THE CONSERVATIONIST

State of New York Conservation Department April-May 1969

What You Can Do

There is a frequent type of letter in our mail which is embarrassing. The writer points to a recent waste of natural resources, pollution, desecration or the loss of a favorite bit of wilderness. He tells of his heartbreak and then asks: "What can I do in the cause of conservation?"

A clue to one answer emerges from a proposal by two Long Island towns—Smithtown and Islip. Situated about one-third the length of the Island from New York City, Smithtown is on the north shore and Islip is on the south. The shores of the two towns are about 14 miles apart. The towns are almost connected north and south by two unspoiled river valleys, those of the Nissequogue and the Connetquot. But on both sides of the valleys, developers are moving in fast to make bedrooms for New York City's spreading millions.

Viewing the fast-moving encroachment, the supervisors of the two towns are proposing that Suffolk County should buy some 900 acres of undeveloped land to guard and connect the headwaters of the two streams. If successful, the two towns would thus establish a green belt along the two rivers, from the north shore to the south.

The State, of course, under two bond issues has been acquiring and developing selected access and recreational areas throughout the State. But such acquisitions are nearly complete and it is questionable whether any further State funds will be immediately available. At the same time every city in the State is sprawling out over undeveloped lands and wiping out the natural green belts between communities.

There are substantial advantages in the acquisition of green belts by localities. Local officials are aware of local beauty spots and their values. The closeness of local greenbelts generates interest and initiative by citizens. They gain a sense of participation from their support for the local project. Finally, by the opportunity for actual physical work in developing such plots, they can gain first-hand knowledge of the principles of conservation.

Here then is a constructive outlet for the citizen who wants to do something about conservation. He can gain pride in his home town and, at the same time, become a conservationist.—Editor

VOLUME 23 NUMBER 5

CONTENTS

First Cover ("Lilacs"), Robert S. Sleicher; Second Cover ("Tent Camp"), N. A. Moore; Third Cover (Buoyage), H. Wayne Trimm; Fourth Cover ("Spring Swamp, Robert Moses State Park, Massena"), Nick Drahos.

The Kinzua Lake Development

Model: Quaker Impoundment, in New York State

A Major New Recreation Area Is Growing Fast On The Former Hunting Lands Of The Iroquois In Southwestern New York State

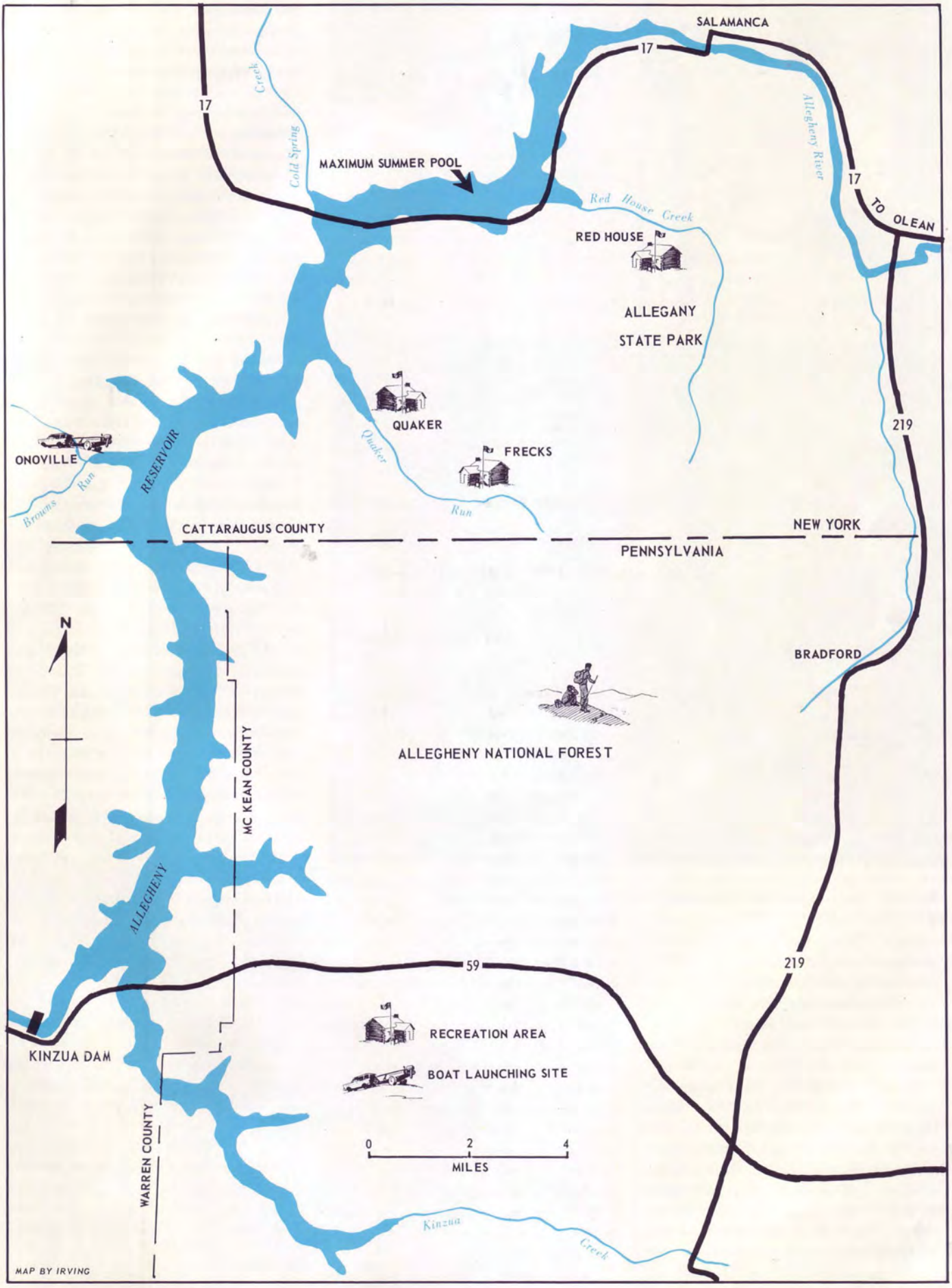
by James J. Lindsey, *Regional Supervisor of Fish & Game, Region 2*

KINZUA (pronounced Kin-zoo) means "fish on spear" in the Seneca Indian language. Nowadays, it means to the Indians a travesty of justice, but to a host of others it means a sparkling, beautiful, wilderness-bounded 12,000-acre recreational mecca. To many people, it means that their homes and livelihoods are now protected against flood havoc. To industry, it means an assured supply of process water.

Way back in 1928, after several floods in the Allegheny River caused untold damage to the City of Pittsburgh and the many population centers upstream for 198 miles, the U. S. Army Corps of Engineers was called upon to develop and report on a flood protection scheme. One hundred and ninety-eight miles above Pittsburgh the ideal place for a flood control dam was found, steep-sided, narrow and close to bedrock. Then the planning began for the development of what some of the Senecas call "Lake Perfidy," but is now labeled Kinzua Lake, or in Federal parlance, Allegheny River Reservoir.

The history of the development of Kinzua Lake is studded with acrimony, in and out of Federal courts. The mammoth dam, completed by the Corps of Engineers in 1966, is in Pennsylvania but backs water at maximum level some 20 miles into New York State—almost all of the impoundment area in New York State is on the Seneca Nation of Indians' Allegany Reservation — some 30,000 acres extending along the river for about 30 miles in a strip about one mile wide. In 1794, President George Washington signed a treaty with the Seneca Nation which, in Article Three states: "Now the United States acknowledge all the land within the aforementioned boundaries, to be the property of the Seneka nation; and the United States will never claim the same nor disturb the Seneka nation but it shall remain theirs until they choose to sell the same to the people of the United States, who have the right to purchase." Well, the upshot of much legal maneuvering in which the Senecas claimed the 1794 (Big Tree) Treaty was inviolate, was an April 14, 1958, U.S. District Court decision—later upheld by the Supreme Court—that the Indian lands could be used by the People of the United States for the common good. Eventually, the Congress awarded the Seneca Nation $15 million for a clearing and flooding easement on about 10,000 acres of their Reservation in Cattaraugus County.

The reservoir is a reality, impounded by a concrete and earth fill dam 179 feet high and 1,900 feet long. The largest dam in the Northeast, it contains 3 million cubic yards of earthen fill and ½ million cubic yards of concrete. The entire development project (aside from recreational facilities) took four years to complete at a cost of $120 million, including land acquisition; highway, railroad and public utilities relocation; and graveyard transferral. The later caused great concern among the Senecas, an understandable repulsion to the disturbance of their ancestors' final resting places. The most wrenching problem here was the grave of The Cornplanter, a Seneca chief who was one of the signers of the Big Tree Treaty. Cornplanter, who met with General Washington in Philadelphia in 1790, was buried on a plot of land overlooking the Allegheny in Pennsylvania—the plot had been granted by the Com-



Reservoir and Cornplanter Bridge seen from road to Rimrock Overlook (Courtesy U.S. Forest Service)

monwealth of Pennsylvania in 1791 to Cornplanter and his heirs "in perpetuity." His grave was within the flood pool of the reservoir and so was moved to higher ground overlooking the new impoundment.

The dam is built, the legal battles are over. In September, 1967 the Kinzua Dam recouped in three days almost one-tenth of the cost of the entire project in saving the City of Warren, Pa. some $10 million of damage in a storm which dropped three inches of rain in the watershed within 24 hours. Without the Kinzua Dam, Warren would have pretty well disappeared downriver. The savings in life and property downstream from Warren in this storm are estimated conservatively at another $10 million.

Now back to 1928. At that time in history, the Corps of Engineers was not charged by the Congress to recognize the need for or include recreational facilities in flood control reservoir design. Within the past ten or fifteen years, the Corps has recognized (along with the Congress) the demand for recreational facilities on water impoundments. Engineers, working with recreationists, have come to realize that flood control reservoirs can be used for recreation without impairing their primary purpose. After all, the usual flood time in the spring when the dams are most effective is long before the normal recreation season. The Allegheny River reservoir, conceived for flood control and downstream flow augmentation during dry periods, is now being managed for recreation as well. As "added starters" fishing, boating, picnicing, camping and sight-seeing are doing well.

