of what was left of his Lake Erie water "a marvelous miniature canal-boat, made entirely of maple sugar."

New York City went to sleep that night, as the wedding reception sputtered out, a transformed city, as did the state and the nation. Virginia, Maryland and Pennsylvania, resting their chins on the wall of the Appalachians, watched the canal boats float west to the promised land, and return again to the city at the mouth of the Hudson, heady with all the new land had to offer. They could watch, but that was about all, for none of them had been given a bride like the Erie Canal.

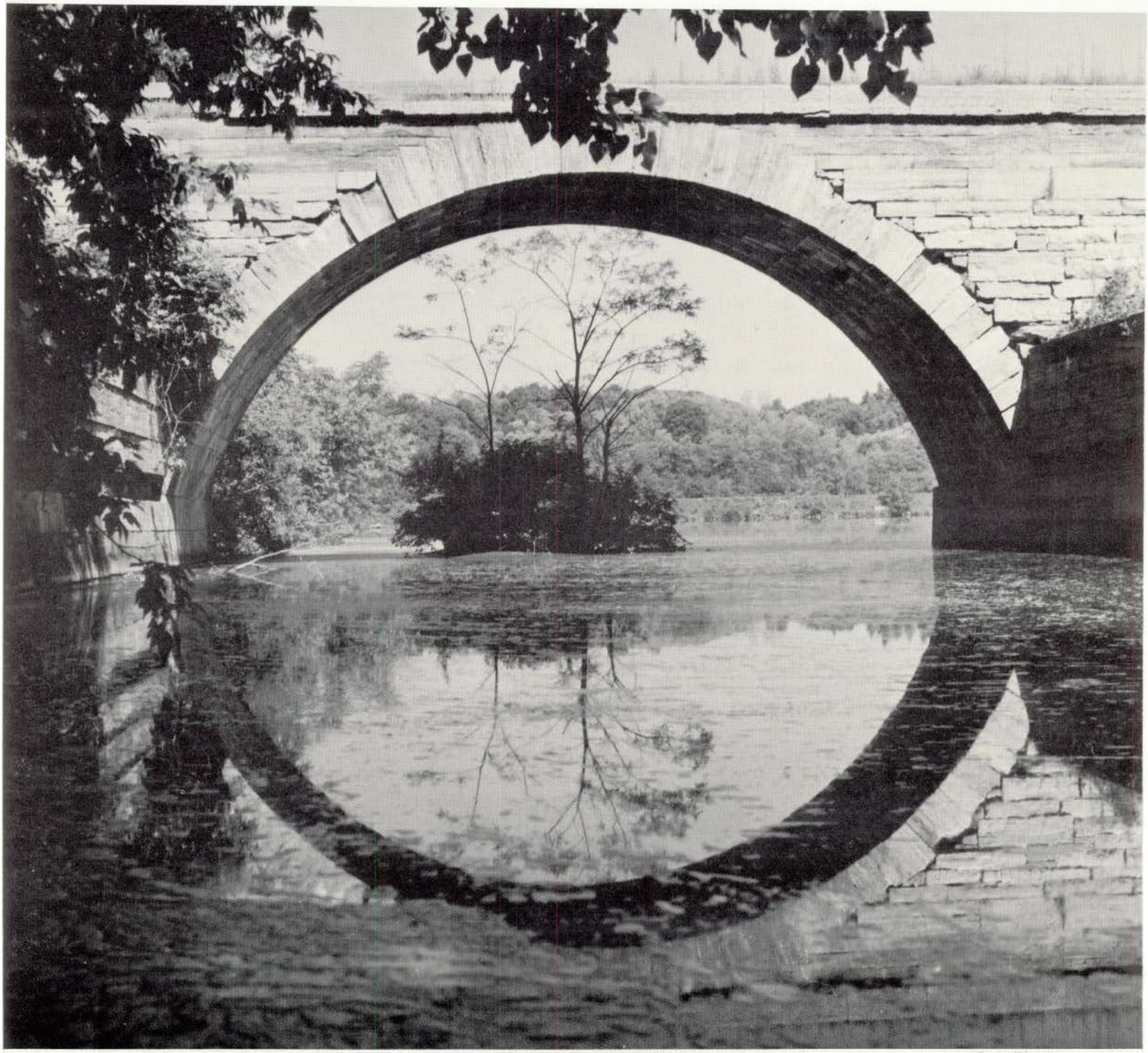
New York Historical Society

Keg used by Governor Clinton to pour water from Lake Erie into the Atlantic

Don Tuttle has contributed so many articles to **THE CONSERVATIONIST** of late that he is almost a member of our staff. A former director of the museum at Fort Plain, N.Y., Mr. Tuttle is now associated with the Meadowcroft Foundation in Pennsylvania.

The Schoharie Aqueduct

by Alvin S. Fick



One of the massive 40-foot arches of the Schoharie Aqueduct, Fort Hunter, N.Y. George Trentelman

Otis Eddy's Testament In Stone

ACROSS the broad waters of the Schoharie River just before it empties into the Mohawk stand the impressive remains of an aqueduct which was one of the engineering marvels of the mid-1800's. Visitors to the quiet little village of Fort Hunter, just west of Amsterdam, N.Y. will find there, still piled stone on stone, nine of the original 14 arches of the aqueduct built by Otis Eddy.

Prior to the construction of the aqueduct, funds for which were appropriated in 1835 (ten years after completion of the original canal), Schoharie crossings were made by poling and winching boats by capstan through the stillwater above a dam eight feet high and 650 feet long. Creek crossings such as the ones at the Schoharie and Oriskany were dangerous and subject to the vagaries of flood or freshet. Delays were common and tragedy was not unknown along "Clinton's Ditch" when floods sometimes swept boat and crew, cargo, mules and driver into the Mohawk River.

Although aqueducts provided the safest and best method for such crossings, as well as for getting past valleys, they were by far the most expensive. In 1842 George W. Little wrote to a friend that $45,000 was all that was needed to bring the $550,000 worth of new work at Fort Hunter into operation. The construction included completion of two double locks and six miles of canal in addition to the magnificent new aqueduct.

Among other maintenance efforts the canal was drained and cleaned each spring, surrendering from its bottom a fearful and wonderful debris which included dead mules, furniture, bodies and parts of bodies, jugs, cats, dogs, bottles, junk, barrels and occasionally a traveler's purse—invariably empty. Such spring discoveries contributed to the legends preserved in story and song and attesting to the vibrancy of life which teemed along and on the Erie.

The original canal was excavated to a depth of four feet. Its width was 40 feet at the top, 26 feet at the bottom, and the 83 locks along its 363 mile length measured 90 feet in length and 15 feet wide. Each admitted vessels 30 feet long, 12 feet wide, and carrying cargos variously described as "30 to 70 tons" and "75 to 100 tons." By 1862 it had been deepened to seven feet, widened to 70 feet, and barges of 240 tons were in general use.

Edward Kenney

The Eddy family genealogy states that Otis Eddy was a man of wealth and influence in Ithaca, where he built a cotton goods mill in 1825. Eddy was also involved in planning the massive Greek revival state hospital at Utica.

Since it is recorded that he was "a manufacturer of cotton goods up to the time of his death," one can only speculate concerning this ingenious, forceful man who left his business in Ithaca to go to Fort Hunter to undertake an engineering project which was to become the marvel of its day, visited by world travelers who came to admire this example of Yankee know-how.

The stone for the aqueduct was quarried on the Voorhees farm a mile east of Fort Hunter, moved to the site by oxen and mule, and arduously assembled. It was cut and fitted with great precision, the joints being treated with lime cement and leaded. Iron bolts passed from the top down helped secure stones in the main parts.

The wooden trunk containing the 41½- by 7-foot water section rested on 14 great piers. Tremendous weight was borne by the structure when the flume of heavy timbers and planks was filled with water carrying a heavily laden barge. The earth-filled towpath adjoining provided crossing way for driver and team.

The Fort Hunter testament in stone to Yankee ingenuity stood for a hundred years before the first arch fell in 1941 when a piling was undermined. To prevent obstruction of the Schoharie, the state commissioner of canals ordered four more removed. Nine are still standing.

Although at 624 feet the aqueduct built by Otis Eddy is far from the longest the Erie Canal boasted—for example, there was one of 1184 feet at Little Falls, another almost 2000 feet long at Crescent 12 miles below Schenectady, and an 804-footer over the Genesee at Rochester—taming the frisky Schoharie was a great triumph. And it is at Fort Hunter where you can still see tangible evidence of the architectural glories of Clinton's Ditch.

Edward Kenney

Alvin C. Fick is former assistant and acting editor of **THE CONSERVATIONIST.** He left the magazine in 1974 to devote full time to writing, both fiction and non-fiction. Whenever possible he illustrates the latter with his own photography. Mr. Fick lives with wife Alma on a farm between Amsterdam and Ballston Spa, N.Y.

LIFE ALONG THE CANAL

To the thousands of merchants, shopkeepers, roustabouts, immigrant laborers, canal boatmen and their families, the Erie Canal was a source of livelihood, a marketplace, an abode, and a playground. Here amidst the vibrant bustle and teeming squalor of a land just emerging from frontier, they lived and died—some of them violently. THE CONSERVATIONIST here presents a portfolio of life along the old Erie as seen by photographers and artists of the time. J.J.D.

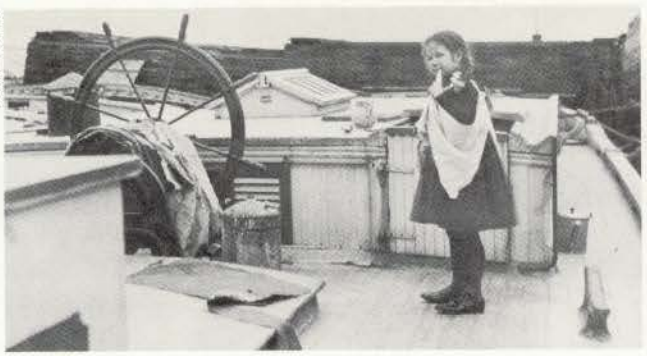
Onondaga Historical Association

Erie Canal, Clinton Square, Syracuse, N.Y.
An early canal lock c. 1870

Painting by Johann M. Culverhouse

The Canal Museum

Culver Pictures



G. Eastman House

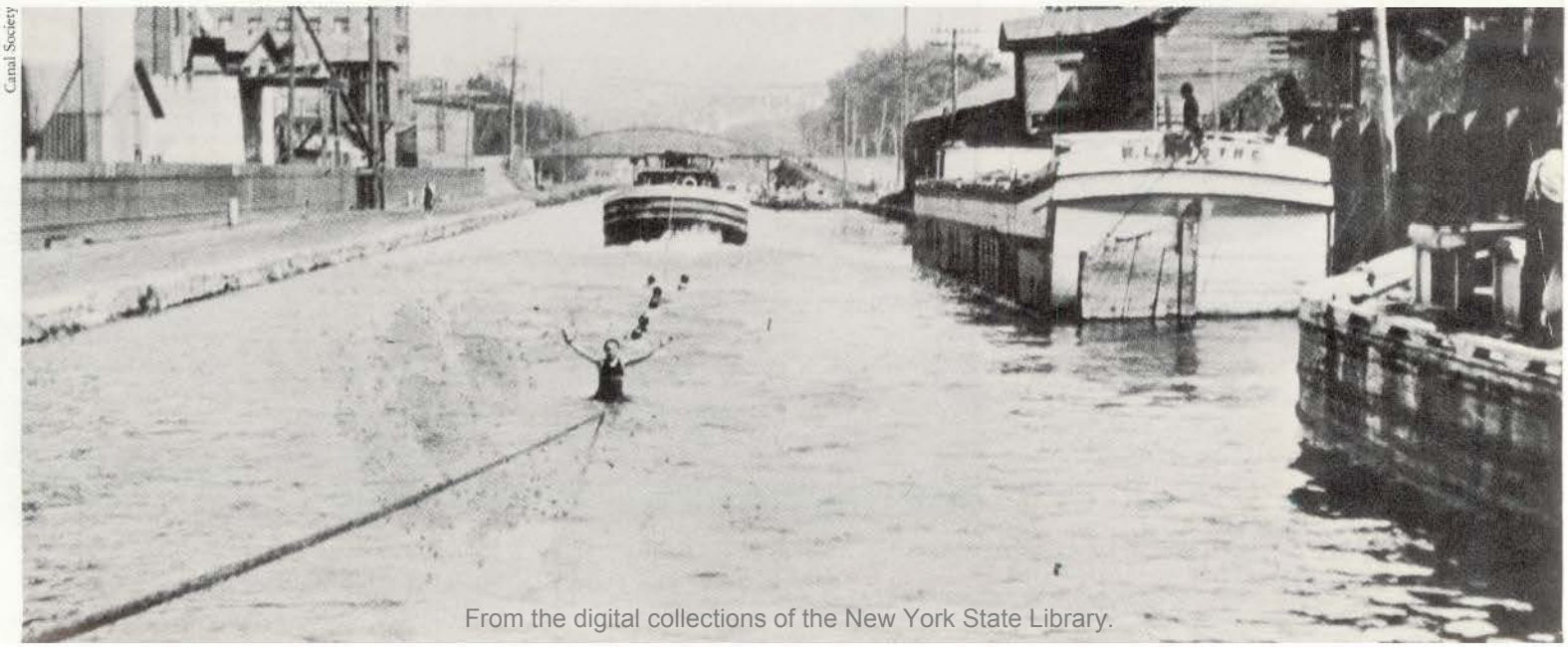
(Left) A canal boat was home for many children, (Right) An Italian-American immigrant.

Culver Pictures

Spring cleaning New York Harbor

Riding the towline, Ilion, N.Y.

Canal Society



(Right) Locktenders, Macedon, N.Y.; (Below) Deepening the canal at Buffalo; (Below right) Canal break, Syracuse, N.Y.; (Below left) Barracks for canal workers

Canal Society

Alfred E. Gayer

G. Eastman House

Canal Museum

Canal Society

Canal Museum

Canal Museum

(Above) Unloading mules (Right) Solina St., Syracuse, 1865, with bridge ramp to canal in background. (For right) Among other things, this man did surveying.

Canal Society

Library of Congress

(Above) Towing with a mixed team (Left) Clinton Square, Syracuse

Canal Museum

Central Wharf, Buffalo, 1880, at the arrival of first steam barge to travel the entire canal.

Albany Institute of History and Art

Going through the lock. Scene on D. and H. Canal.