Around 1962, when the Kinzua Dam was just getting underway, the Federal government insisted that recreational needs be considered in Federal dam projects which impound substantial pools of water in the summer recreation season. The Pittsburgh office of the Corps of Engineers, which had construction responsibility for the Kinzua Dam, responded very quickly and effectively. The U.S. Forest Service (which administers adjacent Allegheny National Forest, the U.S. Fish and Wildlife Service, the Pennsylvania Fish Commission and the N.Y.S. Conservation Department, and local jurisdictions such as Cattaraugus County in New York State and Warren and McKean counties in Pennsylvania, were invited to present their views on recreational potential for Kinzua Lake. As a result of the recreational planning among these jurisdictions, some 26 recreational areas are completed or are under construction on the lake.

Day-use areas for picnicing, swimming and boat-launching are here. One marina at Wolf Run is already accommodating several hundred boats; another marina is planned at Willow Bay (closer to the New York State line). Five "wilderness" campsites (access by boat only) are in operation. Information on these and other areas is outlined in a brochure which can be obtained from the National Forest Service, Warren, Pa. or the New York State Conservation Department, 409 Exchange National Bank Building, Olean, N.Y. 14760.

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Adjacent to the New York State portion of Kinzua Lake is 60,000-acre Allegany State Park—our largest State park. One of the new roads developed around Kinzua crosses Quaker Run in an area now within the park. Leigh Batterson, General Park Manager, Allegany State Park Region, conceived the idea of the East Bank Perimeter Road crossing over Quaker Run on a dam which would create a permanent 240-acre lake within the park. Today this is a reality and our New Quaker Lake will eventually add 400 campsites, swimming beaches, picnic areas and fishing opportunity to the existing extensive facilities in the park. The Conservation Department has stocked Quaker with brook and rainbow trout which should offer fine fishing this year.

Fishing in Kinzua Lake should be an angler's delight this year. New impoundments usually produce bounty crops after two or three years (this generally levels off later). Resident game fish in the Allegheny River in the impoundment area are smallmouth bass, walleye pike, northern pike, rainbow trout and muskalonge. Pan fish run to yellow perch and bullheads. The Federal government and Pennsylvania have stocked smallmouth bass and "muskies" in the lake. Rainbow and lake trout may be stocked in Kinzua if the water chemistry is suitable after bottom vegetation has decayed (vegetation decay at the bottom of new impoundments uses up oxygen creating an unsuitable habitat for fish). Because part of the lake is in Pennsylvania and the New York portion (4,000 acres) lies almost entirely within the Allegany Reservation, the fishing license requirements are awkward. Those fishing in Pennsylvania are required to have a Pennsylvania license, anyone fishing in New York outside the Reservation must possess a New York license; anglers on the Lake within the Reservation must have a Seneca Nation Fishing Permit (obtainable at the Seneca Nation office near Salamanca). It is hoped that the three jurisdictions will soon be able to arrive at an equitable solution to the license requirement mess.

Cattaraugus County has recognized the recreational potential of Kinzua. It has joined with the Corps of Engineers in the development and operation of a boat-launching site and picnic area at Onoville on the west bank of the Lake. The county is also providing navigation law enforcement, through its Sheriff's Department, on the 4,000 acres of recreational pool in New York State.

The Seneca Nation of Indians has a very imaginative plan for a development called "Iroquoia." This will be a reconstruction of an 18th Century Indian village with its customs and dress. This is designed to preserve the traditions of the Iroquois Confederation (Senecas, Oneidas, Mohawks, Cayugas, Onandagas—later joined by the Tuscaroras about 1711) and to improve the economy of the Indians through tourism.

Kinzua Lake is with us now and the word Kinzua means much more than "fish on spear."

Boat access campground, east side of Reservoir
(Courtesy U.S. Forest Service)

Vultures In New York

On occasion, when one squints into a southern or western New York sky, a black mark will be observed far overhead. Seemingly still at first, it will float slowly and gracefully, often circling in broad rising or falling spirals. Initially, it might be mistaken for an eagle in search of prey, but if its features can be distinguished, one will notice that the head and body are a bit too small and its wings, instead of being horizontal to the ground like an eagle's, angle slightly upward. If it is possible to see the head and neck well, one will notice that they are featherless and reddish in color.

Being watched is a turkey vulture.

Although not really common throughout the year in New York, it does move into the State from the south during springtime, sometimes in fairly large flocks. There are even some records of this large bird nesting here. When this occurs, two mottled brown eggs, slightly larger than a chicken egg, are usually laid in secluded places as varied as a hollow log, a cave, an abandoned pigsty or among rocks. Very little effort is spent on building a nest.

The baby vulture is covered with long, whitish down, even on the neck and head. When one of the parents waddles erratically into the nest at feeding time, the young hiss and beat their wings as they rush at the adult's open bill. Each of the young will thrust its head into the mouth to feed on food which has been partially digested by the parent.

As the birds grow in size, glossy brown feathers make their appearance, while the down gradually wears away. Unlike the red of the adult, the skin of the young's head and neck is brown after the first plumage has disappeared. Between 2 to 3 months after hatching, the fully grown vulture will leave its nest for a life of searching out dead animals such as those found along roads, on farms or in dumps. Apparently the workings of evolution have secured a place in the environment for a bird which has no need or particular desire to kill its food, but which feeds only on the dead. Their keen sense of smell and sight, along with their method of soaring slowly at great heights, enables them to find sufficient food to survive in large numbers, especially in the southeastern states where they are greatly appreciated.

—NAHO, *N.Y.S. Ed. Dept.*

Earthquakes Occur Very Frequently,

Probably Much More Frequently Than Most People Realize.

Here Are The Facts On—

Earthquakes In New York State

ON November 22, 1967, the day before Thanksgiving, an area of some 500 to 1,000 square miles was shaken by an earthquake that caused people to rush from their homes, to hurry to the basement to see if the furnace had exploded and to discuss earthquakes with friends and neighbors for some days to follow. Japan? Alaksa? California? Some other site of a famous earthquake? No. That earthquake occurred in Westchester County, a few miles north of New York City.

The shock was a mild one by any standard, but it was not unique, and it demonstrates one of the main points of this article; i.e., contrary to general opinion New York State has experienced, and will no doubt continue to experience, significant earthquake activity. This activity is generally weak to moderate and certainly is no cause for panic or alarm among the public, but it is not trivial, for seismic activity is becoming a matter of increasing concern as our systems for providing for the needs of society become larger, more complex, and hence, more subject to major breakdowns as a result of minor, unexpected shaking in the environment.

No site for a nuclear power plant, for example, is selected without an evaluation of the seismic hazard. No dam impounding large quantities of water is designed without considering possible seismic effects. Buildings are constructed to withstand lateral accelerations greater than those anticipated from seismic sources The nature of this hazard is such that still more detailed and more thorough consideration will be required as population density grows and man's facilities develop.

But to make every structure in New York or elsewhere in the world completely safe against the largest possible earthquake is totally impractical from an economic standpoint. Instead, earthquake countermeasures must be based on a realistic evaluation of relevant information from the field of seismology and allied disciplines. This information falls into three general categories: (1) The historical record of seismic activity, (2) the basic understanding of earthquakes and their causes, (3) the geologic record. Let us examine the state of knowledge in each of these categories with special emphasis on New York State.

Mapping Earthquakes

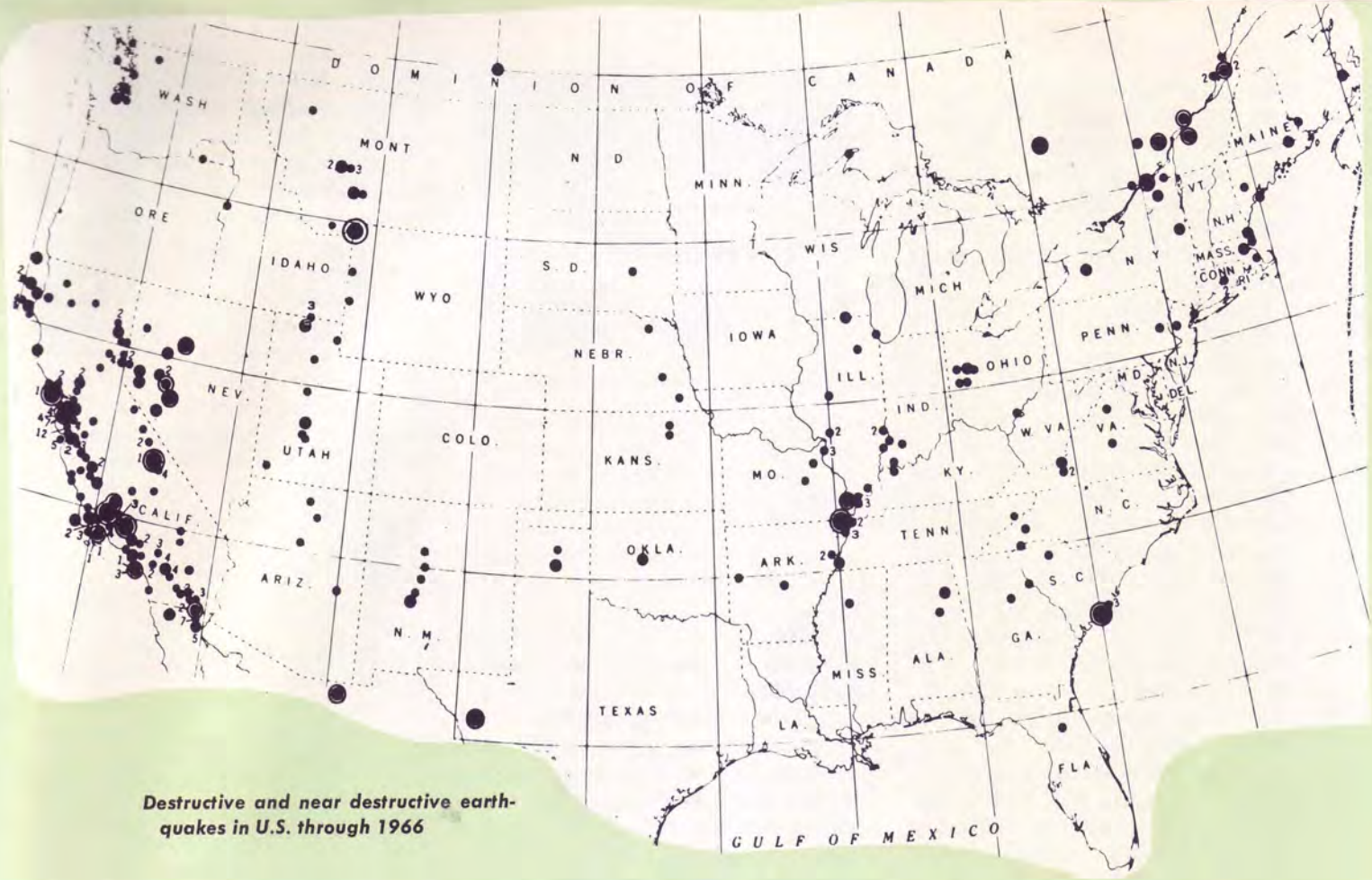
Figure 1 taken from Barazangi and Dorman (1969), shows almost all (the map does not include the polar regions) of the earthquake locations, about 29,000 in number, determined by the Environmental Science Services Administration of the Department of Commerce for 1961 to 1967, an interval when the most accurate instruments and modern computing techniques were used. For most purposes this is the best map of world seismicity available. It shows first that earthquakes occur very frequently, probably much more frequently than most people realize. It also shows that most of the world's many earthquakes are confined to certain narrow continuous zones that separate large, relatively stable blocks. These active zones are also the sites of recent geologic activity including the formation of mountain ranges, deep sea trenches, rift valleys, volcanoes and island arcs. From the perspective of *Figure 1*, the seismic activity of New York State, which is located far from these zones in a "stable" block, must clearly be classified as low or moderate. The activity is well below that of the most active areas, yet it is not zero and it is significantly above that of many other "stable" areas.

Seven years is but an instant on the geologic time scale that spans hundreds of millions of years, however, and, particularly for an area such as New York where the numbers of events are small, the map of *Figure 1* may not be representative. Much additional information can be obtained by considering earthquakes of earlier periods even though the instrumental data on such events might be lacking or less satisfactory than for recent shocks. Newspaper accounts and an occasional special publication describing observed effects provide the bulk of noninstrumental data.

Severe 'Quakes in U.S.

Figure 2 shows the locations of all destructive and near-destructive earthquakes in the contiguous 48 United States during historical time. Shocks oc-

by Jack Oliver, *Professor Geology, Columbia University, Lamont Geological Observatory*



Destructive and near destructive earthquakes in U.S. through 1966

curring from early in the 17th Century through 1966 are included, but only those events for which the historical record is adequate for classification are shown. There must have been many more substantial earthquakes that went unrecorded or even unfelt, particularly during the early part of this period when population density was lower than it now is and communications were less advanced. From this map, which excludes Alaska, our most seismic state, it is apparent that the California-Nevada region is very active and that most other states have at one time or another experienced a sizeable earthquake. Of particular interest are the large earthquakes of 1811 to 1812 in southeastern Missouri and the Charleston, South Carolina, earthquake of 1886. Three of the Missouri earthquakes are among the largest, if not *the* largest, in the history of the United States and were felt at least as far away as Boston. The Charleston earthquake, although not so large as the huge Missouri shocks, was also felt over a large area including Boston, New York, Milwaukee, Cuba and Bermuda.

The significance of the Missouri and South Carolina events is that they occurred far from the narrow, highly active seismic belts shown in *Figure 1*, for reasons that are at present not understood, and hence they give pause to anyone who wishes to state flatly that a given area will *never* experience a major earthquake. Such events are rare, however, and the probability of similar areas experiencing a major shock within one lifetime must be considered small.

Figure 2 shows that New York State has experienced a number of substantial shocks and, furthermore, that several large shocks near enough to New York to affect that State strongly occurred near the northern border along the St. Lawrence Valley. New York's most destructive earthquake, in fact, occurred near the Canadian border on September 5, 1944, and caused some $2 million worth of damage in the Towns of Massena, New York and Cornwall, Ontario. A very great earthquake occurred near Three Rivers, Quebec, in 1663, so early in Colonial history that accounts are sparse and scattered, but it is clear that major damage would result if such an earthquake occurred today. A number of subsequent earthquakes in Quebec, notably in 1755, 1914, and 1925, have affected New York State in some way. In 1914, for example, a shock in Quebec caused buildings to sway, chairs to topple, and pictures to be thrown from the walls in Albany.

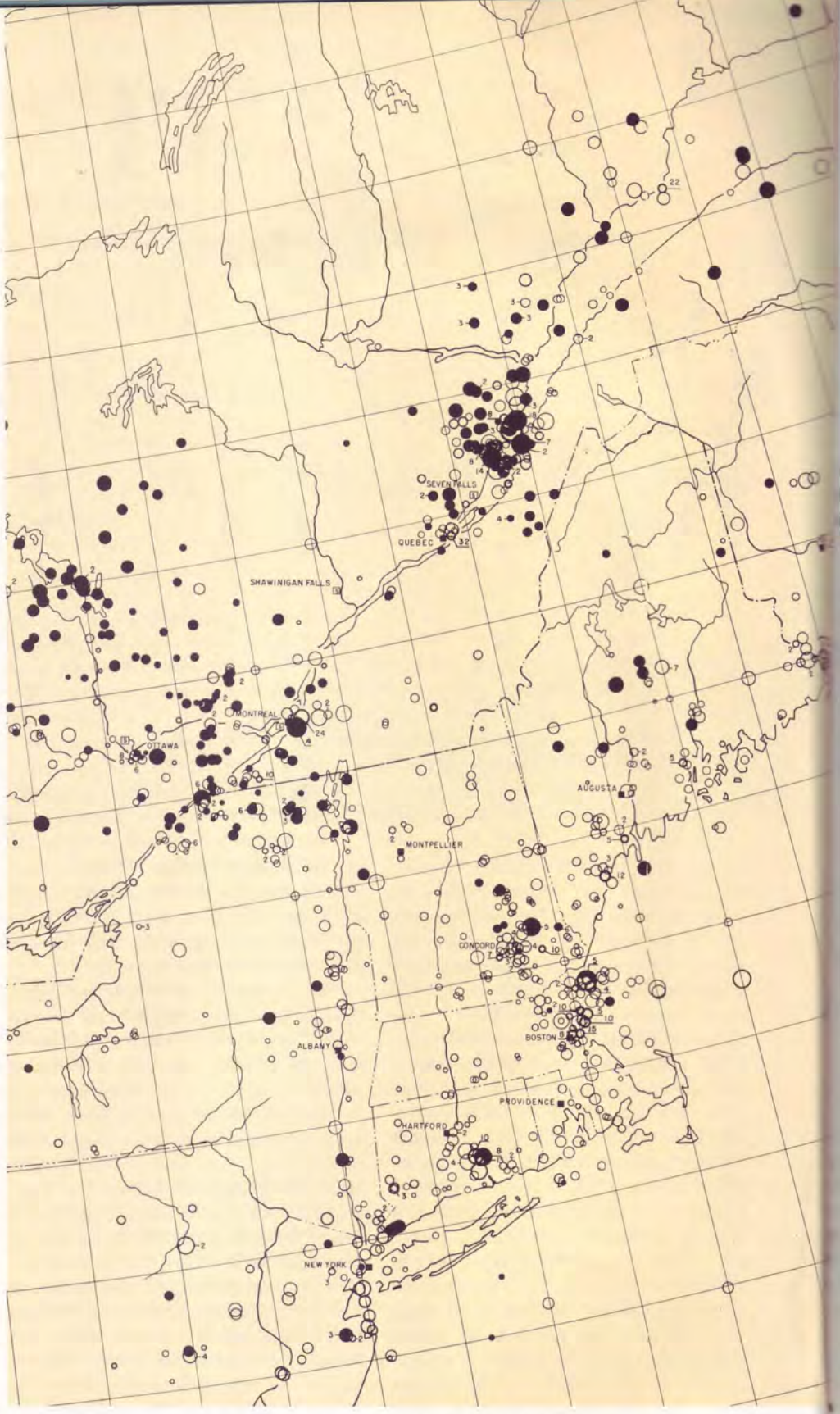
New York History

Attica, New York, some 30 miles east of Buffalo, is the site of moderate recurrent seismic activity. For example, in 1929 a shock threw down 250 chimneys and damaged buildings. As recently as 1966 slight damage occurred in Attica and Varysburg and at the State Prison nearby as a result of a moderate shock. Many foreshocks and aftershocks to this event were felt, and minor tremors have continued into 1968. Many earth scientists consider that the shocks in the St. Lawrence Valley and Attica form part of a NE-SW trend that includes the events in western Ohio, southwestern Illinois, and southeastern Missouri, and that this trend defines a zone of weakness in the earth's crust. Others feel this conclusion is unjustified because of inactivity over large segments of this zone during historic time and lack of sufficient supporting geologic evidence. In the New York City area a shock in 1884 caused greatest damage at Jamaica and Amity-

ville, where large cracks appeared in walls, and thirty towns from Hartford, Connecticut, to West Chester, Pennsylvania, reported fallen bricks and cracked plaster. A smaller shock in New York City in 1893 provoked this description: "Animals disturbed at zoo and billiard playing affected."

Additional information on seismic activity can be found by studying smaller earthquakes, those that are felt but that are well below the destructive level and those that are detected by instruments only. *Figure 3* summarizes the results of a thorough study of all seismic activity (Smith, 1966) for the region including New York State for the interval 1534 to 1959. It is immediately apparent from this figure that small earthquakes occur much more frequently than large ones, a rule that is generally applicable in seismology. There is additional evidence for the NE-SW trend of activity along the St. Lawrence Valley, but there is now evidence for an additional trend oriented NW-SE and extending from Ontario through northeastern New York to Boston. A less active north-south trend is suggested by the line of events following the Hudson Valley. Weak evidence of this latter type must be viewed with some suspicion, for reports of historical earthquakes are frequently biased by variations in population density and people tend to live near rivers. It is likely, that this trend is misleading.