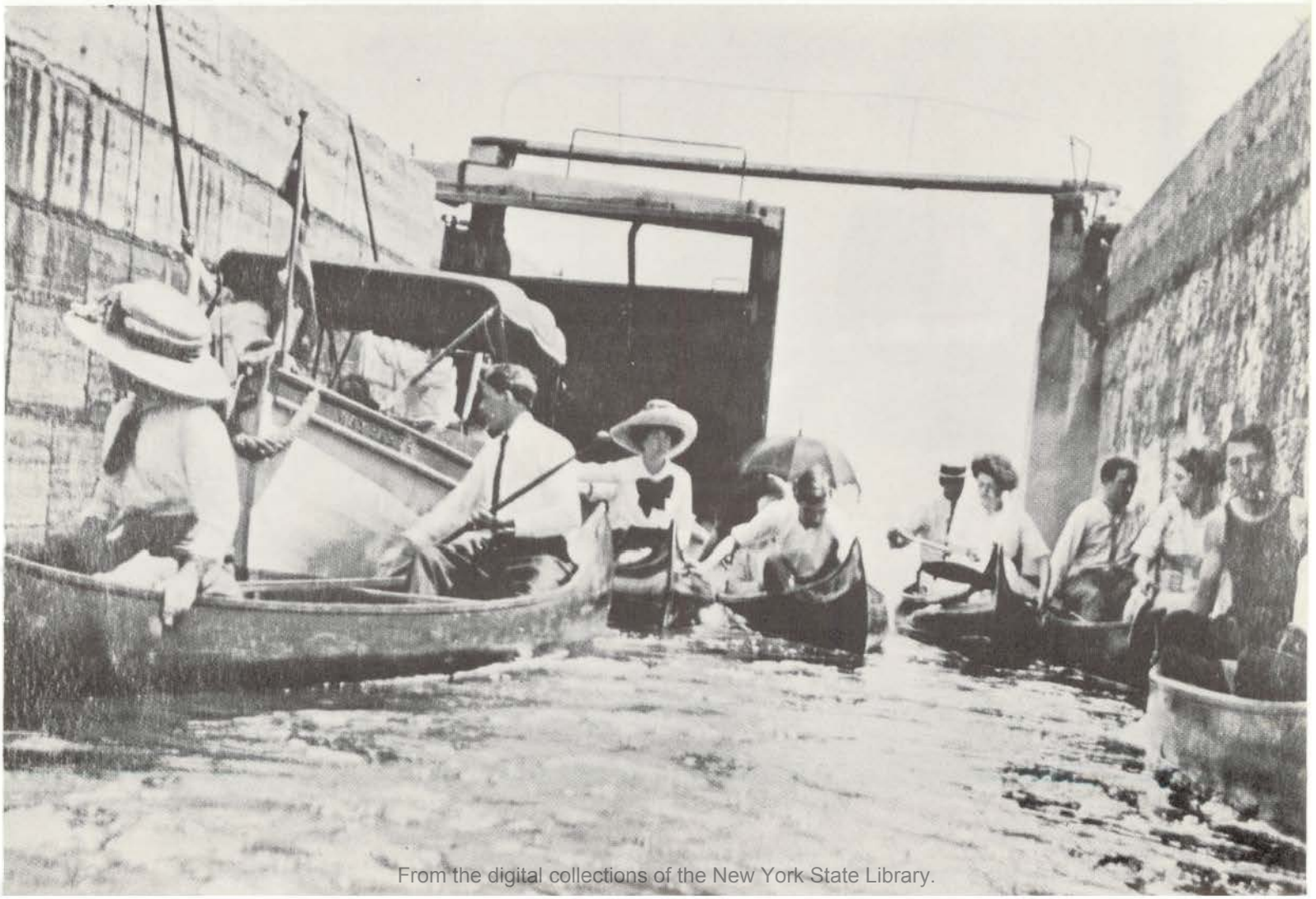
Painting by E. L. Henry

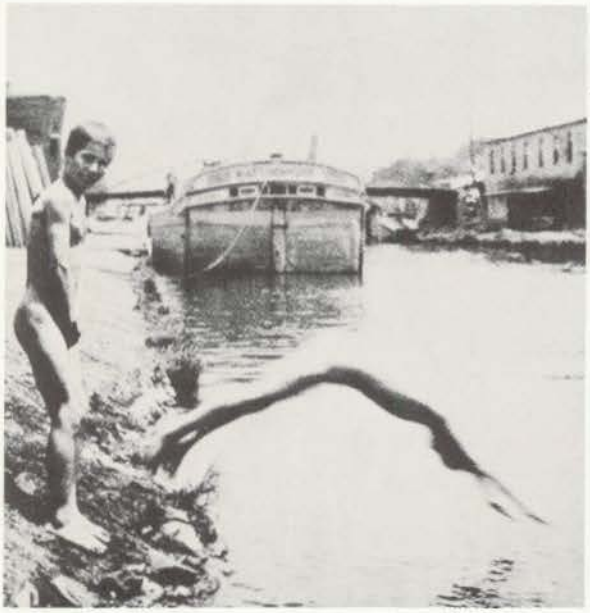
Canal Society

Slim's store, Amboy

Skating on the Canal, Clinton Square, Syracuse — Canal Society

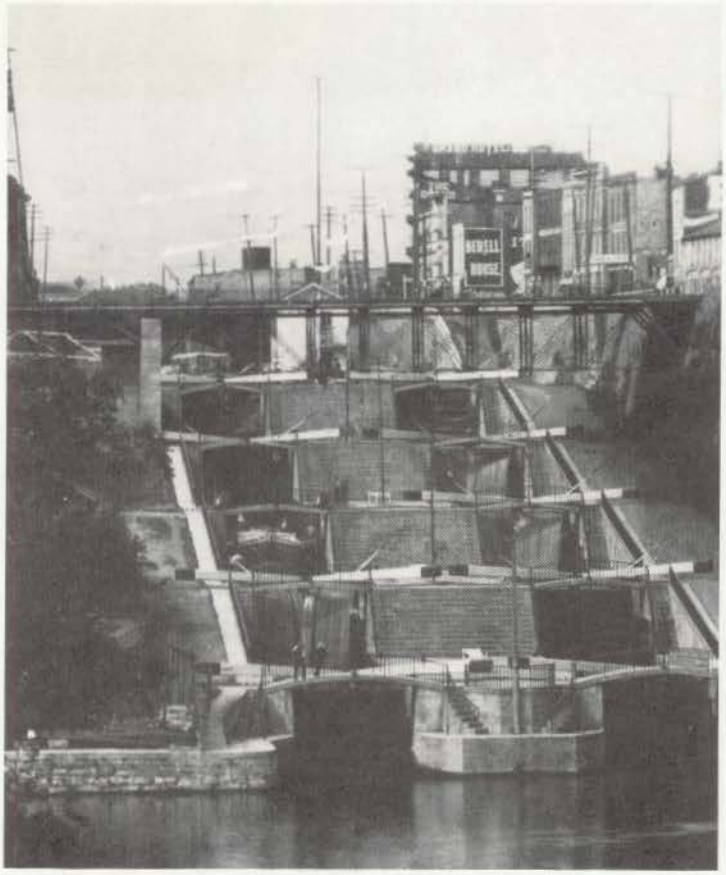
A Sunday fleet in Lock 23, near Schenectady — Canal Society





Canal Society

Ordinances forbidding swimming "au naturel" were not rigorously enforced.



Canal Museum

View of lock, Lockport, N.Y.

Aqueduct across Genesee River, Rochester, N.Y.

Rochester Museum and Science Center

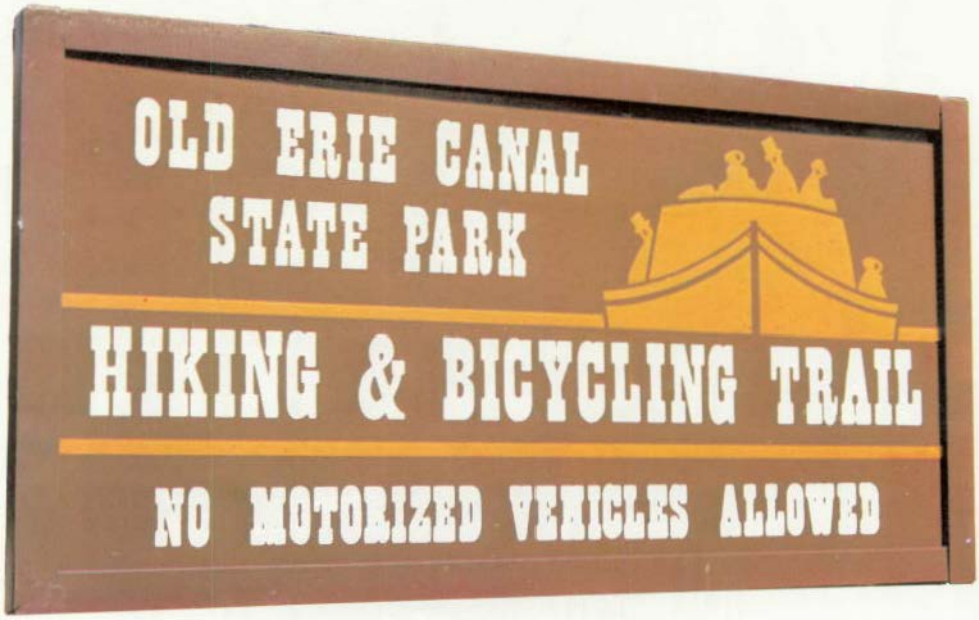
Canal Society

In the 1860's floating elevators transferred grain from canal boats to ocean vessels in the East River, New York

The Childhood of Rapid Transit

Painting by E.L. Henry

Schenectady Museum



The Canal

by Austin C. Smith

BY 1882 canal shippers were struggling to compete with the growing efficiency of the railroads. To save the shippers, tolls on the Erie were abolished and operating costs paid from general tax revenues. Three years later, in the face of stiff opposition from railroad lobbies, funds were provided to lengthen locks and deepen the channel, but these projects were never completed.

Born in bitter controversy, the Erie ended in the same mood when in 1899 Governor Theodore Roosevelt appointed a Committee on Canals whose major recommendation was to build a Barge Canal using parts of the Erie and natural waterways through most of its length. This was feasible because new dam technology made possible the taming of the erratic Mohawk, which was wild in spring and often too low in summer. A $101 million bond issue was passed in 1903, and the magnificent Barge Canal was completed in 1918. It had a capacity of 15 million tons of shipping a year, and it is still in operation today—an important part of the Empire State's transportation system.

But the Erie is neither gone nor forgotten. It lives on in the beautiful Old Erie Canal State Park which is being developed along the 35-mile stretch from Rome to DeWitt (near Syracuse).

Begun in 1970 with a legislative appropriation of $300,000, the work has since continued with matching state and federal funds. It includes canal cleanup, towpath restoration, acquisition of adjacent land, and construction of footbridges, bridle paths, boat and bicycle liveries, and picnic sites.

Remains of the aqueduct at DeWitt

— Today

All photos courtesy of the N.Y.S. Office of Parks and Recreation

Since it was at Rome where the first shovels of dirt were excavated 160 years ago, it is fitting that this city became the site of the Erie Canal Village. The reconstruction, known as "The People's Project" because it was created with many large and small donations from private citizens, includes an 1830 church, an 1840 bridge, an 1860 school house, a spinning and weaving house, blacksmith shop and livery stable, plus several museum buildings. "The Independence," an 1840 horse-drawn packet boat, takes on passengers several times a day for scenic rides. The Harden Carriage Museum houses a $150,000 collection of antiques. There is also an 1890 train station from which tourists may embark for a ride on an open-air train of the same period. In addition to a large collection of canal memorabilia, there are frequent borrowings from the Canal Museum at Syracuse.

In addition to the Rome-Syracuse area and the Schoharie Aqueduct at Fort Hunter, there are state parks at many canal locks: Waterford, Rotterdam Junction, Whitesboro, Brewerton, Macedon, Pittsford (near Rochester), and Medina. All but the lock at Medina are still doing their ancient job of raising and lowering boats to sea level. There is fishing at all of these parks, hiking and biking trails at most of them, and a beautiful nature trail at Pittsford.

De Witt Clinton, who fought to abolish the slave trade, terminated the cruel and idiotic debtors' prisons, and battled for free public schools, would be pleased to know that so many parts of his "ditch" are still being used both for shipping and recreation.

Environmental Conservation Officer

by Joseph T. Lynch

DEC photos

The duties of the ECO demand versatility backed by extensive training.

ECO checks legal size of scallops

Waiting for the poacher to return for hidden deer.

These poached deer call for a $100 fine and/or a year in jail.

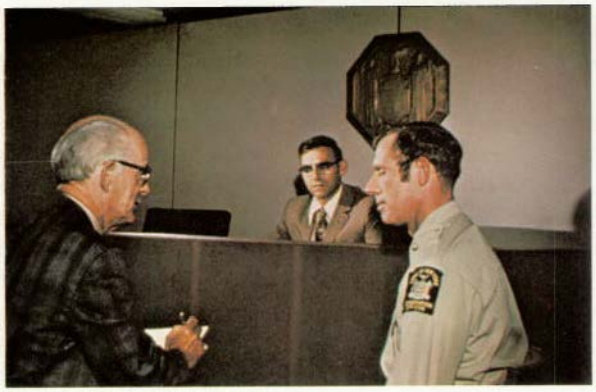
THE place: an old logging road in a rural section of central New York. The time: about 3 a.m. on a moonless night in early November. Two Environmental Conservation Officers (ECO's) perched nonchalantly on the hood of a patrol car suddenly tense expectantly, eyes boring deep into the darkness in the direction of an old logging road. Two amber brake lights wink teasingly from the blackness. A small shaft of light briefly stabs the night. Then the stillness is suddenly shattered by the sharp crack of a high-powered rifle. Before the echo has died away, the patrol car is hurtling through the darkness toward the scene of the shooting. Not a moment too soon. Three men are seen bending over the dead form of a five point buck that they have just "jacked" with the aid of a flashlight. They are arrested and subsequently convicted.

The place: downstate New York. The time: about an hour after sunrise the opening day of rabbit season. An ECO checking a confined area comes upon a party of four hunters. There appears to be nothing unusual except that they have a rather large number of rabbits for so little time afield. Further investigation reveals the secret of their success. The hunters are using two beagles to run the rabbits. If a rabbit holes up, one hunter reaches into his coat pocket, brings out a ferret and drops it into the hole. In no time at all the terrified rabbit is on its way out into the waiting guns of the hunters. Hunting rabbits with ferrets is illegal. The ferrets are confiscated and the hunters subsequently prosecuted.

These two incidents are but two examples of the many different tasks performed around the state by individuals responsible for upholding the Environmental Conservation Law, the Environmental Conservation officers.

As members of DEC's Division of Law Enforcement the 250 ECO's scattered around the state share a tradition stretching back to 1880 when the first organized conservation law enforcement was established in New York State. Since the reorganization of DEC in 1970 the scope of these duties has expanded greatly so that in addition to the traditional upholding of the fish and wildlife laws, ECO's are now responsible for a diversity of jobs ranging all the way from monitoring excessive smoke stack emissions to investigating violations of the Tidal Wetlands Act, from checking the permits of lobstermen in Long Island Sound to investigating reports of illegal sale of products made from parts of endangered species. All of these duties require a sound constitution, an above-average intelligence, a high degree of perseverance, a knowledge of the many facets of environmental protection, and an ability to relate well to the public.

Hunting, fishing and trapping regulation have been the traditional duties of the ECO and it is in this capacity that the average citizen most often sees the officer at work. Hunting seasons require a great deal of regulation. There are seasons, bag limits and licensing requirements, and the ECO is on hand to make sure that hunters adhere to these requirements. Most species have certain restrictions on how they can be hunted as well as when. Migratory birds cannot be lured to the gun by scattering grain. Whitetail deer cannot be taken with the aid of dogs. Certainly, cottontails cannot be hunted with ferrets. By the same token the vast



Court practice is a vital part of the training program

number of freshwater anglers in New York require constant surveillance by law enforcement personnel to keep the minority of violators from compromising the privileges of the majority of sportsmen. And in overseeing the harvest of furbearers during New York's trapping season, it becomes even more important to know what to look for. As the demand and price for furs fluctuates, so do various trapping violations. Generally the officer with a thorough and specialized knowledge of trapping techniques is best equipped to deal with trapping law violators.

The ECO has numerous other duties to perform, all requiring a certain amount of expertise, some demanding a detailed knowledge. Enforcing the Fish and Wildlife Law in the Long Island district, for example, can be both exciting and educational. These laws include licensing and regulating lobster fishing, clam, oyster and scallop harvesting, a multi-million dollar a year business on Long Island. Marine laboratory technicians monitor the bacteria levels in certain types of shellfish. When these levels reach a certain point, the shellfish cannot be safely eaten and the waters from which they are taken are designated as "uncertified." Since a handsome profit can be made by an unscrupulous individual digging clams from an uncertified area, ECO's must constantly patrol coastal waters in an effort to reduce this harvest. Traffic in undersized shellfish and unsanitary handling of shellfish are also discouraged by regular inspections of shellfish wholesalers, packers, shippers, and retailers. Every supermarket, bar and grill and restaurant in New York State dealing in shellfish receives periodic checks. Commercial finfishing is

ECO Duane Hamm in dress uniform. A resident of Middleburg, he serves in DEC's Region 4.

Checking licences of hunters and fishermen is a common routine.

Fish kills caused by a water quality accident are checked to determine legal responsibility.

Dog-killed deer bring officers into action to control the destructive canines.

another activity which requires an officer's scrutiny in both marine and freshwater areas in New York State, where he checks on such things as size limit, licensing and net size.

ECO's enforce both the Tidal Wetlands and Freshwater Wetlands Act which among other things regulates the draining, dredging, excavating, or filling of tidal or freshwater wetlands and waterways and regulates any activity that may substantially alter the natural condition of any tidal wetland area.

- ECO's coordinate containment and neutralization of offending substances such as oil or toxic chemicals and later investigate the facts concerning the accident which might serve as a basis for prosecution.
- ECO's enforce department regulations controlling disposal of industrial and sanitary wastes.
- ECO's monitor and document density of smoke stack emissions and ticket both cars and trucks emitting unnecessary smoke. They also enforce laws restricting open burning.
- ECO's investigate and review all applications for hunter safety instructor.
- ECO's investigate and document all circumstances surrounding hunting accidents and interview parties involved.
- ECO's contact and interview people applying for permits to possess certain species of animals.
- ECO's enforce regulations controlling the operation of watercraft and snowmobiles.
- ECO's respond to a wide variety of complaints ranging from trespassing on posted property to tracking packs of dogs killing deer, especially during the winter.