The observation of such trends in the earthquake activity suggests the possibility of correlation of seismic activity and geological features, but, at the present stage of development, such relations are difficult to establish. It has been suggested that seismic activity in the New York-New England-Ontario area is associated with the uplift of the land as it rebounds following removal of the load of the great ice sheets. This ice, several thousands of feet thick, must have depressed the earth's surface considerably, and several hundreds of feet of uplift subsequent to melting have been measured in some places. Such distortions of the crust may well have caused some seismic activity, but the present pattern of seismicity does not show an obvious relation to the former configuration of the ice, which extended as far south as Long Island at one stage. Thus, this hypothesis enjoys only modest support.



Seismic activity in Northeast from 1534 to 1959

Zones of Weakness

Another possibility is that forces whose nature and origin are not well understood act to distort the earth's interior and manifest themselves as earthquakes occurring along zones of weakness, such as faults, in the crustal rocks.

In the lower St. Lawrence Valley, the NE-SW trend appears to correspond to a structural feature known as Logan's fault, which was most active some 400 million years ago. Logan's line (shown in *Figure 4*), the surface trace of the fault, veers toward the south, attaining

a north-south orientation east of the Hudson River. Recent movements along this ancient fault clearly could not account for the activity extending toward Missouri. This fault and related faults might be associated with the seismic activity along the Hudson, however, for the locations of most events are so poorly known that they may well have occurred on the fault. This suggestion is supported by observation of minor postglacial (i.e., less than about 10,000 to 20,000 years old) faulting in bedrock along this same trend east of the Hudson River and Lake Champlain and continuing well into Quebec. Before definitive statements on this subject can be made, better observations of both earthquakes and geology are required, but at present this work represents a hopeful approach toward relating seismic activity and geology.

The NW-SE trend of activity through Boston has not been correlated with any geologic observations. The present difficulty in relating available information on geology and seismic activity in this area, however, should not be taken as an indication that these relations do not exist. It is far more likely that they do exist but that they remain to be discovered, for such relations are known elsewhere. In fact, in southeastern New York very minor seismicity has been associated with the Ramapo fault that forms the northwestern border of the Triassic rocks of Rockland County and New Jersey. The difficulty in extending such correlations lies with the inadequacy of our present knowledge of both the geology and the seismic activity. Precise locations of earthquake foci, for example, can be made only if adequate instrumental data are available, and, for smaller earthquakes, this means that closely spaced seismograph stations are required.

Expanded Observation Needed

Observing stations in New York State are diverse in character and few in number (see *Figure 4*). One of the finest seismograph stations in the world is operated by the Lamont Geological Observatory of Columbia University in Palisades, New York, where one of the world's best-known research groups in seismology is located. A smaller satellite station is maintained by Lamont at Sterling Forest. Fordham University, City College New York, Rensselaer Polytechnic Institute and Rochester's McQuaid High School (and possibly one or two others) operate additional stations and stations

Reading a seismograph record

in other localities have operated for limited periods of time. Most of the instruments at these stations are primarily for the detection of large, distant events, however, and in any case, the number and distribution is inadequate for accurate location of small events throughout much of New York State. Thus, an expanded observational effort will be required to obtain the information that will be needed in the future as society progresses.

Before leaving the topic of earthquake hazards, a comment on the tsunami, or seismic sea wave, is in order and here New York appears rather well off. The shores of the Pacific Ocean are regularly struck by tsunamis; in 1960, for example, an earthquake in Chile generated a wave that drowned people in Hawaii and in Japan, nearly halfway round the world. Such destructive waves at large distance from the source of the earthquake are not known on Atlantic shores, probably for a number of reasons. Atlantic earthquakes are generally not so large, their surface effects are not favorable to sea-wave generation, and the broad continental shelf may inhibit sea-wave penetration to the coast.

Exploration of Earth's Interior

A very important part of seismology is the exploration of the earth's interior through the study of seismic waves. Such studies provide the bulk of our information on most of the earth's interior including the very center. The prominence of seismology in this work comes about because most waves, radio or radar waves, for example, cannot penetrate the deep interior as seismic waves do and because drilling can penetrate at most only about five of the 4,000 miles to the earth's center. As a result of these capabilities, seismology has been an important contributor, although by no means the only one, to the current revolution in geology that is based on the idea that the sea floors are spreading apart along a worldwide rift system and that, as a result, the continents drift about with velocities of the order of an inch per year. These new concepts appear to offer an explanation for much of the world's seismic activity. These ideas have yet to be developed and refined to include the areas of moderate activity such as New York, but the ideas are new and the near future appears most promising.

For the conservationist, earthquakes and related phenomena are at best a minor issue when contrasted with such problems as air and water pollution. Yet major shocks do produce effects of immediate concern to conservationists. The effect on the salmon fishing industry of the Alaskan earthquake of 1964, which influenced stream flow over a large area, is still under investigation. The surface traces of active faults and types of ground particularly subject to extreme shaking are factors in the determination of the location of "green belts" in earthquake-prone areas. Possible generation of earthquakes through loading of the crust by very large reservoirs is of concern, as are the many indirect effects that earthquakes might have on nature through damage or destruction to man's facilities. Certainly the conservationist should know earthquakes and their effects and should be cognizant of the information on the solid earth that is derived from the study of seismology, for wise conservation of man's resources will surely depend on a basic and thorough understanding of the earth and its processes.

Logan's Line traces an old fault in earth's surface

Fishing Again

Soviet factory stern trawler of the type fishing off the Long Island coast

With The Russians

by Albert C. Jensen, *Asst. Chief of Marine Fisheries,*

John C. Poole, *Supervising Aquatic Biologist, Bureau of Marine Fisheries*

The Authors Find The Food Better,
But The Mattresses Just As Thin
On Their Second Trip On A Russian Vessel
Researching The Fishery Off The New York Coast

THE news item appeared innocently enough when it was released November 25, 1967. It said, simply: "American and Soviet fisheries delegations met in Moscow the last two weeks of November and reached agreement after extended discussion on the fishery problems of the Middle Atlantic Coast of the United States. . . . [The agreement] provides relief for the American commercial and sports fisheries in the area between Cape Cod and Cape Hatteras by a reduction in the fishing effort of the Soviet Union."

The news release went on to detail how the Soviets had agreed to refrain from fishing in a large area off Long Island in exchange for the privilege of being able to anchor six miles off Moriches Inlet. The agreement also allowed them to fish in an area of some 60 square miles, also near Moriches Inlet.

The reaction of New Yorkers to the news item was far from mild. Negative reaction ranged from a mild: "It will never work!" to an explosive: "The American fisherman has been sold down the river in Moscow!" But there also was some positive reaction to the agreement. Many conservationists recognized that although the agreement was not perfect, it was better than no agreement. There was hope, too, that the negotiations might benefit the silver hake, red hake, scup, and fluke populations fished by New York's fishermen. A year later, we had an opportunity to evaluate the agreement.

In October, 1968, we two authors took part in a second co-operative U.S.-Soviet fishery-oceanographic survey designed in part to see if the fishing agreement had indeed been of any benefit to the fish in the Middle Atlantic Bight. The area surveyed, from Cape Cod to Cape Hatteras, was the same as in the first cruise we reported on in the February-March, 1968, issue of THE CONSERVATIONIST in the article, "Fishing With the Russians." The primary purpose of the second cruise was to determine the autumn distribution and relative abundance of groundfish (cod, flounders, silver hake, and other bottom-dwelling species). An additional purpose was to evaluate the fishing agreement to see if there was any improvement in the stocks of fish by comparing 1967's catches with 1968's catches. Finally, the cruise provided further opportunity to evaluate the relative efficiency of the Soviet net and trawler.

Foreign Fleets Are Impressive

Evaluating the efficiency of the foreign vessels operating off the coast of New York is especially important to provide a base-line for the proper management of the State's offshore marine fisheries resources. The size and makeup of these fleets have varied but generally are impressive. Early last April, the senior author was an observer with a Federal agent aboard a U.S. Coast Guard amphibian 'plane checking foreign fishing activities. Flight coverage was confined to the waters off Long Island and nearby New Jersey and most observations were made as close as 120 feet above the water. The vessels we saw were typical of some of the fleets that operate in these waters.

A total of 97 fishing and support vessels were sighted and identified. They included 76 Soviet and 21 Polish ships. The Soviet fleet consisted of 2 factory stern trawlers, 67 side trawlers, 3 refrigerated fish transports, 2 cargo vessels, and 2 factory base ships. The Polish fleet was identified as 3 stern trawlers, 15 large side trawlers, 2 supply ships, and 1 factory base ship. The total fleet, though generally concentrated in one area, was divided into three main groupings.

One group of 47 vessels was located within a 10-mile area 60 miles south of Moriches Inlet. Heavy to moderate catches of herring were seen on deck and the crews were busily placing the fish in barrels while other trawlers were heading to the mother ships with full deck loads. (The United States uses very little herring at the present time whereas it is an important food fish in the Soviet Union and other European countries.)

The second group of 25 vessels was located in a 10-mile area, about 40 miles south of Moriches Inlet. The decks of the vessels also were heaped with herring. The third group of 25 vessels (21 of them were Polish) was 35 miles east of Barnegat Lightship off New Jersey, also fishing for herring.

In addition to these Soviet and Polish vessels, the international waters off Long Island have been fished by ships from East Germany, West Germany, Greece, Japan, Spain, and there even was one Cuban vessel. Our own vessels also fish these waters but we do not have the large, modern, efficient trawlers that are common to the fishing fleets of other nations. With all this pressure on the fish stocks of the nearby Continental Shelf, it was imperative that we obtain some measure of the resource and try to evaluate the impact of the fishing effort exerted on the resource. Thus, the second co-operative U.S.-Soviet research cruise was launched to help measure this impact.

Two Research Vessels

As in the 1967 cruise, two vessels took part. The U.S. contribution again was the U.S. Bureau of Commercial Fisheries (BCF) research vessel *Albatross IV* out of Woods Hole, Massachusetts. The Soviet contribution was the research vessel *Blesk* out of Kaliningrad. She had been built early in 1968 and this was her maiden voyage. *Blesk* is 178 feet long and is classed as a SRTM—a freezer side trawler. The otter trawl fishing net is set out and retrieved over the side of the ship. Vessels of her class can freeze 12,000 pounds of fish per day but *Blesk* is used for fishery research and has a small space up forward for a laboratory. In addition, she has a small winch on the port side for instruments to collect water samples and measure the temperature of the water on the surface and on the bottom.

The Soviet scientific party included six fishery biologists and oceanographers led by Dr. Vladimer A. Richter, an expert in the biology of red hake. All of them were from the ATLANTNIRO laboratory in Kaliningrad. The American scientists included 11 biologists from a number of laboratories and agencies in the Northeast. They hailed from BCF, University of Maryland, New Jersey Division of Fish and Game, New York State Conservation Department, . U.S. Bureau of Sport Fisheries and Wildlife, and the Virginia Institute of Marine Sciences.

Three of the Soviet party were returnees from the 1967 cruise. Two were biologists and the third was Captain Lev S. Berezhkin who last year commanded the Soviet research vessel *Albatross* and

Soviet fishermen with brown shark

this year was back in command of the newer ship.

The joint oceanographic research effort departed Woods Hole on October 10 when the two vessels proceeded down Vineyard Sound to the first of the nearly 200 stations they were to occupy. The first two stations occupied by *Blesk* were immediately to the north and to the south of Cox Ledge, the famed cod ground of the Montauk sport fishing fleet. The north station, in a depth of 140 feet, yielded 678 pounds of fish in a half hour. The catch consisted of 320 pounds of flounders, 170 pounds of cod, 72 pounds of silver hake, 100 pounds of spiny dogfish, and 16 pounds of butterfish.

The sizes of the cod showed why the ledge is such a favorite with anglers. The fish ranged in length from 13 inches to 34 inches. But this time, instead of winding up in a sport fisherman's bag, the fish were studied in detail for scientific research. After being weighed and measured, the cods' stomach contents were examined to see what they had been feeding on. Earbones (otoliths) were removed from the skull of each cod to determine its age. Even after all this was done, the fish were put to further use; they were prepared by the ship's cook as a seafood treat for the fishermen and scientists. The same procedure was followed with the flounders and whiting.

The station just to the south of Cox Ledge was at a depth of 150 feet and yielded a catch of about 520 pounds in a half hour. There were 42 pounds of silver hake, 32 pounds of butterfish, 21 pounds of squid, 25 pounds of monstrous goosefish (anglerfish), about 400 pounds of spiny dogfish, and only one cod, 11 inches long. The dogfish, as we found out throughout the remainder of the cruise, marked the beginning of more and larger catches of these small sharks.

Obolensky examines lobster on R/V Blesk

Mending net on the Russian vessel

Mattresses Were Thin

Living and working conditions aboard the Soviet ship were pretty much the same as they had been on the previous year's cruise. We slept in two-man staterooms that contained curtained bunks, clothes lockers, a washbasin, a small bench, and a writing table. It was a curious sensation to sleep between coarse linen sheets instead of the smooth cotton sheets we are used to at home and the somewhat thin horsehair mattress was not exactly a Beautyrest. But as someone wisely remarked many years ago, hard work makes any pallet a feather bed. After 12 hours each day of weighing, measuring and dissecting fish, the firm mattress and rough sheets were welcome indeed.

There was a big difference in the food, however. In the first cruise the fare was simple almost to the point of being Spartan. The captain apologized that he had been given a poor cook. On the 1968 cruise, however, along with a new ship, the captain had been given a good cook. Soups still were prominent on the menu but they were meals in themselves. We ate authentic borscht that was a treat each time it was served. Delicate pancakes, (blintzes, the crew informed us) artistically folded and served with soured cream graced the table at several meals. And to our wonder, on two occasions at tea time, the cook baked and served sweet rolls and a jam-filled pastry.

In addition to the good food, we enjoyed a lengthy spell of unusually good weather. For days at a time, the sun shone hot and the sea was glassy smooth. Most of us, Americans and Soviets alike, dug out shorts we had providently packed in our sea bags and stripped to the waist to take advantage of the sun's warmth. As we neared the southern-most portion of our cruise track, near Cape Hatteras, North Carolina, the sun beamed hotter and we were joined by schools of porpoises that swam and played around the ship. We were also host to flocks of land birds, some perhaps lost, that exhaustedly landed on the ships to rest 100 and more miles out at sea. Many warblers, sparrows, and kinglets sought rest on the ship. One large visitor to the ship was an osprey that landed on the rigging when we were 70 miles from the nearest point of land. The osprey must have been very weary or perhaps dazed and disoriented because it allowed a Soviet fishermen to climb to it in the rigging, take it in his hand, and bring it down to the deck. After we had photographed the osprey, it flew back up into the rigging to rest and later in the day, it flew off, perhaps back to the land or perhaps farther out over the ocean.

Live osprey which rested on ship far at sea

A number of large sharks were caught in our net in addition to their smaller brethren, the dogfish, and the other fishes. Most of the large sharks belonged to one of two species, the dusky shark (*Carcharhinus obscurus*, and the brown (*C. milberti*). The dusky shark commonly grows to a length of 11 feet and the brown shark grows to a length of six feet. All of the specimens of both species that we caught were about five feet long. Since we had to manhandle each shark specimen to measure and weigh it, we were just as glad not to have caught any of the really big individuals. Early one evening, however, we did see one very large shark swimming close to the ship as we were hauling in the net full of fish. The long, streamlined shape ghosted through the water just below the surface, leisurely picking up smaller fish that had fallen out of the net. Back and forth it circled within the small area brightened by the ship's lights, feasting on the spill-over of scup and silver hake. It was at least 15 feet long and looked as though it might have been as much as 20 feet long. What kind of shark was it? We don't know for certain because positive identification of sharks is not easy when they are in the water. However, we checked a reference book and pooled our observations to arrive at a tentative identification that was a little disquieting. Our evening visitor appeared to have been a maneater shark (*Carcharodon carcharias*).

Cruise Covered Summer Flounder Range

The cruise tracks of the two vessels covered a wide portion of the Continental Shelf including much of the range of the summer flounder or fluke. This species has been in short supply for a number of years and at the moment biologists have no precise answer why this is so. We were very pleased, then, to encounter spawning concentrations of this important and valuable flatfish. Running ripe males and females were taken in the catch of the *Albatross IV* and we were able to artificially fertilize the eggs and carry them through two days of development. Our observations of the spawning areas will help fill in some gaps in our knowledge of the life history of the fluke. Conservation of the species is part of New York's long-range program of marine fisheries management.

In between the long watches of measuring and weighing sometimes thousands of fish, we did find time on both ships for some recreation. Russian movies were shown twice a day on the *Blesk* and provided a good (if not-completely-understood) diversion. The movie fare this year included a costume epic set in the late 19th Century showing the old Russian aristocracy in a not-too-unfriendly light. There was also a Soviet style "hoss-opera" with Cossacks for cowboys and World War I vintage German troops as the bad guys. The picture depicted some superb horsemanship. One rather surprising film told the story of peasant uprisings on collective farms. Most people who read the newspapers know, of course, that such uprisings have taken place but it seemed unusual to us to find them the subject of a Soviet movie.

Reading also provided diversion and this sometimes assumed international variations. On the *Blesk*, Dr. Robert L. Edwards of the BCF laboratory at Woods Hole amused himself with a nicely-illustrated Russian children's story about reindeer in the northern forests of the USSR. He found the prose sometimes was surprisingly sophisticated for a book written for young people and occasionally had to turn to Captain Berezhkin (who has a fair command of English) for help in getting the meaning of some phrase. On the *Albatross IV*, Dr. Richter spent his time off watch by translating "Alice in Wonderland" into Russian. The rest of us were content to pass the few spare moments available by reading the various magazines and paperbacks we had brought aboard.

1968 Catch Smaller

As the cruise neared its completion, there were a number of things that were quite obvious to all of us. For one, the

(Continued on page 40)

Ponds

Listed below are wilderness ponds and waters which the Department has stocked with trout by airplane in 1968. The Department cannot supply maps of these waters and their surroundings. For detailed information on access, sportsmen should purchase U.S. Geological Survey maps obtainable at large bookstores and sporting goods stores. The townships where ponds are located is listed immediately after the name of the pond. Abbreviations for species are as follows: ST, speckled trout; Splake (hybrid speckled & lake); RT, rainbow trout; BT, brown trout; R.Sal., red salmon; S'brns., Sam Browns (hybrid Atlantic salmon and brown); LT. (lake trout). Good luck and carry a compass.

A Listing Of Wilderness Waters Stocked With Trout In 1968

CLINTON COUNTY

Water (Township)	*Species*
Military Pond (Black Brook)	ST
Mud Pond (Saranac)	ST
Mud Pond (Black Brook)	ST
Slush Pond (Black Brook)	ST