An ECO's work can sometimes be classified as "routine" but rarely as "uninteresting." Don't be surprised if you encounter an ECO perusing laundry products at your local supermarket or pesticides at the family garden center. Inspection of such establishments might turn up products containing outlawed levels of phosphorous or prohibited pesticides. Occasionally ECO's can be found in such unlikely places as men's wear shops, jewelry stores and furriers, checking for products made from the parts of endangered species such as alligator wallets and watchbands and spotted cat coats.

Pet shops and animal shows are often ideal places to discover endangered species. One recent example involved an ECO who walked into a pet shop in a large upstate city and found himself face to face with a large and not overly friendly tiger. After recovering from his initial surprise, the ECO seized the tiger, legally, not physically, and prosecuted the pet owner for trafficking in endangered wildlife.

The primary responsibility of enforcing the Environmental Conservation Law does not preclude involvement with other New York State laws. Despite the special nature of his work the ECO is a police officer and as such is invested with authority to enforce any law in the state. Penal Law enforcement takes up more of an ECO's time each year, especially in areas of large population density. With few exceptions, violations of these laws are turned over to other law enforcement agencies. But in some instances, the ECO must handle the violation.

All officers spend a certain amount of time in court and at departmental hearings, giving testimony and preparing legal papers. Occasionally an ECO is called upon to prosecute his own case. A knowledge of court and trial procedure then becomes very important since careful preparation can mean the difference between a weak or a strong case.

If an Environmental Conservation Officer's job is demanding, it follows that requirements for becoming an ECO are also high. To become an ECO, one must be between the ages of 21 and 29 (with an allowance for military service), have a high school diploma or equivalent, and either two years of full-time paid work as a police officer or an associate's degree in a related field from an accredited college. Every candidate must pass a civil service examination, have 20/40 vision in each eye without glasses and be able to pass certain physical examinations which test his or her ability to perform well under field conditions. Those passing the civil service examination are placed on a statewide list and appointments are made from that list. DEC is making a deter-

mined effort to interest women and members of minority groups to apply for the examination.

Once chosen, a candidate is given a provisional appointment as a trainee and is then assigned to one of the regional offices. However, to be eligible for permanent appointment, a trainee must attend 16 weeks of basic schooling held at the New York State Police Academy in Albany. After successful graduation from this school, the ECO is still required to complete a minimum of one year and a maximum of two years in trainee status.

The curriculum at the school is as varied as the job the student officers will be required to perform. To give an idea of the diversity of the instruction, some highlights are enumerated below.

- Driver training and emergency vehicle operation, first aid and cardiopulmonary resuscitation training, small boat handling and water rescue.
- Criminal procedure, penal and environmental conservation laws are studied in depth. A substantial amount of time is spent on investigative techniques, public speaking and community relations.
- Firearms instruction including training with the rifle, shotgun and handgun. A comprehensive physical fitness program coupled with instruction in defensive tactics.
- Techniques and specialized problems in hunting, fishing and trapping enforcement.
- Case preparation and courtroom procedure. Students participate in mock trials to develop and sharpen their professional demeanor on the witness stand.

A majority of the instructor force is drawn from ECO ranks. Other instructors include members of the State Police, department lawyers and representatives of other agencies.

An in-service school varying from one to two weeks is offered annually. Subject matter is changed from year to year in an attempt to keep the officer advised of new developments and up-to-date procedures. Some of the past courses have included first aid, defensive tactics, transactional analysis and justification for use of deadly physical force. One instructional block that remains constant and is included in all annual in-service schools is firearms training.

Lobsters are checked for legal size and to determine if they are carrying eggs.

Setting a beaver line trap in response to a nuisance complaint.

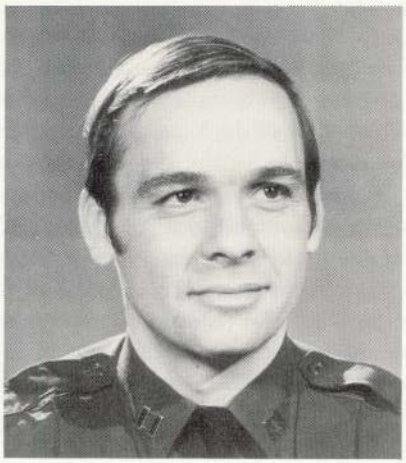
Various specialized schools are utilized when and where available. During the spring and summer of 1977, for example, all officers in the state completed a 16-hour emergency vehicle operation course. Nearly a dozen officers have completed instructor training seminars lasting one or two weeks. Some men have also received specialized training from the F.B.I. in firearms and defensive tactics. A limited number of ECO's will be sent for advanced training at the prestigious F.B.I. Academy in Quantico, Virginia.

The ability to interact well with the general public is probably the single most important asset an ECO can possess. To function effectively, he or she must have the support of the people. To reach the general public, ECO's spend much time attending and speaking before sportsmen's federations, hunting and fishing clubs, fraternal organizations, scout groups and high school and college students.

Each section of the state has inherent problems which demand special attention by the law enforcement patrol. Transfer from one part of the state to another and temporary special detail assignments provide an ECO with the opportunity of gaining exposure to many different law enforcement problems and the techniques used to deal with them.

The extensive range of duties and responsibilities entrusted to our Environmental Conservation Officers makes their job as unique and interesting as any in law enforcement. It takes a special type of person to do the job properly. An exciting and satisfying career awaits the young man or woman who measures up to the challenge.

Checking tar spill for possible legal action.



Joseph T. Lynch is a chief environmental conservation officer with the rank of captain who works with the Law Enforcement Unit out of Region 8 in Avon. An Air Force veteran, he joined DEC in 1966. He is an honors graduate in criminal justice from Broome Community College, has received special training in firearms instruction and defensive tactics from the F.B.I. and will soon attend the F.B.I. academy at Quantico, Virginia.

Thirty
in a W

by Henry

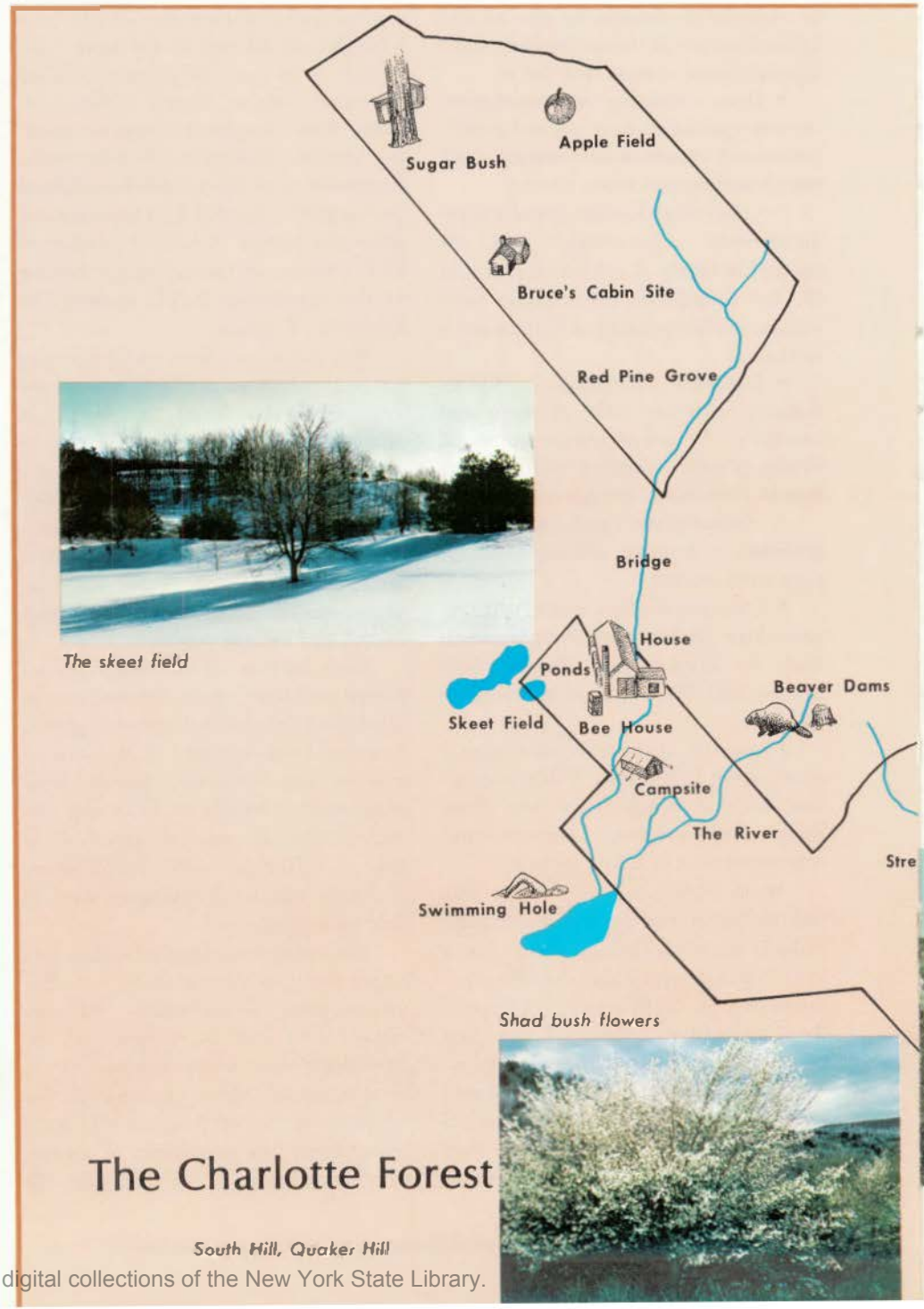
SO many years since good fortune first showed me three wooded terraces that rise like giant steps nearly 800 feet above the Charlotte Valley. Sometime in the dim and shadowy wilderness of our pioneering past they received the name of Quaker Hill. A mile upstream Otsego, Delaware, and Schoharie Counties join; 20 miles below is the junction of the Charlotte and the Susquehanna. Behind Quaker Hill the last glacier scooped out and then abandoned a spring-fed pond to the closing ring of sphagnum moss and dwarf spruce. Between the pond and the creek a brook drops 600 feet with enough seasonal bounce to have once turned a sawmill.

My first visit fell on a bleak November day midway between the fall of leaves and the fall of snow. No sunshine and few birds or flowers were there to enliven the landscape of sodden ground and bare trees bordered by leaden sky. But I was a woodsman in search of a forest home and thought to have found one in the surrounding woods. They became mine for keeps, and have since manyfold rewarded my choice with all the values, interests, and bounties that a woodland can give.

Land use maps of New York show the Charlotte Valley as among the very best in the state for corn and cattle. As far back as 1751 Sir William Johnson must have sensed this. As Commissioner of Indian Affairs he arranged the transfer to King George II of lands on both sides of the Adagaghteingay, the Iroquois name for the Charlotte. He did so by handing over 300 British pounds worth of commodities to Aroghyiadecka and nine other Oneidas of improbable names. Schoharie Germans had made canoes on the Charlotte, and one Ludowick Becker was farming at the foot of Quaker Hill. In time the village of South Worcester appeared around his farm with church, school, smithy, mill and general store. Outward in all directions spread newly cleared fields bounded with walls of stone, indelible imprints of New York's rural past.

A century and a half later agriculture was in full retreat, and by 1947 farming had long since ended on Quaker Hill. The thousand acres I purchased included at least a half-dozen former farms in various stages of regrowth to forest. The human presence had deeply modified even the permanent woodlots. An early and pioneering industry had felled and peeled the then abundant hemlock for the tanin bark. Much pine and hemlock had served in farm buildings; much hardwood had heated houses or been distilled into chemicals, or passed through the sawmill that the bouncing brook once turned.

Still there were exceptions. Loggers using oxen in the last century were not able to reach all the hemlock on Quaker Hill's north slope. They had left thereon



The skeet field

Shad bush flowers

The Charlotte Forest

South Hill, Quaker Hill

Years oodlot

S. Kernan

a strip of primeval timber three centuries or more in age and a yard or more in diameter. The steep sides of the brook had protected some gigantic hardwoods and white pine, and the boggy surroundings of the pond had protected their pitcher plants and spruce.

My forest land was among the first to be enrolled under the Forest Practice Act and to become a tree farm. The topographical map and management plan revealed extensive areas of old field and second-growth as well as some 400 acres of marketable timber. I have sold 651,517 board feet of logs and 269 cords of pulpwood. Together with Christmas trees, firewood, and other small items, the sales totaled $33,475. During the same three decades, my woods have supported local schools and governments with $23,865 of taxes. The $9,610 difference is a 5.3 percent yield on the purchase price, a yield comparable to most common stocks, and far more interesting. At least I think so. The low purchase price and the quantity of salable timber have made possible the "profits." (I do not calculate the cost of my time and labor because I enjoy woods work and would prune, chop, and saw for the mere pleasure of it.)

Clapper Lake

Photos by Author

Two years ago came a drastic increase in taxes. My first tax bill back in 1947 asked only $6 a month for the local school; in 1976 they asked a staggering $160 a month. True, in 1947 maple logs were worth $23 a thousand board feet standing in the woods, and they are now worth around $100. But overall property taxes have increased by a factor of more than 10, from $332 a year to $3,941. Since only 400 acres can produce cash income to pay taxes, the enterprise cannot remain solvent at that rate. The other 600 acres have their own undeniable values, but among them is not that of producing money to pay taxes. As taxes have risen, they have more and more determined the size and timing of timber sales, whereas the deciding factors should be the condition and capacity of the forest. New York's new forest tax law—section 480-A (see "The New York State Forest Tax Law", THE CONSERVATIONIST, Jan.-Feb. 1977) intends to help resolve that contradiction with a much lower assessment and a six percent severance tax as the timber is removed. The longrun effect of a more rational basis for removals should be to bring about higher yields favorable to both the owner and the public.

Higher yields come about principally from the manager's knowledge of what and how much to cut, and when—not easy questions to decide in our northern hardwoods. They do form a forest type of notable variety and value, but with past use compounding their natural complexities and reenforcing a tendency to produce many trees that hinder the higher values sought. Eleven species of conifer grow spontaneously on my land and 25 species of hardwood.

From acre to acre the forest changes its mixture of species and age classes from seedling to primeval specimens.

In fact there are counterforces in the other direction. For example the hemlock, after the drastic cuttings of a century or more ago, is making a slow comeback. Attacks of a bark borer and fungus have largely done in the beech. The birch and basswood are of rather poor quality, while the oak, pine, cherry, and butternut are too scarce for counting as sawtimber. The result is that half the volume and well over half the value lie with the sugar maple.

Scattered among the sugar maples in a ratio of about one in twenty are white ash of superlative quality. Apparently the climate, the soil and the association with the maple are favorable to the sound, straight and clear boles, provided the crown can be in the sunlight above the general forest canopy. The poet Vergil wrote: "Ash is the most beautiful tree of the forest" — an observation as true in the central New York of today as in the Rome of 50 B.C.

For 30 years I have admired these stands and tried to favor their growth and quality, and to make sure that more of the same or better will follow removals. I therefore cut down the poorer species and specimens several years before logging to favor the better trees and their seedlings with more space and light. When the cull trees are out of the way and plenty of desirable seedlings are on the ground, I look for salable trees 18" and over in diameter. If enough are present to interest a logger, I can mark them for removal with full confidence that others of like species and eventually of even better quality will take their place.

To measure and give direction to this plan, I early chose 30 acres of promise and made a record of every tree. Present were 4,533 board feet per acre and 502 cubic feet of wood in trees from six to twelve inches in diameter. Five times since I have worked through those woods to discourage the understory of hop hornbeam and beech sprouts, and twice I have marked timber sales. They have produced 64,000 board feet of logs and $3,298. Moreover no less silvicultural experts than Professors Farnesworth and Minkler of the SUNY College of Environmental Science and Forestry at Syracuse have inspected the results and pronounced them excellent.

Other areas favored for work are old fields upon which grow dense young stands of maple and ash. As they change from seedling to sapling to poles and larger, the best stems stand out more and more with their straight form and rapid growth. Soon the cuttings need no longer be left in place but can become fuelwood. Selective and repeated removals for fuelwood can thus create a woodland of superlative beauty and promise.

Over the years my tolerance has grown toward the lesser species, toward the understory, and toward whatever may serve the needs of woodpeckers, hawks, squirrels, raccoons, and wild bees. Whatever tree I choose to cut I much prefer to put on the ground than to start the long process of death and disintegration with poison or girdling, a process painful to see and dangerous to be near.