ESSEX COUNTY

Arnold or Skiff Mt. Pond (Ticonderoga)	ST
Baily Pond (Schroon)	ST
Bass Lake (No. Hudson)	ST
Barnes Pond (Minerva)	ST
Big Cherrypatch Pond (N. Elba)	ST
Birch Pond (Elizabethtown)	ST
Burge Pond (Schroon)	ST
Black Pond (or Rhododendron) (Keene)	ST
Black Pond (Minerva)	ST
Bloody Pond (No. Hudson)	ST
Brothers Pond	ST
Center Pond (Minerva)	ST
Challis Pond (N. Hudson)	ST
Chub River	ST
Clear Pond (Minerva, Newcomb)	RT
Clear Pond (Ticonderoga)	ST
Lake Colden (Keene)	ST
Connery Pond (N. Elba)	Splake
Connery Pond (N. Elba)	Splake
Cotters Pond (Schroon)	ST
So. Dalton Pond (Moriah)	ST
No. Dalton Pond (Moriah)	ST
Dunk Pond (Minerva)	ST
Flowed Lands (Newcomb)	ST
Giant Washbowl (Keene)	ST
Glidden Marsh (Schroon)	ST
Goose Pond (Schroon)	RT
Goose Pond (Schroon)	ST
Grizzle Ocean (Ticonderoga)	ST
Gull Lake (Schroon)	ST
Hatch Pond (No. Hudson)	ST
Hatching Pond	ST
Hewitt Pond (Minerva)	ST
Horseshoe Pond (Schroon)	ST
Howard Pond (No. Hudson)	ST
Hudson River (Minerva)	RT
Hudson River (Minerva)	BT
Hudson River (Minerva)	BT
Huntley Pond (Minerva)	ST
Latham Pond (Newcomb)	ST
Lilypad Pond (Keene)	ST
Lilypad Pond (Ticonderoga)	ST
Little Crowfoot Pond	ST
Little Howard Pond (Moriah, No. Hudson)	ST
Little Rock Pond (Ticonderoga)	ST
Locke or Eagle Nest Pond (Moriah)	ST
Long Pond (N. Elba)	ST
Lost Pond (Ticonderoga)	ST
Lost Pond (Ticonderoga)	RT
Lower or Big Marsh Pond (No. Hudson)	ST
Lower Twin Pond (N. Hudson)	ST
McKenzie Pond (N. Elba)	ST
Marion Pond (Schroon)	ST
Marsh Pond (Schroon)	ST
Moose Mt. Pond (No. Hudson)	ST
Moose Pond (No. Elba)	ST
Munson Pond (N. Hudson)	ST
Otter Pond (Ticonderoga)	ST
Owen Pond (N. Elba)	ST
Oxshoe Pond (Schroon)	ST
Pharoah Lake (Schroon)	ST
Rankin Pond (Minerva)	ST
Rock Pond (Ticonderoga)	ST
Sherman Road (Minerva)	ST
Spectacle Pond (Upper) (Schroon)	ST
Springhill Pond (Lower) (Ticonderoga, Hague)	ST
Springhill Pond (Lower) (Ticonderoga, Hague)	RT
Springhill Pond (Upper) (Ticonderoga)	ST
Stony Pond (Minerva)	ST
Triangle Pond (No. Hudson)	ST
Twenty-ninth Pond (Minerva)	ST
Upper Marsh Pond (No. Hudson)	ST
Upper Twin or Round Pond (Keene)	ST
Upper Twin Pond (No. Hudson)	ST
Upper Wallface Pond (N. Elba)	ST
Vanderwacker Pond (No. Hudson)	ST
Whortleberry Pond (Schroon)	ST
Winch Pond (Wilmington)	ST
Wolf Pond (No. Hudson)	ST

FRANKLIN COUNTY

Bear Pond (Santa Clara)	ST
Bear Pond (Santa Clara)	ST
Bessie Pond (Santa Clara)	Splake
Big Fish Pond (Santa Clara)	ST
Clamshell Pond (Santa Clara)	ST
Dawson Pond (Harrietstown)	ST
Deer Pond (Santa Clara)	LT
Dry Lake (Santa Clara)	ST
East Copperas Pond (Santa Clara)	ST
Grass Pond (Santa Clara)	ST
Grass Pond (Santa Clara)	ST
Grass Pond—Isolated (Santa Clara)	ST
Grass Pond, E. of (Harrietstown)	ST
Meadow Pond	ST
Gull Pond (Altamont)	LT
Horseshoe Pond (Santa Clara)	RT
Horseshoe Pond (Santa Clara)	ST
Kit Fox Pond (Santa Clara)	ST
Ledge Pond (Santa Clara)	ST
Little Ampersand Pond	ST
Little Fish Pond	ST
Little Long Pond—P141 (Santa Clara)	ST
Little Long Pond—P267 (Santa Clara)	Splake
Little Long Pond—P267 (Santa Clara)	RT
Little Polliwog Pond (Santa Clara)	ST
Long Pond (Brighton)	ST
Long Pond #3 (Santa Clara)	ST
Loon Pond (Brighton)	ST
Lydia Pond (Santa Clara)	ST
Monday Pond (Santa Clara)	ST
Mountain Pond (Santa Clara)	ST
Mud Pond (Santa Clara)	ST
Nellie Pond (Santa Clara)	ST
Ochre Pond (Santa Clara)	ST
Otter Pond (Santa Clara)	ST
Owl Pond	ST
Owl Pond	ST
Palmer Pond (Harrietstown)	ST
Big Pine Pond	R. Sal.
Big Pine Pond	ST
Pitchfork Pond	ST
No. Whey Pond	ST
Little No. Whey Pond	ST
Rock Pond (Harrietstown)	ST
St. Regis Pond	ST

Stocked By Airplane

St. Regis Pond	ST
Samjamaw Pond (Harrietstown)	ST
Sky Pond (Santa Clara)	ST
South Otter Pond (Santa Clara)	ST
Sunrise Pond (Santa Clara)	ST
Tuesday Pond (Santa Clara)	ST
Whipple Pond (Santa Clara)	ST

FULTON COUNTY

Fourth Lake (Stratford)	ST
Holmes Lake (Bleecker)	ST
Indian Lake (Caroga)	ST
Little Holmes Lake (Bleecker)	ST
Long Lake (Stratford)	ST
Long Pond (Stratford)	ST
Nine Corners Lake (Caroga)	ST
Otter Lake	RT
Otter Lake	BT
Prairie Lake	ST
Red Louse Lake	ST
Stewart Pond (Caroga)	ST
Third Lake (Stratford)	ST
Ale Pond (Morehouse)	ST
Ackerman Pond	ST
Ackerman Pond	ST
Amos Lake (Arietta)	ST
Balsam Lake	ST
Barker Pond (Indian Lake)	ST
Bear Pond (Arietta)	ST
Bear Pond (Arietta)	ST
Beaver Lake	RT
Beaver Lake	ST
Bennett Lake (Hope)	ST
Big Rock Lake (Morehouse)	ST
Big or South Twin Pond (Arietta)	ST
Bochen Lake (Morehouse)	ST
Brown Lake (Arietta)	ST
Brook Trout Lake (Morehouse)	ST
Brown's Pond (Indian Lake)	ST
Bug Lake (Inlet)	ST
Bug Lake (Inlet)	RT
Buckhorn Pond (Wells)	ST
Bug Lake (Inlet)	R. Sal.
Bullhead Pond (Indian Lake)	ST
Bullhead Pond	ST
Canary Pond (Benson)	ST
Carry Pond (Lake Pleasant)	ST
Cascade Pond (Indian Lake)	ST
Castor Pond (Morehouse)	ST
Cat Lake (Arietta)	ST
Cedar Lake (Arietta)	ST
Cedar River Flow (Lake Pleasant)	RT
Cedar River Flow (Lake Pleasant)	ST
Center Pond (Indian Lake)	ST
Christian Lake (Arietta)	ST
Christian Lake (Arietta)	ST
Chub Pond (Long Lake)	ST
Clear Pond (Indian Lake)	ST
Constable Pond (Long Lake)	ST
Cooney Lake (Arietta)	ST
County Line Lake (Benson)	ST
Cranberry Pond (Long Lake)	ST
Crotched Pond (Indian Lake)	ST
Eagle Nest Pond (Inlet)	ST
Falls Pond	ST
Fawn Lake	LT
First Lake (Indian Lake)	RT
Grass Pond (Long Lake)	ST
Grant Lake (Benson)	ST
Green Pond (Indian Lake)	ST
Headwater Pd. of Otter Brook (Arietta)	ST
Helldiver Pond (Morehouse)	ST
Helldiver Pond (Morehouse)	ST
High Pond	ST
High Rock Pond (Inlet)	ST
Icehouse Pond (Inlet)	ST
Indian Lake (Morehouse)	ST
Iron Lake (Arietta)	ST
Jockeybush Lake (Arietta)	ST
Johnson Vly Pond (Wells)	ST
Kings Pond (Arietta)	ST
Kunjamuck River (Lakes Pleasant, Wells)	ST
Kunjamuck River (Lakes Pleasant, Wells)	ST
Kunjamuck River (Lakes Pleasant, Wells)	ST
Lake Chartreuse (Wells)	ST
LePerre or Prier Pond (Indian Lake)	ST
Little Moose Pond (Arietta)	ST
North Upper Pine Pond (Wells)	ST
Little Rock Lake (Morehouse)	ST
Long Lake (Morehouse)	ST
Long Pond (Wells, Indian Lake)	ST
Long Pond (Wells, Indian Lake)	ST
Lost Pond (Indian Lake)	ST
Lost Pond (Inlet)	ST
Lower Sister Lake (Long Lake)	ST
Lower Mitchell Pond	S'brns.
Mays Pond (Long Lake)	ST
Meco Lake (Benson)	ST
Metcalf Lake (Morehouse)	ST
Middle Lake (Hope)	ST
Little Chain Pond	ST
Misery Pond (Morehouse)	ST
Moose River, So. Br. (Morehouse)	ST
Mud Lake (Wells)	ST
Murphy Lake (Hope)	ST
Northrup Lake (Morehouse)	ST
Otter Lake (Arietta)	ST
Owl Pond	ST
Owl Pond (Arietta)	ST
Owl Pond (Arietta)	ST
Owlshead Pond (Long Lake)	ST
Pea Pond (Morehouse)	ST
Pillsbury Lake (Arietta)	ST
Pine Lake (Indian Lake)	ST
Pine Mt. Pond (Indian Lake)	ST
So. Upper Pine Pond (Wells)	ST
Pigeon Lake (Long Lake)	ST
Dewitt Pond (Arietta)	ST
Notch Pond (Morehouse)	ST
Indian River-Stillwater (Morehouse)	ST
Jessup Lake (Arietta)	ST
Poor Lake	ST
Queer Lake (Long Lake)	ST
Rock Lake (Benson)	ST
Rock Lake	RT
Rock Lake	ST
Rock Lake	RT
Rock Pond (Indian Lake)	ST
Round Pond (Indian Lake)	ST
Sampson Lake (Arietta)	ST
Scutts Lake (Arietta)	ST
Silver Lake (Benson)	ST
Slim Pond (Arietta)	ST
Snag Lake (Morehouse)	ST
South Lake of West Canada (Arietta)	ST
South Pond (Long Lake)	ST
South Pond (Long Lake)	ST
Spoon Lake (Morehouse)	ST
Sprague Pond (Indian Lake)	ST
Spruce Lake (Arietta)	ST
Squaw Lake (Morehouse)	ST
Squirrel Pond (Indian Lake)	ST
Sturges Pond	ST
Stephens Pond (Indian Lake)	ST
Tirrell Pond (Indian Lake)	ST
Twin Rock Lake (Morehouse)	ST
Trout Pond (Inlet)	ST
Unknown Pond (Indian Lake)	ST
Upper Loomis Pond (Arietta)	ST
Upper Sister Lake (Long Lake)	ST
Upper Mitchell Pond (Inlet)	S'brns.
Upper Gull Lake (Long Lake)	ST
West Canada Creek-Stillwater (Morehouse)	ST
West Canada Lake (Arietta)	RT
West Canada Lake (Arietta)	ST
White Lake (Benson)	ST
White Birch Lake (Arietta)	ST
Whitney Lake (Arietta)	ST
Wilson Pond (Indian Lake)	ST
Wolf Pond (Morehouse)	ST