Besides working in natural stands, I have planted 56 acres, at first of red pine but lately of native red spruce pulled from the slys of Quaker Hill and planted in 12" by 12" squares cleared of all other vegetation. Another pleasure has been to develop natural stands of white pine, hemlock and spruce by pruning and thinning them into park-like groves.

Here we have almost no markets for the abundant but low grade wood which the northern hardwood type inevitably produces. Therefore an appreciable improvement must come about through an investment in time, labor, and attention to rid the stand of the poorest trees whether they are salable or not. With the help of the Division of Lands and Forests and the Forest Incentives Program, I have invested between six and eight hours an acre upon the 500 acres where approved silvicultural work has been done and which are about the present limit of timbered lands.

The remainder has at present little or no timber of salable quality and little prospect of any. Nevertheless, even though timber sales have been the financial stay of my enterprise, they have not been the only reward of woodland ownership.

In fact the rewards have come in many forms and seasons. In early spring we have boiled maple sap into syrup and have dug for leeks before the buds have swollen into leaves. We have gathered wild apples in the fall for sauce, cider, and pies. Quaker Hill gives us 10 kinds of berries, four kinds of fish, and three kinds of nuts. We have tasted our own rabbit, raccoon, venison, woodchuck, goose, duck and partridge. Many herbs have given us tea, and wild ginger has flavored our ice cream. We have made muffins of acorn flour, jelly of hawthorn, soup of rosehips, wine of wild grapes, and spice of sumac. Hollow old beech trees have given us honey, and the swamps have yielded balsam fir at Christmas. The meadows give us wild flowers to decorate the house in summer and the woodlands hardwood logs for the winter hearth. We have a log cabin and a toboggan run; two swimming holes, four places for camping, six for picnics, and trails without number. There are waterfalls, caves, springs, brooks, lookouts and ponds that come and go with the seasons. Year after year beaver build their dams in the river, and year after year watch the spring freshets carry them away. The wild geese honk, the goshawks cry, and the soft note of woodthrush rings bell-like and clear through the deep calm of the summer woods.

Nevertheless, while loving all these things the land can give with no debt to axe, saw, or plow, I find my greatest satisfaction with long association and hard work. Aroghyiadecka once lived in this valley and sold his wilderness for a pittance. Today I would not imitate him and his friends for all the currency in New York, let alone for three hundred pounds of it, in kind or out.

Henry S. Kernan has combined ownership of forest property in New York and a career in international forestry with the U.S. State Department and the Food and Agricultural Organization of the United Nations. A graduate of the school of forestry at Yale, Mr. Kernan lives in South Worcester, N.Y.

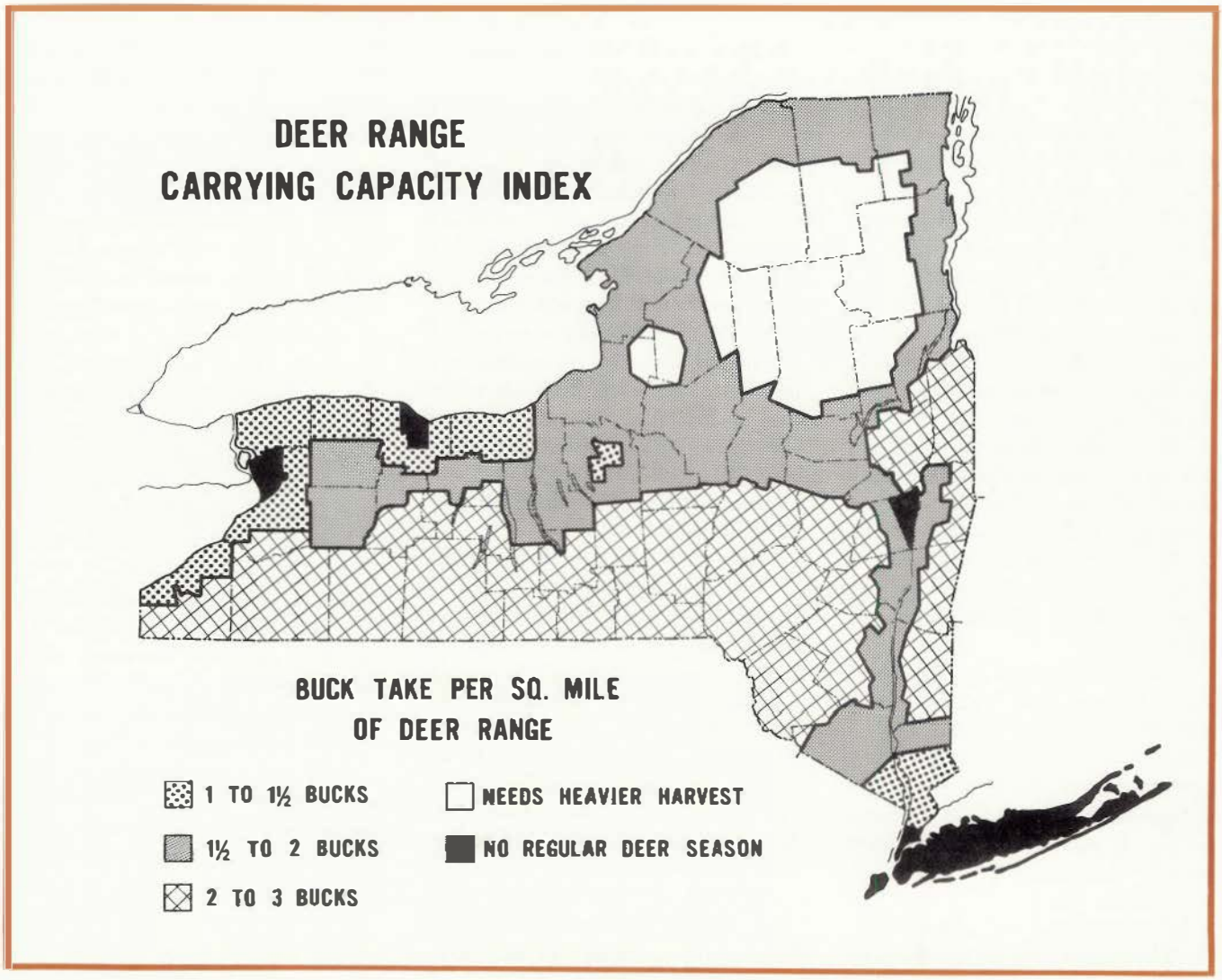
What is a Deer Management Permit?

by Paul Kelsey

Photos by Author (unless otherwise indicated)

A deer management permit is a device by which DEC can use the big game hunters to remove a predetermined number of antlerless deer from specific areas to better balance the deer herd with the food and cover, or with the economic and social needs of the local human population. Further, such a permit helps distribute the hunting pressure in relation to the deer population and harvest needs. It also helps distribute the hunting pressure throughout the season, giving greater recreational hunting opportunity and reducing the landowner tensions which have occurred during the one day any-deer seasons. The key word in all the forgoing is "predetermined".

How is a deer management permit used to get a predetermined antlerless harvest? First we must have a target. For deer management in New York this is the Range Carrying Capacity Index (see map). Ever since World War II, department biologists have been operating deer checking stations throughout the state, and thus have developed a good yardstick with which to measure the vitality of the deer herd. It has become apparent that if the buck kill exceeds three bucks per square mile of deer range for several years in a row, and other indicators of physical condition such as antler size go down, there is a reduction in availability of quality food on the range. Not as conspicuous as the smaller antlers produced by the bucks, but more important in maintaining the deer herd, is the reproductive rate of the does which also goes down. A healthy deer herd is like money in the bank at high interest—you can get a



State of New York, Department of Environmental Conservation

Wayne Trimm

greater return from it than you can from more money at a poor rate of interest.

There are parts of New York where agriculture, industry, and human density make it inadvisable to try to support this large a deer herd; hence in the area along the Great Lakes where intensive agriculture exists, and along the band of human density through the Mohawk and Hudson Valleys, reduced population densities of deer are required to avoid undue conflict with human concerns.

In the Adirondacks the weather is the big variable with herd starvation periodically overshadowing the best of management. This, combined with interrupted legislated authority makes it difficult at this time to establish a long range capability standard for the Adirondacks.

The state is broken into numerous deer management units, small ecological enclaves having distinct boundaries, such as roads or rivers. Currently there are 43 of these deer management units. As little change as possible is made in these units from year to year in order to facilitate management plans and to limit the resulting confusion caused to hunters. Their boundaries are not sacred, and if management needs call for boundary changes they are made.

The statewide buck season is set by the Legislature. Superimposed over this is an individually tailored antlerless deer season in each of the deer management units designed specifically to meet the needs of that unit. If no antlerless harvest is required or if the DEC doesn't have the authority to issue deer management permits in the unit no permits are issued for antlerless deer—as is the case in 20 DMU's this year. In deer management units where population control is needed, predetermined numbers of antlerless deer are permitted to be taken.

How are these figures determined?

Deer management unit X, for instance, has a buck kill of three per square mile of deer range. It is right on target, so we want to maintain a stable population. Long experience has shown that the removal of about one adult doe to each three adult bucks holds a population constant. If last year's buck kill was 600 bucks in DMU X, that would mean that 200 adult does must be removed this year or the population will fluctuate. Two hundred, then, is the predetermined number of does we want to remove. In addition to each adult doe, one fawn will also be taken. That means that 400 antlerless deer will be taken. Experience has shown that only one of every two permits issued will be successfully filled. Therefore, to get the predetermined 200 adult does, 800 deer management permits must be issued.

If the buck kill had exceeded the 3 bucks per square mile of deer range, it would have indicated that there were too many deer in the DMU for the long time good of the herd. With reduction in order, a few more than the 200 adult does would have to be removed, the exact number determined by the size of the excess, condition of range, health of the herd and its reproductive rate.

Even if the buck kill had been a little below the three bucks per square mile of deer range, the removal of fewer than 200 adult does would have been possible, while still permitting the herd to increase.

The hypothetical figures for DMU X were very round. Fortunately the computer can take the much more detailed figures for each DMU and digest them quickly, spitting out the required information in a short time.

Now we have determined how many permits are required to obtain the required antlerless harvest, how do we come up with the number of hunters in a group?

The obvious answer is to divide the number of anticipated hunters who

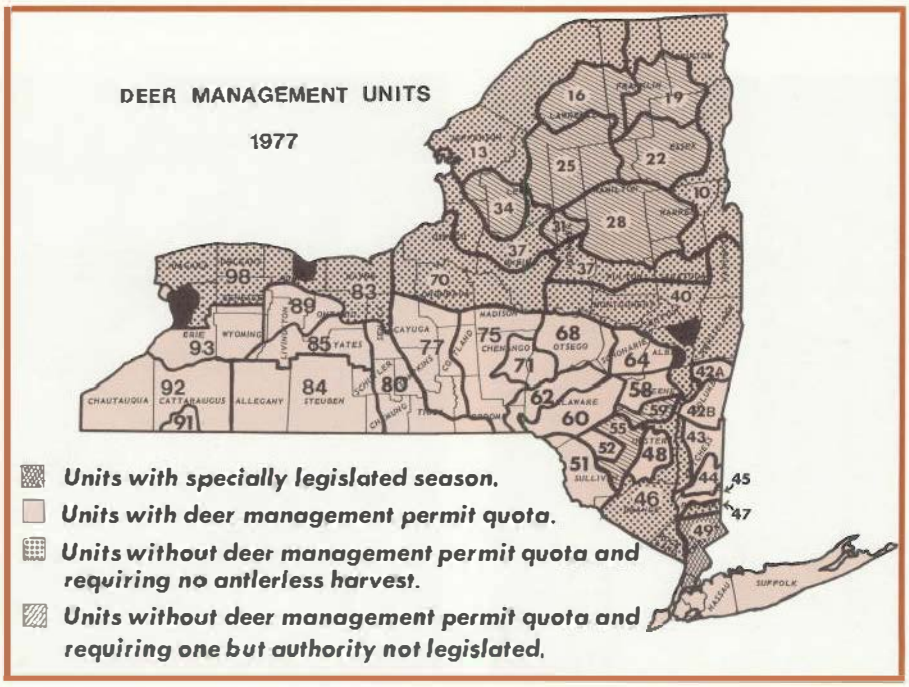
want permits by the number of required permits and that would determine the number of hunters on each permit. Presumably everyone would then be happy. But in many cases this would result in eight to ten hunters in a group. Experience has shown that most hunters feel a group is too large when it exceeds four persons. So since 1974, group size has been four or less. This, however, means that not as many persons can participate in the antlerless hunt. Those whose applications for permits are rejected aren't happy either. No matter what you do, you can't make everyone happy. In 1977 an experimental "preferencing" system is being used in an attempt to lessen the chances of a person being rejected in applying for a permit over several consecutive years. Applicants rejected in 1976 are being given non-selection preference certificates entitling them to preference in the issuance of 1977 permits.

To insure that landowners have a good chance of hunting antlerless deer on their own land, half the deer management permits are set aside for landowners' parties within the DMU. In most cases not all of these are used. They are then reassigned to the regular permit allotment and available to any applicant.

Successful deer management depends on the cooperation of deer hunters carefully filling out and submitting the deer management report cards supplied with each permit. This enhances the success of the deer management program by providing needed data which helps determine future season limits.

It would be ideal if the desired management harvests could be made with simpler regulations, but experience during the late 1940's and 1950's showed that under New York's heavy hunting pressure too many deer were harvested under the one day any-deer seasons. This resulted in marked fluctuations in deer populations.

Lotteries to give limited numbers of hunters permits to take the required antlerless deer were greeted with disfavor, for too few could participate. Wisconsin had tried a party permit to solve a similar problem in their state with reasonable success. In 1960, New York took the most applicable parts of their program and started out with three party permit areas. With each passing year, more experience has been gained and the system refined, so that today the deer management permit is a well honed knife to slice off just the needed surplus population to keep our deer herd in proper balance with its range or with the humans with whom it shares its range.



A Salute to Au

by Joy and Frank Bear

Photos by Authors

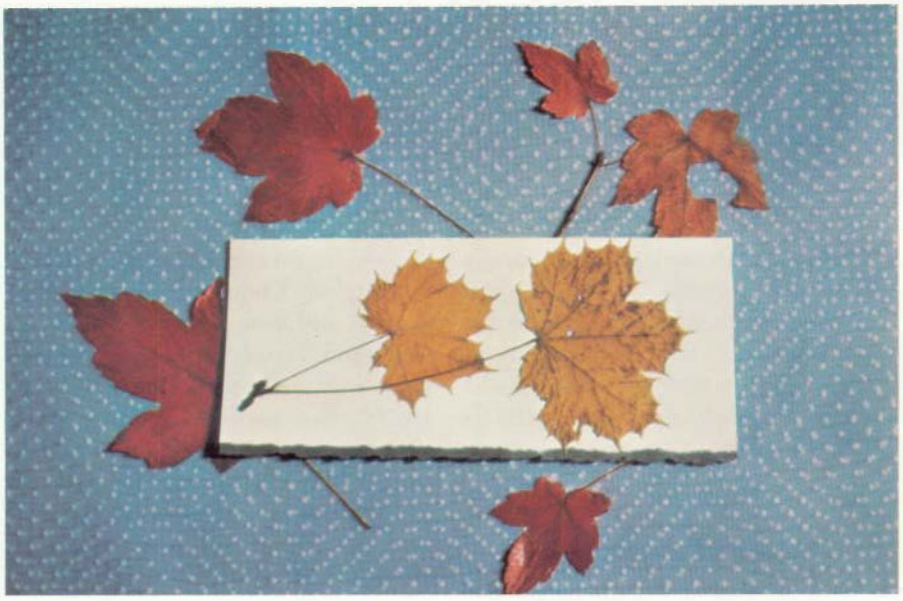
WITH October and November comes a climactic excitement to the natural world. Trees begin closing down their giant waterworks. Chlorophyll leaches from leaves, which slip into scarlet and gold raptures—into purples and lemons, crimsons and browns. It is a time of primitive emotions to which we respond urgently, without knowing just why.

The colorful season is short; winter's approach is inexorable. Let us not deny ourselves the joy of autumn foliage. Trees are everywhere, in cities, in suburbs, and in our own yards. Let us, however, walk with the spirit of the environmentalist. While we admire, we will not pick, break or plunder. We will stay on paths provided for our use. Few places object to strollers picking up leaves which have fallen onto a path. Once in the hand, a leaf sometimes seems so perfect we feel that it should be kept and cherished a while—even shared with others.

This is how our card project was born, of a desire to enjoy fall leaves a little longer, and to share their beauty with others. If you make and send a leaf greeting card, it will be noticed, commented upon and treasured. If you send these cards during the holiday season, they will stand out from the rest.

Best of all, the cards are fun to make, and collecting the leaves will store up enough golden moments until spring.

utumn Leaves



How to Make the Cards

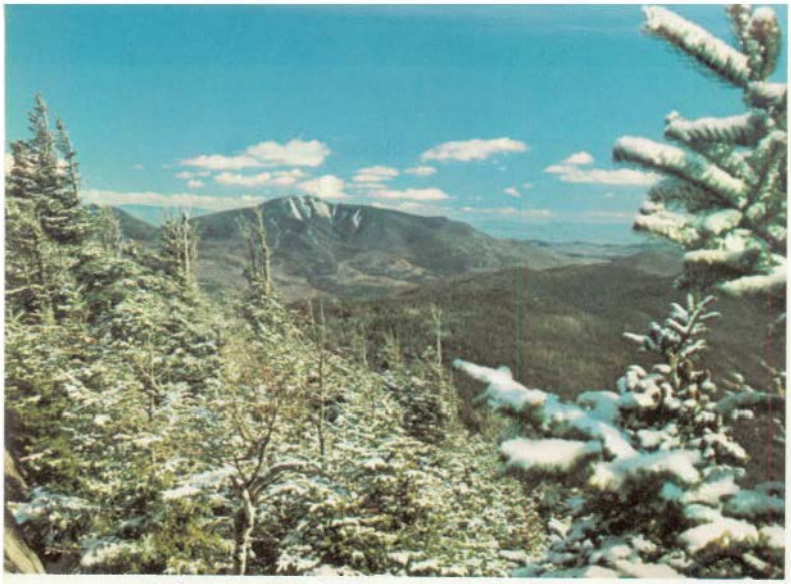
After your leaves are collected, dry them between several sheets of newspaper, under a board or weight, for about a week. Stiff leaves, such as oak, can be relaxed by dipping in hot water before pressing.

Blank cards and matching envelopes can be found in stationery stores, or you can make your own. For custom-made cards, visit an art supply store for large sheets of paper in white or pastels. Open an envelope for a pattern, and trace it on your paper. Cut your card to fit the envelope. A one-fold card is usually more attractive than a single sheet.

Attach the dried and pressed leaves to the cards with a thin film of white glue. Cover the card with aluminum foil or wax paper before pressing, in case you have been too generous with the glue. Press under a book or light weight for about an hour. That is all.

Considerations involving etiquette, safety, and aesthetics prompt a few final hints: stay on paths, and collect only fallen leaves; know your plants (poison ivy has some of the loveliest leaves); keep an open mind—insect-eaten and wind-torn leaves, brown as well as bright, are all attractive.

Joy Bear has been for the past 13 years an exhibits designer for the Nassau County Museum on Long Island and a freelance writer. **Frank Bear** is a producer of educational films and former chairman of the Nassau County Planning Commission. Both Mr. and Mrs. Bear are active in environmental organizations.



Early Winter Landscape *Photo by Joe Turon*

LETTERS

Good But Could Be Better

As a "cooperator" landowner—that is a landowner who is cooperating with the Division of Fish and Wildlife in the N.Y.S. Department of Environmental Conservation to provide free hunting under supervision—I wish to report that, on the whole, the manners of hunters are greatly improved by this program.

Since the people of this area decided to join with DEC officials for controlled hunting, we have heard fewer midnight shots indicating deer jacking, have seen less of the hunters with a flask on hip who turn every hunting party into a drinking party and, on the whole, have felt less frightened of stray bullets than previously.

But, there is still room for improvement. For instance, we note an increase in roadside litter at the end of the hunting season. On one occasion this past year, we picked up a plastic bag filled with shotgun shells and beer bottles on a wood road leading into our property. At least this group of hunters used a plastic bag for their litter instead of scattering it broadside. But I wonder if any of them reflected on how they would react if I dumped a similar bundle of litter in their dooryards? Do they think at all of the imposition they impose on landowners who have to give time and effort to clean up after these thoughtless visitors? In addition to personally handling the throwaways, we have to pay for sanitation service to haul it to the town landfill. On some occasions it amounts to an extra barrel full.

Although the game-protectors are as vigilant as possible, there are still trespassers into safety zones accorded the cooperators. They leave plenty of evidence with a trail of shotgun shells through woodlots near our buildings which are off-limits to hunters.

Lettie Gay Carson, Millerton

A Memory of John Burroughs

As a student of the life of Thomas Edison, I found Paula Metzler's article, ("In Nature's Laboratory," July-August 1977) about Edison's camping trips into the Adirondacks very interesting.

An incident that occurred on one of these trips may be of interest to your readers. Edison, Henry Ford and John Burroughs were traveling in an open car which developed mechanical trouble. They stopped in a small Adirondack town and located a taciturn mechanic who proceeded to diagnose the problem. Edison and Ford were dissatisfied with his progress and made suggestions which the mechanic completely ignored. Finally, Edison could bear it no longer and said, "I know what I'm talking about, I'm Thomas Edison." Ford likewise identified himself. The mechanic looked up and, pointing at John Burroughs sitting in the car with his long white beard, said with a drawl, "Yes, and I suppose he's Santa Claus."

Richard Kroboth, Vestal

Birdwatching with FDR

I was interested in Mr. Whitehead's article concerning President Roosevelt's birding trip in May of 1942 in Dutchess County along with Allen Frost (I still have Allen's check list for 1942) and Raymond Guernsey, whom I knew very well back in the 1940's and 1950's. This particular birding trip is what we natives in the county call the annual May Census and is taken the middle Saturday or Sunday of May each year. The tradition was started by Munsell Crosby who lived at "Grasmere" in Rhinebeck in 1919 and except for the pre-war year of 1940, the county bas never missed a May Census. After Crosby's death in 1931 the census was carried on by Frost, Guernsey, Frank Gardner, Jr. and the late Ralph T. Waterman, after whom the local county bird club was named in 1958. I went on my first census in 1946 by the way.

In the past 19 years the census has covered all of Dutchess County with the use of 5 to 8 groups of birders (rather than only one). But the one group which I lead still follows the route from Thompsons Pond to Grugers Island to Hyde Park which Munsell Crosby and Ludlow Griscom started in 1922 and was the one used in 1942 as well. Naturally the environment along the route has changed a good deal, but last year we had 124 species compared to the 108 in 1942 and in 1972, we had a high of 130. Incidentally we now keep a record of the total of each species seen as I find simple check marks seen years later give a poor picture of the status of species.

Thank you for the interesting article and your excellent magazine which so well covers the many many aspects of our environment, and hopefully the

conservation of this environment before it is too late.

Otis T. Waterman, Poughkeepsie

Replies to Lt. Kaminsky

The May-June letters section of THE CONSERVATIONIST contained a letter from a military man that I cannot let pass without comment. He objected to a wide coverage of cucumbers on the ground that it demonstrated a tendency of your magazine to engage in paltry digressions about unimportant things. The priority items he then listed were the very same that seemed to make his stay in Alaska worthwhile: abundance of game and the assurance of that abundance. He made an initial mention of improving wildlife habitat, but it was obvious from the earlier and later parts of the letter that even that term centered on a concern that he gets a kick out of, and thus feels is the only valid concern for a magazine that deals with conservation.

If Lt. Kaminsky hotly objects to some of the "homier" concerns, instead of simply passing over them as they occur, he should either find a different magazine—or better yet, should look and listen a bit and discover that there is more to the enjoyment of being part of nature than can be contained in a gunsight.

He also apparently reads only those parts of Alaska Magazine that suit his fancy, and has overlooked that breadth of scope that prompted editor/publisher Bob Henning and his company to change the name of the magazine from Alaska Sportsman several years ago. I am a former and future resident of Alaska, and can assure him from ten years of reading Alaska that that excellent publication has looked at length into many things he considers unimportant—but Alaskans do.

Harold D. Wessell, Scotia

As an Alaskan resident with home ties in New York, I am writing in response to Lt. Albert F. Kaminsky's letter in the May-June 1977 issue.

Alaska Magazine cannot compare with our favorite, THE CONSERVATIONIST, for which we have many years of back issues and plan many years of subscriptions. We appreciate your magazine for its variety—from pickle recipes (Alaskan beets are great in a New York recipe, July-August 1976) to the sketchbook, to cultural and historic interests in the arts and crafts, to environmental concerns, and lastly to wildlife information for sport hunting. Thank you for maintaining such high standards in THE CONSERVATIONIST.

Susan and Don Brusehaber, Eden, N.Y.
or Eagle River, Alaska

Charles Livingston Bull

I am delighted with the portfolio of illustrations by Charles Livingston Bull and the text by Donald Tuttle.

My interest arises from the fact that my father's book of short stories of wildlife, "Green-Timber Trails," is graced by illustrations by both Mr. Bull and Paul Bransom.

The seven short stories originally appeared in the old St. Nicholas magazine and when collected into a book by the Century Company in 1920, were illustrated by eight drawings, four by each artist.

My father, William Gerard Chapman (1877-1945), was a student of wildlife in both northern Wisconsin and the Timiskaming district of Ontario, from which locales he drew the inspiration for his stories.

He was, incidentally, a native of Peekskill and spent his boyhood years in Greene County.

Gerard Chapman, Mill River, Mass.

Road-Killed Deer

While driving near our country home, in southern Cattaraugus County, this past April I observed from the road what appeared to be the fur-covered carcass of a deer about fifty feet away. As I walked nearer to the animal I was startled to see the deer raise its head and make a vain attempt to crawl away on two front legs. A closer examination showed that both hind legs were broken, one was rotated a complete 180 degrees, also that a large patch of fur about the size of this magazine was missing off the hind quarter. That wound was skin deep, right down to the muscle. I immediately contacted the sheriff's department. A deputy arrived and put an end to the animal's misery. To the best of our collective abilities and with available information, we approximated the deer was there a minimum of seven hours.

Incidents like this one infuriate me, when apathetic people won't make the effort to locate and have destroyed, if necessary, an animal they have struck with their motor vehicle. If a driver chooses to hit an animal to avoid an accident, he or she assumes the obligation to check to see if that same animal is dead or injured.

In this particular case to hit a deer causing such severe damage and let it suffer needlessly is inexcusable and the blatant abuse of a natural resource that belongs to all. People should remember a driver's license is a privilege, not an inherent right, subject to state government's judgments concerning state resources.

Richard Battaglia, Buffalo

Something Strange

We photographed a strange looking insect at our property in Allegany County and wonder if you might be able to identify it.

The insect landed on a maple tree, unraveled a long prong-like feeder which it injected into a crack in the tree. Then it removed sap from the tree, which was stored in a clear plastic-like bag at its rear. The same bag served as a storage container for the feeder prong. Is this some rare insect?

Donald J. Norton, Williamsville

• *The strange looking creature in the picture you enclosed is an ichneumon fly—a wasp-like insect that preys upon other insects. What the fly is doing is depositing its eggs in a grub or larva of another insect.—Editor.*

Book Reviews

Conducted by Joan Taylor

The Book of Sharks, by Richard Ellis, 251 pages, Grosset and Dunlap, Inc., $25.

Forty-five years ago I was asked to help write a book on sharks, the first general book on these sea marauders ever written. It was not without its faults, of course; some of them were biological, some of omission, some of neglect to establish a scale whereby to judge the size of illustrated species. But at that time there was no thought of consideration for the beauty of the pantophagous fish, nor the remotest inkling that some day it might be well to conserve them, rather than attempt extermination of all the various species.

Past decades have provided the general reader with many good books on shark fishing, angling for sharks, the commercial aspects of shark fishing, and observations by competent scientists and researchers. But no complete book on the various species of the world has been available to the public until the recent appearance of "The Book of Sharks" by Richard Ellis of New York City.

This is the first time, to my knowledge, that the entire field of sharks and their habits has been exposed by a meticulous writer and artist after years of extensive research (much of it firsthand on and near the sea). For Ellis is an expert painter enamored by sharks, thorough in his research and interpretation of the various species, so that the book is a splendid compendium and eminently readable.

The illustrations in color of various well-known shark species provide the reader with easy recognition and a gratuitous appreciation of the beautiful conformations in nature's adaptation to the primary purpose of biological functions; sharks are living fossils dating back at least 300 million years, and now are little changed from those early times. With delineation of diagnostic shapes and the arrangement of fins and tail structure, shark species are shown in full-page plates whose color and values are spectacular.

The relationship between author and subject in "The Book of Sharks" implies such complete rapport that we need seek no further for a readable, yet scientific text that pleases both literary and artistic discriminations. Conclusions are duly documented from recognized authorities and a growing number of "shark people" whose daily, intimate contacts with sharks, in both the laboratory and the ocean, provide the stamp of fidelity.

A final chapter describes, with illustrations, the sharks indigenous to American waters, followed by an excellent index. It is easily possible for the reader to learn the zoology, biology, morphology, provenance, location, nomenclature, paleontology and neontology of various species, while enjoying data on habits, customs and the beauty of these undersea predators.

No study or discussion of sharks is complete without inclusion of anthropophagy, or man-eating, tendencies. Ellis has presented an adequate number of conclusions from scientists and divers who are more or less vitally interested in the ethology, or biological study, of animal behavior and inclination to attack mankind. Oddly enough, there is apparently little tendency for sharks to attack man with the sole inteution of devouring him forthwith. It has happened, of course, hut many more cases of shark attack record an initial rush, a single bite or gnathic snap and the departure of the shark for other areas of the sea. How and why such habits occur is one of the present researches of the ichthyologists.

Likewise, search is continuing for an adequate shark repellent, whether chemical or acoustical. It may be that such experiments will eventually discover how to repel sharks, but it has not yet been accomplished.

Ellis, a believer in conservation of sharks for their own sake, in his afterword states: "The years I spent studying the shark are only seconds in its history. With no regard for me and no awareness of how hard I tried to hold or understand it, the shark swims on, ceaselessly, toward immortality . . . Like Everest, the shark will remain indomitable."

It is this reviewer's conviction that Ellis has understood the shark, truly and well, in his monumental volume, and presented it as it is, a tour de force of considerable achievement. — Horace S. Mazet

Ski Touring in New England and New York, by Lance Tapley, 188 pages, Stone Wall Press, Inc., 5 Byron St., Boston, Mass. 02108, $4.95.

What do I need, how to do it, and where to go—these are the three questions uppermost in the minds of those taking up a new activity for the first time. If you're considering ski touring, Lance Tapley's new volume has the answers for you. While there are many books now on the market which deal with the technical aspects of cross country skiing, Tapley's is the only one to this writer's knowledge that combines a discussion of equipment selection, waxing and ski technique with an extensive section on where to go.

The last few years have seen the appearance of a large number of Nordic skiing resorts, small intimate affairs centered around a farm, a lodge or a public park. These offer groomed trails, equipment rental, instruction, in combination with indoor facilities ranging from a simple snack bar to full scale overnight accommodations. The days are passing when people learn Nordic skiing through the efforts of dedicated enthusiasts; nowadays these resorts are the principal source of instruction and other aids in getting started. Tapley's book starts in Maine, works its way down through New England, and through New York from the Hudson River Valley to Buffalo. In each case, he gives some idea of the flavor of the place and the geniality of the host. There is no other book like it. It is the premier guide-book of cross-country skiing.

But Tapley does not restrict himself to resort areas as he comments exten-

sively on the vast areas of public land in New York which are suitable for ski touring. It is a dual guide written for both those who are just getting started and for those who desire something more adventuresome.

While for many, Nordic skiing is identified with the mountainous area of New York State, such as the Adirondacks and Catskills, Tapley has shown that there is much activity in central New York near Syracuse, in the Finger Lake district, and on the Niagara Frontier. Ski touring is closer to home than you might think. But Tapley is more than just a recreationist, he is also a philosopher, and an artist. His book is full of beautiful descriptions, and passages on the meaning of the outdoor winter experience.

This is a work of many dimensions that should find a place on the shelves of all serious outdoor enthusiasts. — Almy Coggeshall

Heartland, A natural history of Onondaga County, by Mike Storey, 102 pages, 16″ × 20″ topographic map of county, Onondaga Audubon Society, Inc., Care of Beaver Lake Nature Center, 8477 E. Mud Lake Road, Baldwinsville, N.Y. 13027, $4.50.

While there is an abundance of information about the natural wonders of our country—its geology, flora and fauna—in beautiful coffee table books, or in technical texts, there is also a glaring absence of books available to the outdoorsman which relates this information directly to his own community. Few laymen have the time, temperament, or training to dig this information from its many diverse sources. As a park ranger naturalist, and later as a naturalist at Beaver Lake Nature Center in Onondaga County, and now as its superintendent, Mike Storey could see how this type of information was gobbled up by people when it was made available, and how it increased their interest in what was around them, and their desire to work for a better environment.