HERKIMER COUNTY

Bear Lake (Webb)	ST
Big Otter Lake (Webb)	ST
Boyer Lake (Webb)	ST
Bubb Lake (Webb)	ST
Buck Pond (Webb)	ST
Cage Lake (Webb)	ST
Deer Pond (Webb)	ST
Hawk Pond (Webb)	ST
Horn Lake	ST
Horseshoe Pond (Webb)	ST
Little Rock Pond	ST
Little Salmon Lake (Ohio)	ST
Lower Moshier Pond (Webb)	ST
Mildle Branch Lake (Webb)	ST
Middle Settlement Lake (Webb)	ST
North Lake	ST
Oswego Pond (Webb)	ST
Razorback Pond (Webb)	ST
Rock Lake	ST
Salmon Lake (Webb)	ST
Sand Lake (Webb)	ST
Sunshine Pond (Webb)	ST
Upper Moshier Pond (Webb)	ST
Walker Pond (Webb)	ST
West Pond (Webb)	ST
Witchhopple Lake (Webb)	ST
Wolf Pond	ST
Woods Lake (Webb)	ST
Cork Pond	ST
East Pine Pond (Grieg)	ST
Little Pine Pond (Grieg)	ST
Pine Lake (Grieg)	ST

ONEIDA COUNTY

Brandy Lake	ST
Round Pond	ST

ST. LAWRENCE COUNTY

Bassout Pond (Clifton)	ST
Big Trout Pond (Piercefield)	ST
Bridge Brook Pond (Piercefield)	ST
Birch Pond (Fine)	ST
Burntbridge Pond (Colton)	ST
Cat Mountain Pond (Clifton)	ST
Church Pond (Colton)	ST
Clear Pond (Clifton)	ST
Cowhorn Pond (Clifton)	ST
Curtis Pond (Colton)	ST
Darning Needle Pond (Clifton)	ST
Dog Pond (Colton)	ST
Fishpole Pond (Clifton)	ST
Glasby Pond (Clifton)	ST
Hedgehog or Clear Pond (Colton)	ST
Horseshoe Lake	ST
Horseshoe Lake	RT
Lilypad Pond (Parishville)	ST
Little Trout Pond (Piercefield)	ST
Long Lake (Pitcairn)	ST
Long Lake (Fine)	ST
Long Pond (Parishville)	ST
Olmstead Pond (Clifton)	ST

(Continued on page 47)

1968 Not So Nutty

by Dr. E. M. Reilly, Jr., Curator of Zoology,
N. Y. S. Museum and Science Service

IN the last December-January issue of THE CONSERVATIONIST, I wrote a short note entitled, "Squirrels on the Move," at the end of which I asked: "How are things in your backyard?" If not over—the response has at least been whelming.

Fifty-three readers very kindly sent in observations concerning the nut and fruit crops in their regions or notes on the squirrel population and behavior. It is almost certain that the nut and fruit crops were considerably below normal through most of New York State except for the Great Lakes shores, the central Adirondacks and the St. Lawrence River region from which we received no reports. Where the squirrels were on the move and/or behaving peculiarly, the wild nut and fruit production was extremely low. Late spring frosts, which killed the flowers of the oaks and other nut or fruit bearers, were almost certainly responsible.

Mrs. Russell Judson of Claverack noted squirrels swimming the Hudson River between Athens and Hudson and her letter to the Editor triggered my article. I happen to live in Old Chatham—as distances are measured in Columbia County, practically a neighbor of Mrs. Judson's—and had noted the squirrel movements and the very low yield of wild nuts and fruits.

After the article appeared, Miles Ennis, of Conewango Valley, reported few nuts in his region although the squirrels seemed abundant, fat and sassy. Mrs. Schuyler Winslow, of Stony Creek, reported an almost complete failure of the nut crop near her home and the resulting onslaught of squirrels and other animals dependent on wild fruit, upon feeding stations and cultivated crops. Miss Harriett Hawley reported that only horse chestnuts (which flower late in the year) had a normal crop near Wellsville.

George Oswald reported a few black walnuts near Hall and observed that the oak-hickory production near Prattsburg, Pulteney and Italy was almost nonexistent. He also reported the squirrels raiding nearby cornfields in unusual numbers. Marshall C. Tweedie reported no squirrels in his favorite hunting grounds as well as almost no nuts of any kind near Seneca Falls. Jimmy Lowery of New City sent observations which indicated nut crop failure near his home. Mrs. Robert Sheffield noted the lack of nuts, rose hips and thornapple berries on her 30 acres near Binghamton and the resultant crowding by squirrels, rabbits and pheasants at her feeding stations. At Rotterdam Junction, Mrs. W. L. Blawis reported no acorns on three oak trees there and very few on the oaks near Lake George.

The long-distance traveler, Judson P. Deuel, remarked on the very low butternut production on these trees between Jamestown and Rouses Point and Whitehall to Batavia. Good stands of butternuts between Rome-Booneville-Lowville, Waterville-Brookfield-Sherburne and Trenton-East Steuben produced few if any nuts. Mr. Deuel's own butternut trees at Hartford were without fruit this year. John S. Genung reported very few acorns and only a few pignuts near Waterloo and ". . . in southern Seneca and northern Schuyler County, where oaks, both red and white, predominate. I never saw a squirrel or an acorn!" Near Waterloo, however, he managed to gather over three bushels of walnuts [black] from under three to four young healthy trees and still leave some for the squirrels. At Corning, R. M. McMullin reported no nuts from two black walnut trees and a butternut tree in his yard.

Garry Wemple of Berkshire Farms, at Canaan, struck a brighter note with his observations that the trees, mushrooms and dumps had apparently kept the squirrels near the boys' school active and healthy.

A. B. Carson of Rushville reported few pine cones on a reforestation lot, no butternuts and very few other nuts except some good production of acorns in a red oak forest. From their backyard in Mayfield, overlooking Sacandaga Reservoir, Mr. and Mrs. Paul Koehler reported plenty of nuts on their beech and oak trees. W. Dale Williams of Surprise said butternuts, hickories, beeches and oaks in Greene County bore but very few nuts. Chris Schmelling of Syracuse had spent many days in the outdoors and had sent many interesting notes on nature as well as on the scarcity of nuts and fruits in the Oneida County area.

Lack of space prevents me from mentioning all the fine people who reported the observations about squirrels and the nut and fruit crops in their backyards.

Since they are surely confirmed readers of THE CONSERVATIONIST, we take this opportunity to thank each and everyone of them. One note should be added here: Even in a normal production season for wild nuts, fruits and squirrels, the animals do move around, especially in the fall, and some are killed on our highways or drown in our lakes and rivers. A wild food-crop failure means more widespread and noticeable movements of the animals. Such periodic fluctuations control wild populations and generally result in the survival of the fittest.

Levi Wells Prentice

The Decline Of The Adirondack Painters

by William K. Verner, *Research Asst., The Adirondack Museum*

For the past year THE CONSERVATIONIST *has been reproducing selected paintings of artists in the 19th Century who portrayed Adirondack scenes. As a group they intermingled with the Hudson River School painters and both fed off the Romantic Movement. The illustrations we have used have been selected by the author from the collection of the Adirondack Museum at Blue Mountain Lake. In this article he analyzes the waning of painter interest in the Adirondacks, and describes the work of Levi Prentice as among the last of these regional artists. His "Lila's Lake" was shown on the second cover of the February-March issue of this magazine. From time to time,* THE CONSERVATIONIST *will continue to reproduce paintings of the Adirondacks through the generosity of the Adirondack Museum, and will rely on Mr. Verner for his illuminating comment.—Editor*

IN the December-January issue of THE CONSERVATIONIST we suggested that in addition to the profound changes which took place in the Adirondacks and in the public's attitude towards the region following the Civil War, there were significant alterations taking place in the role of landscape painting in American culture.

Whereas American landscapists reached a crest of financial, cultural, and social success in the quarter century following 1850, the interests of artists and patrons shifted to Europe, particularly to France, from the time of the national centennial. Part of the reason lay in the positive magnetic attraction of Europe itself, but, more important, Americans found themselves deeply involved in accommodating themselves to new ways of life in which urban industry was replacing agricultural civilization as the dominant means of livelihood, as mass production was supplanting the old handcrafts, as homespun gave way to the machine. In art, a reflection of this lay in the supercession of the older traditions of naturalistic landscape and portrait work by the photograph and the new mechanical means of pictorial reproduction. The faces of Americans and the face of the American land could no longer compete in their painterly forms with the new chemically and mechanically reproduced images.

In that same article, we suggested also that such American painters who still continued to attempt capturing the land in oil on canvas tended to stand out as rare individuals, as exceptions to the new cultural rule, and that their modes of expression tended to become more highly individualized. The day of the "schools" of native art were waning, whether "Hudson River school" or otherwise. When we think of the work of the great Winslow Homer, we think of it as highly individualized art and we think of the artist himself as very much the individualist. Another artist who exemplifies the new trend in Adirondack art, who in a sense sings the swansong of the old landscape tradition, was Levi Wells Prentice (see second cover, February-March issue) clearly no match for a Winslow Homer in our critical standards, but an intriguing figure nonetheless and one whose case perhaps better than that of any other artist of his time illustrates the conclusion of the major Adirondack landscape tradition.