Onondaga County may have the greatest variety of wild communities in the state with its marshes, swamps, lakes, canyons, hills and forests. In "Heartland" these are given life through explanation of how specific areas were created by the retreating glaciers. The paradox of the northern trees—the beech, birch, maple and hemlock—being found in the southern part of the county, while southern trees—tulip, cucumber, oaks, and dogwood—are found in the northern part of the county, is explained in relation to the county's soil and topography. In a chapter, "The Great Chain," the topography, soil, water, plants and wildlife are all put together showing their ever-changing interrelationship from the time that the early settlers pushed back the forest to create their farms, until the present, when many of those farms are now woodland again, with numerous interesting stops at waystations where the many steps in the process can be seen living on the land today.

A part which users will find invaluable gives maps and descriptions of eleven unique natural areas in the county. Even the curious newcomer to the county will quickly find some, such as the Clark Reservation State Park with its geologic wonders and unique flora, but others, such as the Camillus Valley unfortunately have been overlooked by most outdoorsmen of the county except the ardent trout fisherman and a few spring warbler watchers.

Though it was designed to bring better understanding of their county wild land and its biotic communities, I can see another subtle value, for within every community are naturalists—either by vocation or avocation—who could use the pattern established by Mike Storey, and enrich the outdoor experience of their neighbors, just as he has for the "Heartland" of New York.

— Paul Kelsey

Books Received

Ecology Out of Joint: New Environments and Why They Happen, by Louis J. and Margery Milne, Charles Scribner's Sons, $8.95.

The Tree Farm, The Rebirth of a Forest and a Family, by Robert Treuer, 244 pages, Little, Brown & Co., $8.95.

About this issue

Our November-December issue is devoted in goodly part to the Erie Canal. We have long wanted to do the story of "Clinton's Ditch" for any number of reasons. From its official opening until its replacement in 1918 by the present Barge Canal, the Erie dominated the social, economic and environmental history of New York State. Conceived in controversy, built amidst doubts as to its economic success, the Erie Canal proved to be wildly successful beyond the wildest dreams of its investors. It opened New York State to settlement and gave impetus to the expansion of such cities as Albany, Troy, Schenectady, Syracuse, Rochester and Buffalo. It served as a conduit for the thousands of new immigrants in their trek to new lands on the Western frontier. It helped make New York City the greatest seaport in the nation. And in so doing, the canal irrevocably, for better or worse, altered our environment, changing forest into farmland, and sleepy village into thriving urban center. Although we cannot cover the story of the Erie Canal in its entirety, we at least hope to give our readers some of the flavor of this exciting era. In preparing this special section we have had the help of many people but we particularly wish to acknowledge the contributions of Darrell P. Welch of the New York State Library, Jeff Daley of the Schenectady Museum, James Gregory of the New York Historical Society, Marjorie Freytag of the Munson-Williams-Proctor Institute, Patricia Daragan of the Canal Museum in Syracuse and members of the Canal Society of the Onondaga County Historical Association.

Our other feature story concerns the duties and training of DEC's Environmental Conservation Officers. We think the story is quite timely considering that the ECO's are most visible to the public during hunting season, but if you are like us, you will be quite surprised and pleased to find out that they do a great deal more than track poachers and trespassers.

As a closing note we should like to introduce Graham L. Cox as DEC's new Director of Educational Services, replacing Holt Bodinson who recently assumed duties as director of the Arizona-Sonora Desert Museum in Tucson, Arizona. Mr. Cox is a graduate of the University of

Sheffield, England and has pursued graduate work in environmental management at SUNY (Geneseo) and in land conservation and environmental law at the State University Law School, Buffalo. Mr. Cox was employed by the Rochester Times-Union where he served as the newspaper's environmental reporter, served for five years as an assistant environmentalist with the Monroe County Environmental Management Council and immediately prior to his appointment to the department was acting director of the Genesee/Finger Lakes Regional Planning Board. Mr. Cox is married and has two children. We hope his stay with DEC will be both fruitful and enjoyable.

Graham Cox

Major New Hall Opens American Museum

In progress for six years, the long-awaited new Hall of Reptiles and Amphibians at the American Museum of Natural History will open on November 18. Preparators are now putting the finishing touches on the exhibits in the ten large cases that comprise the new area. The new exhibit is expected to be one of the museum's most popular permanent halls. It is located on the third floor in the Theodore Roosevelt Memorial Building on Central Park West. "The new hall emphasizes many aspects of modern biology, using reptiles and amphibians as examples," says Dr. Richard G. Zweifel, chairman and curator of the Department of Herpetology and scientific head of the new hall. "We show, quite graphically, how they move, eat, reproduce, use energy and ward off predators. We're not just placing them in a row under glass."

Your Questions Answered

conducted by Paul Kelsey

Preparing Deer Meat

I have been hunting deer for 25 years and have always had to bring my deer to a butcher because I have been unable to find good instructions for cutting a deer into steaks, chops, etc. Can you help me out?

Charles Landman, Nesconsit

The charts often shown, but without much explanation, are those using the standard method of cutting beef. Your librarian could probably find you step by step instructions for that. I think that there is a better way, and I am being joined by a growing number of sportsmen who prefer the old-fashioned method used by backwoodsmen—deboning the deer. This way you end up with three types of meat, steaks, stew meat and ground meat. The New York State College of Agriculture and Life Sciences has published a bulletin giving detailed instructions with good illustrations. "Boning Out Your Deer For Home Freezer Storage," #S99 is available for 25¢ from your local County Cooperative Extension Service Office, or by writing to the Mailing Room Building #7, Research Park, Cornell University, Ithaca, N.Y. 14853. It is surprisingly simple, and anyone who has had just a little carving experience and who has a sharp knife can do it. It may take a little courage to make the first cut, but once started it goes along very nicely. Start with the hind quarter, which at first glance looks like one large leg muscle. Closer inspection shows it is made up of a group of muscles, each in its own protective cover. Separate these carefully and detach them from the bone, cutting off and discarding the tough ligaments at either end. These can be frozen in one-meal lots for later processing, or they can be processed and frozen ready for the frying pan. The former requires more forethought for their use, for they must be completely thawed before converting them into steaks. To cut steaks from these small muscle segments, use a sharp knife, or better still, an electric knife. Cut them one-quarter inch thick across the grain. Some are going to look mighty small, but their size can be doubled by "butterflying" them. To butterfly a steak, stop the first cut just before completely severing the steak from the main body of meat. The second cut completely removes the steak but leaves it still attached to the first steak. They are spread like a butterfly for cooking. Parts too small for steaks can be used as stew meat or for ground meat. The secret of cooking these steaks is to cook them fast—about 90 seconds on a side—so a tinge of pink remains in the center. Cooked quickly, so that all the moisture is not driven out, they are tender and literally melt in your mouth. Cooked longer, they will quickly take on the eating quality of shoe leather. Don't try to save deer fat for use with ground meat, for its flavor will detract noticeably from the quality of the finished product. Instead, use beef or pork fat at the rate of about one pound of fat to each seven or eight pounds of meat. Some people find that sausage adds both the fat and a flavorful spicy taste.

Wild Flower Photography

The article on wild flowers in the July-August issue was one of the most interesting I have read. I have tried photographing flowers with a 35mm camera and find that with my ordinary lens I can not get all of the flower in focus. Russell Jenkins' photos were sharp and clear. Did he have a special type of lens for close-up photography?

Robert J. Mihevc, Herkimer

Russell Jenkins used fairly standard techniques of photographing the wild flowers in the July-August issue of the magazine. His camera was a Nikon with through-the-lens metering, using a 55 mm macro lens, which permitted him to get close enough to the flowers to obtain a large image on the film. All his flower pictures are taken either using a tripod or resting the camera on a sandbag. This eliminates camera wiggle, and permits slower shutter speed, which in turn permits the use of a smaller aperture to get greater depth of focus. There is one thing that discourages most casual photographers when they compare their pictures with those published by experts. They compare the published picture with their run-of-the-film picture. That published picture is only one of many pictures taken. For the article, Russell Jenkins showed our art director, Wayne Trimm, approximately 2,000 slides. From these, Trimm selected 400 which were further sorted to secure the 25 pictures finally used. Dr. Arthur A. Allen, possibly the leading bird photographer of a generation ago, put it this way. "The main difference between an ordinary photographer and an expert is that the expert doesn't show you all his pictures."

Hatching Fish Eggs

I hatched some bass eggs and bluegill eggs. Some were in regular fish tanks in the house with filter and pumps, others were in a large tank with fresh spring or well water running through constantly. All fish hatched beautifully. I fed them regular fish food, but they died after about two weeks. What did I do wrong?

Art Schepler, Hamlin

I am afraid that your fish died of an overdose of sanitary care—that they starved to death in the sterile environment created by your effort to insure that they had good clean water. They lived for two weeks on the yolk sac, and when this was all used, they were ready to start feeding on little zooplankton. They require live food, not dried food on which many of our aquarium fish will thrive. Shortly after they had emerged, you should have used a plankton net—one could have been devised from an old "silk" stocking—scooped it through the still water of an algae infested pond, and dumped all the slime into your aquarium. The slime would have contained many minute animals upon which the young bass and bluegills normally feed. If you had let your aquarium become green with algae, you might have had the zooplankton also, but at least you would have set up the proper environment so that you could easily have innoculated it with zooplankton as described earlier.

Beaver Travels

We enjoy watching the numerous beaver colonies here in Allegany County. Frequently it is necessary to live-trap them and move them to other sites. They frequently return to the sites, and herein lies our question. Often there are no connecting waterways between—how do they get back? Do they travel overland? How do they manage this with webbed feet, a huge tail and not all that many land-adapted defenses?

Kris M. Smith, Dalton

Beaver do most of their traveling along waterways; however, as you point out, they do on occasion travel overland between different watersheds. Though their feet are specifically designed for swimming, they are perfectly good for walking. Their tail isn't supple, or a thing of beauty that they can hold up over their back like a squirrel, but it is firmly attached to their posterior, and anyplace that the front part of the beaver can go, the tail follows along without asking any questions. An animal the size of a grown beaver is bigger than any other animal, except a dog or coyote, that it might contact in the wilds of Allegany County, so with his chisel-teeth, he has adequate defense for most situations. There is one other thing which you may be overlooking, and that is that the return of beaver to a trapped out pond does not necessarily mean that the trapped beaver have returned. You have probably heard biologists use the term, "Mother Nature hates a vacuum." Whenever any animal is removed from a good piece of habitat, a resident of a nearby habitat which isn't quite as good will quickly move in. There is a constant movement of animals into better niches in the environment as they are emptied. A beaver pond site that is good, but which has conflicts with human interests and must be kept vacant is a constant problem, for as long as it is attractive, beaver will continue to move in. Taking them out just sets the stage for the next to move in. Fortunately these transients are generally young animals with no family responsibilities; however, each spring a new crop of these youngsters is evicted from the home pond and starts out looking for a place to set up housekeeping.

Hummingbird Nest

While walking along Schoharie Creek I found a nest on a fallen limb. It was about three inches high, round, with the entrance on top about one-inch in diameter. The edges were neatly rounded. The inside was very soft—bits of hair, downy feathers, and lichen. The outside was uniquely constructed with what resembled cobwebs and grey lichen bits glued on for camouflage. Perhaps you can tell from this description what species of bird made the nest?

Nora M. Nahwold, Middleburgh

I have never seen a hummingbird's nest that was as high as the nest which you describe, but except for that, you have given an excellent description of one of their nests. Furthermore, hummingbirds are very apt to nest close to streams, often having their nests overhanging the water. The other possibility is that it may have been a blue-gray gnatcatcher's nest. They are very similar, but larger. If the outside diameter was under 1½ inches it was probably a hummingbird; if the outside diameter was greater than 1½ inches it was probably a gnatcatcher. Wood pewees also make nests which straddle branches and are covered with lichens, but they would be larger and are relatively shallow.

Headhunting Predator

Yesterday we found our female tree swallow in the bird house with her head missing. We lost four baby guinea fowl the same way with their bodies untouched. Several years ago the same fate happened to a litter of kittens upstairs in the barn. What animal would eat only the heads of its victims? This is so gruesome! I'd like to trap the animal lest it attack my bluebirds in the same way.

Mrs. John A. Meston, Rush

I think that you have two problems, not just one. I would suspect that the tree swallow lost its head because the nest box was not deep enough to keep her out of the reach of investigating raccoons. One probably reached in and was able to get her head, but she was able to resist being pulled out until her head was actually pulled off. The young guinea fowl and kittens which lost their heads were probably prey of a rat. The standard explanation for prey found without their heads is to blame the great horned owl, but your domestic animals, particularly when the kittens were upstairs in the barn, were in much better rat habitat than owl habitat. Rats generally eat the head first.

Artesian Well

For my rural home water supply I am dependent on a gravity well. Is there any way that I can improve the flow of water to the well?

Mrs. Francis Cooper, New Berlin

I have never heard the term "gravity well," but I assume that it is another name for a flowing well, more commonly referred to as an artesian well. If the head of water in the aquifer which supplies your well does not have enough pressure to give you adequate flow to handle your needs, there is nothing I know of which can be done to increase the flow. The flow from an artesian well is constant, going on whether you are using the water or not. Where the supply does not always meet the demand, it is possible to let it flow into a reservoir before it flows on out your overflow. If you draw the water for your water system from the reservoir with a small pump and pressure tank, you are no longer depending on the pressure and flow of the artesian well. As long as the reservoir is large enough to supply all the water that you will be needing at any one time, you will have both water and pressure. While not in use, the reservoir will fill again.

Coydog

Could you please define the term "coydog"? Is it a cross between coyotes and dogs, or between coyotes and wolves?

George Lynn, Shoreham

In the early days of the invasion of New York by coyotes, they often crossed with dogs, resulting in the coydog. Generally this was a dead end, for they had the dog's breeding pattern instead of that of the coyote, which resulted in the young being born at a poor time for survival. Now our coyote population is dense enough throughout most of the state so that there is relatively little breeding between the two different canines.

Dwarf Mistletoe

Dwarf mistletoe on black spruce (Above left) Witches' broom

Photos by Author

NEW YORK STATE is the home of the smallest member of the mistletoe family—*Arceuthobium pusillum,* or dwarf mistletoe. Not as showy as Christmas mistletoe (*Phoradendron* spp), dwarf mistletoe was overlooked for years, and while Christmas mistletoe was known in superstition and legend, dwarf mistletoe was unknown to science or anyone until 1871. In September of that year Mrs. Lucy A. Millington of Glen Falls discovered "a curious little parasite" growing on black spruce at the edge of a peat bog near Warrensburg. Within two weeks, Charles H. Peck, the New York State botanist, independently discovered the same tiny parasite on black spruce in Rensselaer County.

Dwarf mistletoe is a tiny, yellowish-brown, sparingly branched plant whose leaves are reduced to tiny brown scales. The entire plant is only 1 to 3 cm long. Dwarf mistletoe can be found from Pennsylvania north through the Maritime Provinces and west to Minnesota. Essentially, it has a distribution similar to black spruce, its chief host, but it has also been found as a parasite of red and white spruce, larch, and rarely of white, red or jack pine. Christmas mistletoe, with its broad, thick green leaves and small white berries is a much larger plant, being a parasite of deciduous trees from Pennsylvania south.

Dwarf mistletoe is often associated with witches' brooms—an abnormal growth of shoots at the end of a branch which gives the infected limb a broomlike appearance. Generally, they are found near the tops of tall trees. A witches' broom may be a few centimeters to more than a meter in diameter. Besides dwarf mistletoe, witches' brooms may be caused by fungi, insects, nematodes and other plant pests. Presumably the formation of a witches' broom is in response to a foreign stimulus that tends to alter the chemistry of branching and bud formation of the host plant.

It was witches' brooms that led Mrs. Millington to the bog in the first place. In her words, "In every case the limbs of the trees infested were very much distorted. Every twig bristled with the little parasite, and some trees seem to have died from the effects of its absorption of their sap." Asa Gray, an eminent botanist of the day and one who had received some of Mrs. Millington's first collections wrote, "It is curious to notice, first that a plant of this sort, growing on the boughs of spruce trees in such quantity as to distort and even destroy them, and in three (adjacent) counties of a long and fully settled region, has been entirely overlooked, and then, when discovered, found about the same time by two independent observers at considerable distance from each other."

Dwarf mistletoe flowers in late spring. If the individual plant is inconspicuous, its flower is even more so. Both male and female plants are produced, often on different trees. The fruit, a somewhat flattened, elliptical white berry, ripens in October. The fresh ripe fruit sticks to the beaks of birds. The birds then wipe their beaks on branches, where the seeds from the fruit adhere until germination.

Let's allow Mrs. Millington to finish the story. "Fearing that I should fail to get plants with full seed vessels, I picked a single plant with vessels very much swollen. While holding it gently between my thumb and finger, to observe it more closely, I felt the tiniest recoil of the capsule, and the seed struck me a smart blow in the face. I gathered another, and another, and each pretty little bomb went off with a force that must have carried it several feet away. When the seeds are being sown, there must be quite a brisk bombardment going on for several days."—Alvin R. Breisch

Painting by Wayne Trimm

Winter smells, winter dreams

PERHAPS cooler weather stimulates our olfactory nerves or perhaps with less to look at we compensate by seeking out good smells, but November and December are a sniffer's delight. On a bleak approaching-winter day while arranging a window box with bird offerings, the sharp scent of pine boughs quickens our senses. The oozing pine pitch stains our hands and the balsam odor lasts all day. Even the bright sumac has a dry, bitter smell. The birds will ignore the pearly-everlasting that we include for its beauty and quickly snatch up the bits of bread we tie on the boughs. The fat pine cones are soon stripped clean of the cornmeal and peanut butter mixture. The cornmeal lessens the stickiness.

Cleaning up the garden presents some interesting smells. Compost piles were built right in the garden area this year. Three piles of almost composted leaves, manure, vegetable and fruit leavings, and grass clippings were carefully layered with soil in the tomato plant cages. Who could truly describe the rich, slightly acrid odor of this beautiful black, crumbly mixture? It is time to cover it with plastic for winter protection. Odd weeds, vegetable plants, and scads of still fragrant dill weed are gleaned during the clean-up. These will be thrown on the main compost pile near the woods. Too many dill seeds will grow from this compost next spring. The garden will again take on the appearance of a crazy quilt pattern with clumps of feathery dill interrupting the vegetable rows. We encourage it for the wonderful pungent aroma that permeates the house wherever we place bouquets of the dried weed.

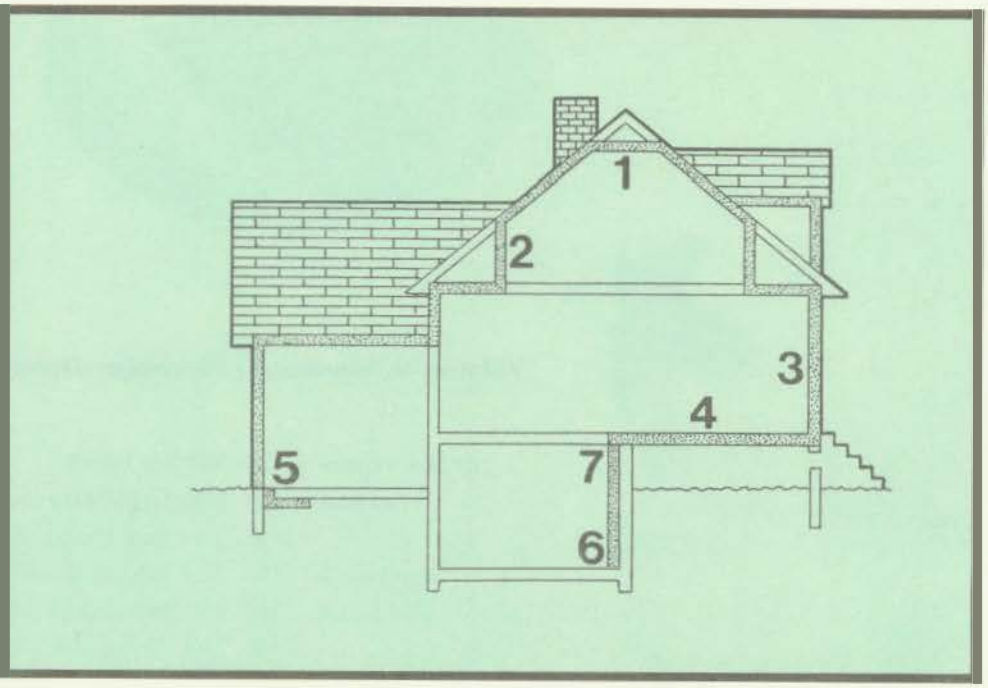
The approaching weather change will soon bring snow and a last tramp in the woods for holiday greens and berries must take place soon or the snow will prevent it. Our nostrils are pinched together in the cold wind but still the woodsy smells assail us. Dry leaves are stirred up by our feet and for just an instant we think of jumping in an inviting pile and just wallowing in the deep mixture of leaves and needles and duff. The icy winds bring us back from childhood fantasies and we quickly gather our greens, being careful to take only a few from each tree. We stop a moment to breathe in the odors of bark, ground pine, and all the vegetation that has dried but still emanates an earthy incense.

This will be our last excursion into the deeper woods. As the Mad Moon of November yields to the Moon of the Long Nights in December we will stand by the back door and sniff for the coming snow. The special scent of oncoming rain or its refreshing aftermath cannot compare with the smell of the first snow. We strain to feel and see the crystal sharpness. First the odor of swirling, whirling leaves and then the flakes tumble at us. The snow smells clean and as we watch it pile up we think of the wet wool smell of mittens and of boots and shoes drying too close to the fireplace. The smoke from neighbor's chimneys brings the thick fragrance of burning wood to mingle with the cold night air.

Many November and December days are spent in preparing special dishes for our holiday feasts. The lovely aroma of thyme and rosemary and sage and savory lingers only to be overtaken by cloves and cinnamon and rich pastry smells. Our rooms are pleasant with fragrance and we don't yet long for the days of last summer or dream of the coming spring. We enjoy this season for soon the longer nights of January will close in on us and the stuffiness of our houses will be overwhelming. Our senses will deaden and the delights of December will be forgotten. — Joan Taylor

Where to Insulate a Home

1. Ceilings with cold spaces above
2. Rafters and "knee" walls of a finished attic
3. Exterior walls: walls between heated and unheated spaces; dormer walls
4. Floors over outside or unheated spaces
5. Perimeter of a concrete floor slab close to grade level
6. Walls of finished or heated basement
7. Top of foundation or basement wall



Courtesy, Energy Facts, Cooperative Extension, N.Y.S.

An Energy Conservation Checkup

by Thomas W. King, Jr.

Now that winter is almost upon us, and our storm windows have been up for a while, we can safely forget about energy conservation for another year. Right? Not quite.

Before the first frosty morning leaves a coating of white on the ground, the householder owes it to himself and his country to take all possible measures for greater physical and financial comfort during the bitter months to come.

First of all, let's look at the simple economics of energy conservation. The higher your energy costs were last year, the more you will save by making energy conservation improvements. For example, windows and doors account for about 20 percent of the wall area in an average home. And heat losses through and around windows and doors may be responsible for as much as 50 percent of your fuel bill. An investment of around $50 in weatherstripping, caulking, and plastic storm windows (if you don't have glass ones) may cut this loss in half, which means that you could save as much as 25 percent of last year's heating bill. For the average homeowner, this would be a $150 return on a $50 investment.

For more elaborate conservation measures, you can figure that any improvements whose cost is recovered within seven years makes good economic sense. As a matter of fact, owners of large commercial buildings plan to get their money back in less than three years.

Start with the southwest exterior corner of your house and (working in a clockwise direction) check your storm windows. Make sure that they fit tightly. (Remember, the purpose of storm windows is to create a *dead* air space which does the insulating.) If you have plastic storm windows, make sure that the edges of the plastic are sealed to the window frame (masking or other pressure sensitive tape will do). Regular storm windows are best sealed from the inside with weatherstripping. Aluminum combination windows should be fastened tightly to the window frame with aluminum woodscrews and any spaces filled with caulking. While you are checking storm windows, also check between the window frame and sill, and the siding. Often there is a small space there where air can easily infiltrate. Use a good caulking compound and seal these spaces. An often overlooked factor is the cellar windows. So make sure there are storms there also. Check the corners of your house where the ends of the siding meet, around water faucets, exterior electrical outlets, and where there are porches or chimneys. Fill even the smallest spaces with caulking compound. (All spaces should be cleaned of dirt and loose material first.) If there are large cracks or spaces, fill with caulking cotton, sponge rubber, or mineral wool before caulking. Also check under the eaves of your house for small spaces where cold air may infiltrate or heat escape. Check around doors. Doors that are not absolutely necessary (especially those on the north and west side of your

house) can be sealed off for the winter (use a plastic sheet, but make sure it fits tightly to the frame). Otherwise, the doors should be made to fit tightly to the frames with weatherstripping. And don't forget the bottom of the door (and the keyhole). While you are outside, check the condition of your foundation and seal any cracks. Also check where your house meets the foundation and caulk any empty spaces.

Owners of mobile homes should make sure they have full and properly installed (vented) skirting. But before skirting, make sure that any exposed water pipes underneath have been wrapped with insulation.

Once the outside shell of your house has been completely sealed, it is time to check the interior. Begin by taking a lighted candle (a piece of smoking incense or punk is even better) and holding it around and under windows, doors, electrical switches, outlets and fixtures, and notice where drafts occur. First try to find the source of these drafts on the outside of the house and seal them there. However, even if you find them outside, seal off the area on the inside too. (Remember, insulate by creating dead air space.) Again, a good caulking compound, putty or patching plaster can be used. If drafts are noticed near windows, weatherstripping should be applied. Even if it is necessary to remove the weatherstripping next spring in order to open the windows, it will be worth the minor inconvenience and cost. Check all interior woodwork and plumbing for drafts and seal them off. You will be surprised to find drafts in the most unlikely places.

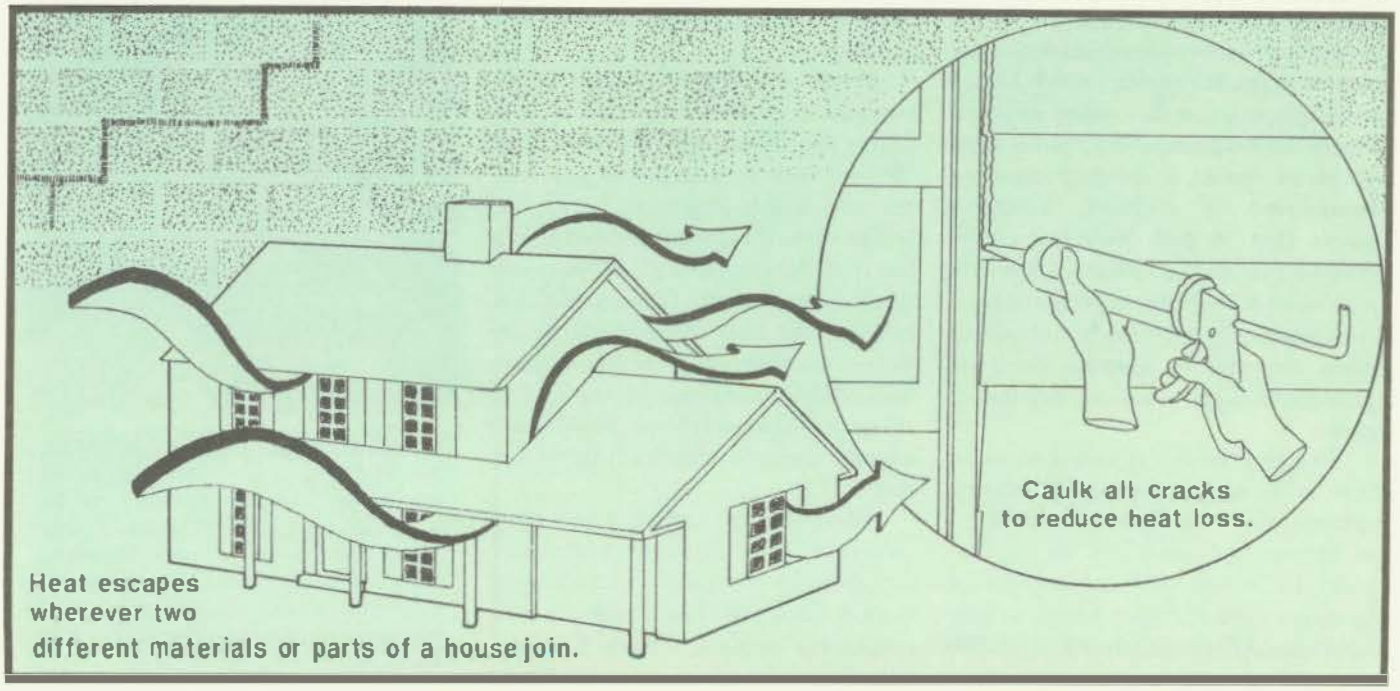
Now that the walls of your house are sealed, both outside and inside, go to the attic and check the type of insulation under the floor. "R value" expresses the resistance of different insulating materials and thicknesses to the passage of heat. In New York State's climate the total amount of attic insulation should have an R value of at least R-19 (R-30 is preferable, and if you have electric heat and live in the colder parts of the state, R-38 would be a good investment). Different types of insulation material and its form (bats, blankets, or loose fill) determine the R values. For example, 6 to 6½ inches of glass fiber in bat or blanket form has an R-19 value.

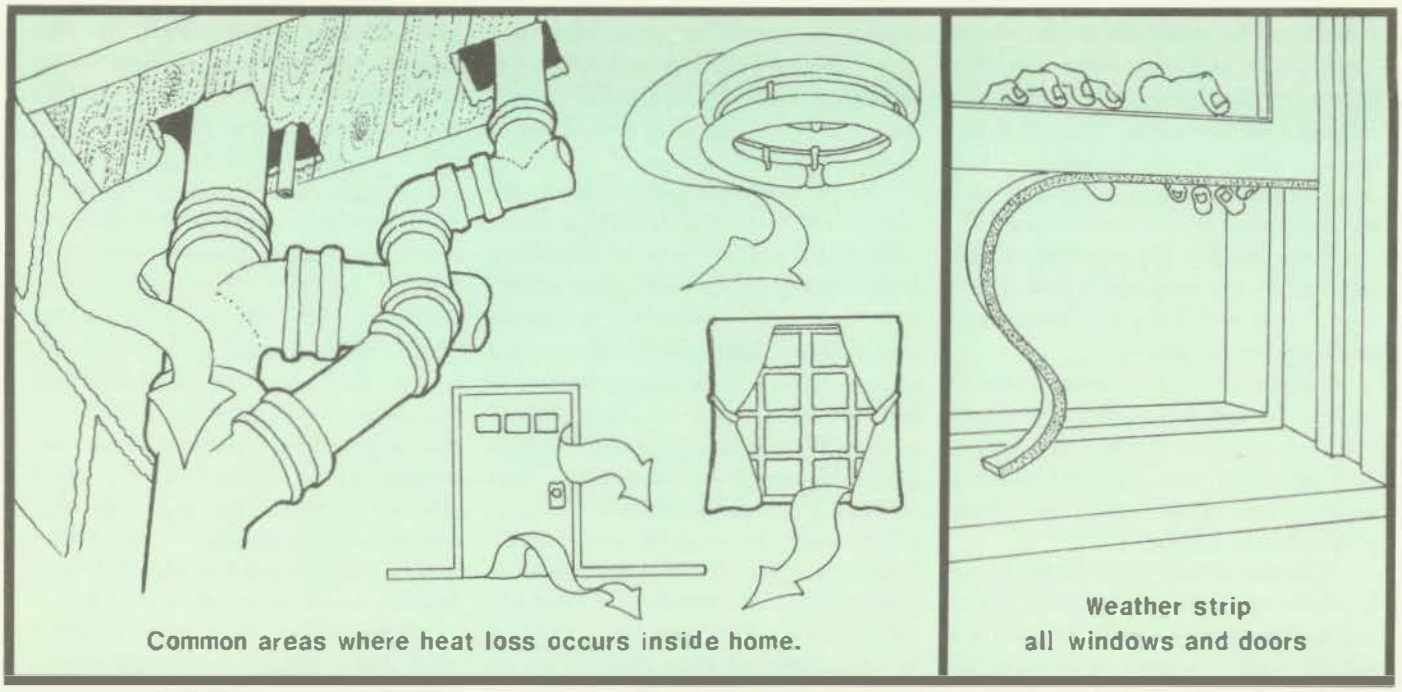
Every house in New York State needs some attic insulation. An excellent booklet on this subject is available from many of the utilities in the state or from the U.S. Department of Housing and Urban Development and is entitled "In the Bank—Or Up the Chimney—A Dollars and Cents Guide to Energy-Saving Home Improvements."

After your house has been sealed and properly insulated and you have reduced your heat loss to the lowest appropriate (from an economic sense) level, you should turn your attention to your heating system itself. In this climate, space heating accounts for up to 75 percent of all energy used in homes. So it is extremely important that your system be correctly sized and operating at its most efficient level. If you haven't already done so (for oil and gas fired systems), contact a reputable heating specialist. Have your furnace and flue outlets cleaned and have other checks and tests made as specified in the owner's manual. A properly-sized furnace should run almost constantly on the coldest days. If it shuts off for long periods, or is on and off for equal periods, it may be too large and waste fuel (a common problem in older homes that have had insulation added). If your furnace never shuts off, it may be too small. In addition, there are a number of other improvements and modifications that can be made to your oil or gas furnace to improve its efficiency and cut fuel consumption. These include flue recovery devices, orifice rectifiers, and jet size changes according to the season. Technical developments are occurring so rapidly that it is necessary to check the marketplace to see what is available.

One of the most obvious ways to save energy is to turn down your thermostat. In New York, an around-the-clock setback of 5 to 8 degrees from the traditional 72 can result in fuel savings of 15 to 20 percent. If your heating season fuel consumption is avera ing $600, that would mean a savings of $90

Courtesy Energy Facts, Cooperative Extension, N.Y.S.





Common areas where heat loss occurs inside home.

Weather strip
all windows and doors

Courtesy Energy Facts, Cooperative Extension, N.Y.S.

to $120. Not bad at all! A thermostat setting of 68 degrees should be sufficient for daytime activity and 60-65 degrees for sleeping (young children and the elderly may require a higher setting). And surprisingly enough, most people can adjust to 65 to 68 degrees without sacrificing any comfort by regulating humidity and wearing proper clothing.

The amount of water vapor in the air (humidity) directly affects comfort and determines the need for heat. Cold winter air is less humid (holds less water vapor) than warm air, and when cold air passes through a home heating system it becomes even drier. Extremely dry air around you causes the moisture on your skin to evaporate rapidly, which lowers body temperature. In coldest weather, heated air becomes so dry that in some people it causes a stinging sensation reminiscent of sunburn. Everyone knows that in July humidity is the dreaded foe. But in January it becomes man's best indoor friend, preventing uncomfortable dryness of skin and cutting down on colds by keeping the nasal passages in shape to resist inhalation of germs.

Proper humidity is easiest to maintain in homes with hot air heating systems, since these permit installation of automatic humidifiers on the furnace. In homes with other types of heating systems, free-standing or portable humidifiers can be used. (That $90 you will save by lowering your thermostat can be invested in a humidifier. Next year the savings will be money in your pocket or can be spent on a winter wardrobe.) A humidity level of 30 to 50 percent is comfortable for most people. Both central and free-standing humidifiers are automatic. If anything should go wrong with the automatic feature, you would soon be alerted by moisture condensation on mirrors or windows. In this unlikely event, prompt action is necessary, since excessive moisture can pass through ceilings and walls where it may be trapped and condense, causing mildew, rot, peeling paint, or a breakdown of insulation material.

Proper clothing is another important and oft-neglected aspect of comfort during the cold months. The old saying, "If your feet are cold, put on your hat" has been largely forgotten. Yet the fact is that up to 25 percent of body heat is lost from the head area. So keeping your head covered, both indoors and out, redirects the heat which could be lost there to other parts of your body. Several layers of clothing (creating dead air spaces between layers) provide more warmth than a single thick, heavy garment.

There are, of course, many other ways each of us can practice energy conservation. The Cooperative Extension at Cornell University has prepared a comprehensive manual, "Save Energy—Save Dollars," which is available for $1.50 from Mailing Room A, Research Park, Cornell University, Ithaca, N.Y. 14853. Individual leaflets from the collection are available free from county cooperative extension offices.

Finally, and perhaps most importantly, we should all take the time to look around us for those who may have limited physical or financial resources, and then volunteer to assist them in accomplishing some of the very same energy conservation improvements that we have made for ourselves.

Thomas W. King, Jr. was with DEC for over 14 years as engineer, planner and chief of the Energy Bureau. Most recently he transferred to the newly-formed State Energy Office where he works in the Bureau of Program Development. Mr. King and his family live in the Pine Hills section of Albany and are kept busy restoring an "elegant" Victorian home.

Fuelwood —A Cord Is a Cord, Or Is It?

by Stuart S. Hunt

IF you are lucky enough to have a fireplace, no doubt you recall the thrill upon first acquiring this mixture of status symbol and practical contribution to a cozy feeling of well-being. Some of the original excitement returns each fall when an adequate supply of firewood is safely stored.

Unfortunately, this feeling of satisfaction is often diluted by confusion about how much wood is going to be delivered for what price, and whether it will be sufficiently seasoned to burn well. We are all concerned lest our pocketbooks be plundered, and the questions are especially important now that many are planning to use wood as a supplement to regular heating.

If the seller merely tosses the wood into a truck and dumps it into a driveway, the buyer is left wondering whether he is getting the amount he bargained for. He might request that the wood be piled, but often this entails extra cost. Moreover, the seller may pile the wood rather loosely, thus quickly reaching the standard four feet of height and hoping the shortage will not be detected. On the other hand, when the buyer piles, he may stack too tightly, and then unjustly suspect the seller. No two people will use the same number of logs in piling a cord of wood.

If the logs are round, fewer of them are needed to reach the standard height than with split logs. Green wood also occupies more space than seasoned wood.

But the real confusion lies in the terms used in the sale of fuelwood. What is a cord? How big a pile is a half-cord? Are you buying fireplace wood sold as a "face" cord? Finally, are there any laws designed to help consumers in this area?

In most cases dealers buy their wood in the same sizes and cubic volume as the final purchaser. So both are purchasing what is known in the trade as a short cord or a face cord. In this case "short" is good, since the standard cord consists of logs four feet in length—too long unless you happen to own a 19th century mansion. If you do buy a standard cord, the four-foot logs would be

piled four feet high and eight feet long, making 128 cubic feet of wood and air space. Today this unit of measurement is used mainly in the sale of pulpwood.

The "face cord" is a short cord in which the logs vary from 12 to 24 inches. The pile is also four feet high and eight feet long. The most typical face cord consists of 18-inch logs, and the pile would come to 48 cubic feet. This works out to 37.5 percent of a standard cord.

During the late 1800's and early 1900's hardwoods were cut for the production of methanol and charcoal, and this was an extensive forest industry in the Catskills and along the Appalachian Mountain region. Again this was a clear cutting practice, and the wood was piled as standard cords. It was a desirable piling method since both the wood cutter and the buyer could determine an easy volume calculation in settling contracts. This important wood industry finally faded out of the region, but charcoal is making a comeback.

Now in this day of fuel shortages, wood cutting and marketing have taken a modern turn with great changes in the technology of the design of wood burning stoves and furnaces. The woodcutter and wood dealer are no longer concerned with the standard cord. With high powered equipment such as chain saws, wood splitting devices, and tractors, the commercial woodcutter can easily fell and cut trees into fuelwood. Trucks then take the wood many miles to excellent markets.

The woodcutter has no trouble finding woodlots on either state or private lands where marked trees are available for cutting. Usually these trees are those left over from lumhering operations or are in stands which are in need of thinning. Fuelwood cutting can greatly enhance the eomposition and value of the woodland for future lumbering. The woodcutter takes only those trees marked for removal, hauling them out in tree lengths, cutting the trunks and hranches into short lengths using the wood splitter to split the larger pieces and loading directly into his truck for delivery to the wood dealer.

Professional woodcutters and wood dealers are not getting rich since this commodity requires an excessive amount of handling and transportation. Only those operators who have the most modern equipment, own or lease woodlots relatively close to markets, and make the operation a full-time proposition can expect to earn more than a living wage.

When the consumer buys a face cord of 18-inch fireplace wood--48 cubic feet of solid wood and air space—there are a number of factors which determine the amount of solid wood which he receives for his money. In addition to the variables already mentioned, crooks in the logs are the most important factor in reducing the volume of solid wood. Split wood from the trunk of the tree will probably give a higher volume than branch wood. In most cases the consumer is getting wood from the tree trunk. Other factors reducing the wood volume are bark thickness, knots, stubs and swellings. The shorter the length of fuelwood, the more volume of solid wood can be obtained. Hardwoods cut in the spring and seasoned for six months, but less than one year, lose a large amount of moisture content, ending at about 20 percent. Over this period the volume can be reduced as much as 9 to 14 percent—an advantage worth considering when comparing prices.

Wood seasoned for 12 months burns more readily, leaves fewer chemical deposits in the chimney, and is generally worth the extra charge. The type of wood also makes a big difference. Hardwoods of heavy density make better fuel than softwoods, which burn rapidly with less total heat value. In New York State the best woods, in order of preference, are hickory, white oak, beech, hard maple, yellow birch, red oak, ash, elm, red maple and black cherry. Usually the consumer is buying a mixture of several woods. Fruit woods (apple and cherry) are noted for their fragrance. Nut trees, oak, and maple throw the most heat. There is one group of conifers (softwoods) which make fairly good fuelwood: tamarack (the eastern American larch) and the planted exotic larches (European and Japanese). They burn faster than hardwoods, but they have a rather high heat value.

In the sale of cordwood there are bound to be some complaints from buyers. State law, as set forth in the Agricultural Manual Section 193-b, "Method of sale of fuelwood," requires the following:

- All wood for fuel purposes shall be sold or offered for sale by the cord or fractional part thereof.
- Unless some other unit of measure is specifically agreed upon, a cord of wood shall measure and contain 128 cubic feet, well stacked.
- A bill of sale to the purchaser must specify name and address of both seller and buyer; the quantity of wood delivered, in terms of cords or fractional cords or unit of measure agreed upon and must bear the signature of the seller.

The law obviously needs revision, now that the standard cord is outdated except for commercial sales. If the law were to state that all fuelwood must be sold as a *percentage* of a standard 128 cubic-foot cord and the *face surface* measurement must be 4-foot high by 8-foot long, many misunderstandings could be avoided.

Perhaps the best way to get round these problems might be to buy a chain saw, contract with a woodlot owner to cut marked trees, and truck the wood home in a station wagon. As a Scotsman once said, "The wood will heat you twice; once in cutting and once in burning."

Stuart S. Hunt, a former district forester for DEC, is now owner and operator of The Laurens Forest in Otsego County. He holds degrees in Forestry from both SUNY and Harvard.

New Map List Available from DOT

This is a portion of the Department of Transportation's 1:24,000 scale Planimetric Edition of the West Almond 7.5 minute quadrangle published in 1976.

The New York State Department of Transportation has recently published an attractive brochure describing the various maps it sells to the public. The brochure entitled, "Maps . . . available from the Map Information Unit," describes seven different types of maps, along with illustrations and prices of each.

Among the maps described are large scale topographic maps used for highway design, a state map in four sheets, and the Department of Transportation's new 1:24,000 scale topographic maps. Maps described in the brochure have been produced to serve the planning and engineering needs of the department, and can also be extremely useful to local governments, industry, and the general public.

The topographic maps, printed in two colors, are currently available for limited areas of the state. They combine the base image of the Department of Transportation's up-to-date 1:24,000 scale Planimetric Editions with terrain contour lines from the generally older U.S. Geological Survey topographic quadrangles.

Copies of the new brochure, and of index maps and order forms for each type of map, are available on request from: Map Information Unit, New York State Department of Transportation, State Campus - Bldg. 4, Rm. 105, Albany, NY 12232, (518) 457-4755.

EQ News Briefs

National safe drinking water standards have been in effect since June 1977. EPA regulations require that the nation's 40,000 community drinking water systems and 200,000 other public water systems test their water on a routine basis to make sure it is safe to drink. A novel aspect of the law requires utilities to notify consumers if the health standards or sampling requirements are not being met. For further information write for the pamphlet "Is Your Drinking Water Safe?" It may be obtained from EPA's Office of Public Affairs, Washington, D.C. 20460.

* * *

The EPA has recently listed the organic chemical "benzene" as a hazardous air pollutant, based on scientific reports strongly suggesting that humans exposed to this substance suffer an increased incidence of leukemia. Benzene is one of the largest volume chemicals produced in the U.S. and is used in a wide variety of chemical and industrial processes. It is also an ingredient in automobile gasoline. Of 11 billion pounds manufactured in 1976, as much as 260 million pounds may have been transmitted into the atmosphere. These emissions come from chemical manufacturing facilities, petroleum refineries, gasoline storage and marketing facilities, coke ovens, and automobiles.

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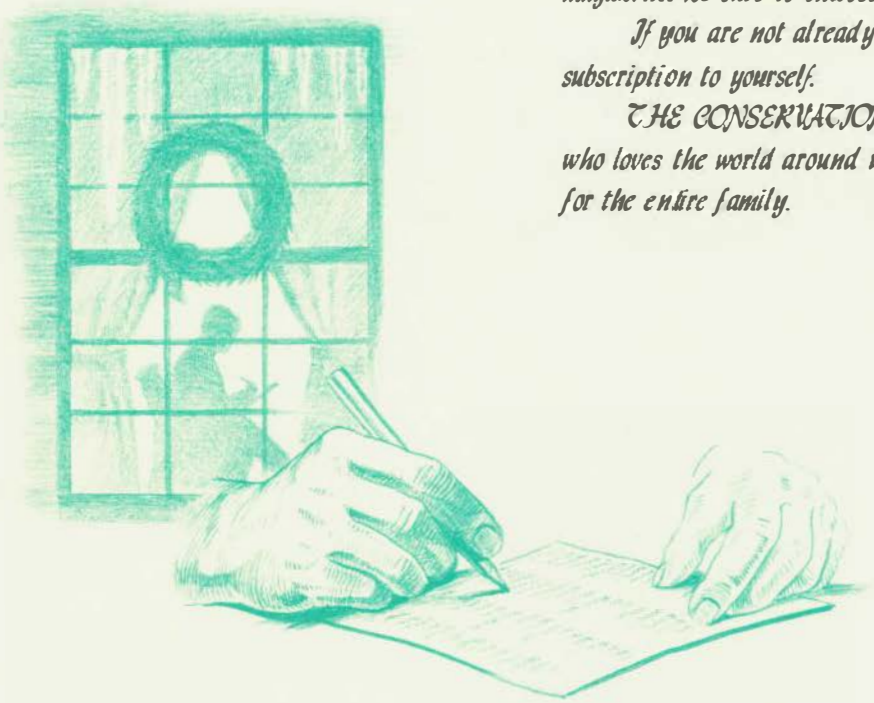

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Sketch Book visit to a Winter Bird Feeder

Bird feeders are excellent locations to study certain bird behavior. Keep a notebook handy near the window overlooking the feeder so interesting behavior can be recorded. A barometer and an outdoor thermometer should be available. Notice the different species of birds interacting, as well as individuals of the same species. Certain species tend to dominate the feeder i.e. blue jays and evening grosbeaks. Notice how various species react to an approaching storm.

White breasted nuthatch
When nuthatches are really hungry few other birds will challenge their sharp beaks.

Downy woodpeckers will often sit and wait for other birds to finish feeding.

At Sketch Book Farm, the evening grosbeaks tend to boss the feeder. Dominant males will threaten with wing flashes and open beaks. Females generally are less aggressive than males although they often fight among themselves.

With a number of birds of the same species there is usually one bird, often a male, that is the leader of the flock.

Angry birds, like this male cardinal, tend to fluff up their feathers, particularly around their heads, giving their cheeks a puffy look.

When the weather is calm, many species of birds visit the feeder at the same time although there is frequent squabbling and bickering within and between species.

The English or house sparrow seems to hold its own around other species. They become opportunists darting in when larger more aggressive birds leave or turn their backs.

Purple finches always seem to argue among themselves and will drive chickadees and other smaller birds away from the feeder.

In good weather, blue jays can rule the feeder. If a storm is coming, evening grosbeaks feed more actively and are seldom driven away from food, even by jays.

Mourning doves are seldom challenged, probably because of their size compared to most birds at the feeder. When a cold front moves in with wind they fluff their feathers to increase the insulating quality.

When fluffed, the feathers trap more body heated air next to the skin and, at the same time, make the head look too small.

Slate colored juncos tend to be active ground feeders. I have never seen one challenge another bird while feeding.

Juncos carry their heads over their bodies more than many other small birds.

White throated sparrows feed well with other species in mid winter. As spring approaches they become quarrelsome among themselves and with other birds.