The direct interest in Prentice emanates from such facts as that, until very recently, practically nothing was publicly known about him. As his art represented something of an anomaly with regard to the times in which he lived he managed to escape the notice of the art world and the art dictionaries totally, as far as we can tell—itself a commentary on the vagaries of taste and art history. He is interesting too because all evidence, both positive and negative, would seem to indicate that he was self-taught, and there is always something interesting in seeking self-effort achieve some measure of success, even if it takes many years for popular recognition of that success to become realized. Finally, Prentice was one of the few artists of even minor importance to have been born within—or in his case, very nearly within—the Blue Line of the Adirondack Park.

What we know of the artist's life is far from complete, but we do know that he was born in Harrisburg, Lewis County, west of the Adirondacks, in 1851, the son of a farming family which itself probably represented a late expression of the so-called New England emigration. In 1860, the family was living in somewhat less prosperous circumstances, or so the census records suggest, in the town of Copenhagen also in Lewis County. By 1871, the family turns up in Syracuse, and within a year or two the Syracuse

(Continued on page 40)

Loading a truck

Youths learn to work together

Youth Forestry Camps Perform A Dual Role As They Work On—

Kids, Crime And

SOMEWHERE in a New York State forest a pine cone falls to the ground. Later, a seedling sprouts from the cone and begins to shoot skyward.

If the basic ingredients are there—good soil, water, sunshine, room—the tiny seedling will grow straight and strong and sturdy. Some day the seedling will become a full grown pine tree.

Our youth—like tiny seedlings—also need basic ingredients—love, understanding, direction—if they are to grow into mature, responsible adults. When the ingredients are missing, something goes wrong. Then the youth needs help.

For the past seven years in that stand of New York State pine—and others like it—some of our not-so-lucky young people are getting the help they need.

The youth themselves may be planting seedlings . . . trimming and pruning pine . . . stocking a farm pond or trout stream and otherwise contributing toward the rehabilitation of the State's natural resources.

For these conservation activities, along with other ingredients such as remedial education, group counseling and a good helping of "caring" are being used to mold a successful treatment program for delinquent and pre-delinquent youths in New York State.

During the summer of 1968, the Division for Youth and the Department of Conservation co-operated again in an effort to help "keep the summer cool." A Satellite Camping Program for young boys between the ages of 10 and 13 was developed on conservation sites adjacent to four of the Division's forestry facilities. This innovative program was conducted for eght weeks, providing nearly 1,000 youth with the opportunity to escape the heat and hostility of city ghettos. In exchange, they received two weeks of camping, companionship and conservation. The results were seen as boys gained weight, became proficient in skills of conservation and were summed up by one youth's statement: "Man, I had the most fun I ever had in my life. Can I come again?"

The architects of the program are the Conservation Department and the New York State Division for Youth.

Since March of 1962 when the first Division for Youth-sponsored forestry camp—the Edward R. Cass Youth Camp—was opened near Rensselaerville, more than 2,000 delinquent or pre-delinquent youths have contributed some 140,000 man-days of work valued at approximately $600,000 by the Conservation Department, in the conservation and rehabilitation of natural resources throughout New York State.

Working out of five Division Youth camps and one START (Short Term Adolescent Residential Treatment) Center the youths have performed important conservation work in the forest plantations while receiving vocational and academic training, remedial instruction and group and individual counseling.

The facilities are operated by the Division for Youth in co-operation with the Conservation Department under Chapter 881, Laws of 1960, from which the Division received authorizaton to establish youth opportunity and youth rehabilitation centers for the rehabilitation, treatment, education and guidance of youths between the ages of 15 and 17 years whose behavior indicates that they would benefit from this type of program.

Since State law prohibits any activity which would tend to modify the "for-

A group stacking fresh cut logs

Conservation

by Milton J. Benoit, *Director of Public Education*, William Skiff, *Program Supervisor, N.Y.S. Division For Youth*

ever wild" concept on Forest Preserve lands, the forestry camps are located on State land outside the Blue Line, where a work program of constructive conservation work can be formulated for each camp.

Besides Camp Cass, Rensselaerville, the Division operates the Great Valley Youth Camp in Great Valley, opened in May of 1962; the Austin MacCormick Youth Camp at Brooktondale, opened in March of 1963; the Charles Loring Brace Youth Camp in Masonville, opened in May of 1963, and the Annsville Youth Camp in Annsville, opened in June of 1968.

What Is A Forestry Camp

Just what is a forestry camp? It is a temporary home for some 60 youths, delinquent or on the verge of delinquency located on Conservation Department-managed forest land. Here Division for Youth and Conservation Department staff provide educational, counseling and conservation work programs in an attempt to alter life patterns of young people on the road to trouble.

Each camp is staffed by about 25 Division for Youth personnel, including a camp superintendent and assistant, youth parole workers, boys' supervisors, instructors, clerical and maintenance personnel.

Conservation Department personnel consists of a youth camp conservation supervisor, two forest general foremen and a maintenance man. These men lay out the conservation work assignments for the youth, maintain an over-all supervision of the conservation work and conduct classes for the young workers in conservation job training and safety.

During their stay at a camp—approximately nine months—the youth devote a part of each day to such forestry work as improvement of tree plantations by thinning and pruning, the construction of access roads for logging, fire protection and recreational use by the general public, and fish and game projects.

Conservation work has to be varied to fit the restless, short interest span of the youth. Projects that yield quick results and a sense of immediate accomplishment are selected on conservation game farms and forest plantations.

Community improvement projects are also sought to bolster the feelings of service to someone else and residents of nearby communities grow more relaxed and interested in camp operation as they see the youths at work.

From a conservation point of view the program has been a financial success.

In the fiscal year running from April, 1967 to March, 1968, for example, four Division for Youth forestry camps and one START (Short Term Adolescent Resident Training) Center produced a total of 20,829 man-days of work on conservation assignments. Total value of work accomplished (computed by the Conservation Department in terms of what it would cost the Department to perform similar work) amounted to $91,710. The year before the total was $89,344.

These totals don't include the Division's fifth camp at Annsville which was opened in June of 1968.

The START Center referred to above is the Monsignor D. Gregory Dugan START Center at Auburn. In this, and other similar centers throughout the State, up to 20 youths are accommodated in a work and counseling setting. Most of these centers are located near large State, county or municipal facilities, such as State hospitals which use the services of the youths for simple maintenance and landscaping tasks.

The START Center at Auburn is the only one in which the residents take part in conservation work as well. In the 1967-68 fiscal year youths at this center accounted for 208 man-days of conservation work—181 man-days on natural stand improvement, and 27 man-days on thinning. While the youths spend a great number of man-days on such activities as thinning and natural stand improvement, recreation development and game management projects, the greatest value of work accomplished in terms of monetary worth comes from the work done on truck trails. The work value of such projects in the 1967-68 fiscal year amounted to more than $16,000.

Pruning a pine plantation

Projects Are Varied

The types of projects are varied and don't allow for boredom. The youths work on such programs as releasing pheasants, pest control, tree improvement, building fences, conservation education, fish management, equipment maintenance, and the development of water impoundments. The youths also spend close to 100 man-days a year fighting forest fires.

One such assignment several years ago kept them away from Camp Cass for a whole week at the scene of a blaze near Whitehall in Washington County. The youth's performance at that particular fire earned them a letter of commendation and a bronze plaque from the Conservation Department.

Does conservation work help the youth vocationally after they leave the program?

At various times during their association with the conservation forestry camps, staff and youth alike have questioned the value of conservation. A youth will sometimes ask: "What's the use of all this forestry work? There's only one tree in Brooklyn and they won't let me cut it down." The youth has a point. There is only one Central Park and it's against the law to cut down trees. When a youth is discharged and returns to the "street" and his former gang members ask him what he has done and he flexes his muscles and tells them: "Man, I've been away for six months and I can cut down 16 red pines a day." He is somewhat humiliated when the next question is posed: "What are you going to do now, man, go around pushing over buildings?"

It is not the purpose of the Division for Youth's forestry camps to produce lumberjacks. The goal toward which the Conservation Department and the Division for Youth work daily is the production of well adjusted citizens. Conservation plays a large part in the preparation of each youth for this, his greatest contribution. Learning to get up and report to work on time is important, just as is learning to use the tools of one's trade efficiently and safely. Working on one end of a crosscut saw helps teach a youth the value of working with others toward a single goal. Having the opportunity to be the foreman of a small work crew develops character, leadership and a sense of contribution. In today's mechanized world, there is little opportunity for a young man to test his strength, his initiative, and to let off the frustration within him by working and sweating in the great outdoors.

Milton Luger, Director of the Division for Youth, has frequently pointed out that the conservation camp program is not designed to develop a saleable vocational skill, but is striving rather to develop the most saleable skill for any adolescent—the skill of attitude. The work involved in planting seedlings, pruning trees, and rebuilding streams for trout can help develop a boy's character and strengthen his sense of contributing, which is so necessary in today's society.

What are the residents of a forestry camp like?

They are much like the youth in all Division for Youth rehabilitation centers except that they are, for the most part, younger, immature 15-year-olds. At the camps they are given a chance to mature, explore roles and learn, with the assistance of firm, supportive male staff members.

Who Are The Kids?

Some have had minor difficulties in their school or community; others have been involved in delinquent acts, which unchecked, would have developed into criminal offenses.

About 58 per cent of Division for Youth center residents come from upstate New York while 42 per cent are from the New York City area. However, more than 75 per cent come from the State's major urban areas. Some 77 per cent are probation cases while 23 per cent of all referrals are voluntary.

Twenty-six per cent have been labelled ungovernable, four per cent are runaways and 14 per cent have had no formal complaint lodged against them. Of the remaining youths, 13 per cent have been charged with auto theft, 16 per cent with burglary, 11 per cent with truancy, six per cent with robbery, four per cent with other larceny and six per cent with assaults.

Two out of three are from broken homes and four out of five have had school behavior problems. Thirty-seven per cent were not in school, 90 per cent were unemployed, and 60 per cent were not living with their natural fathers when they got in trouble.

But more important than all these other statistics . . . and more important than all the man-days and monetary value of work performed in conservation projects by the youth—is the fact that six out of ten successfully complete the Division for Youth program and two out of three have not been arrested within two years of their discharge from a Division facility.

That many of these young people become valuable and contributing citizens of society can be attested to by the fact that close to 1,000 of them have entered and served in the Armed Forces of the United States. Many have fought—and some have died—in Vietnam. Many of them have been cited for meritorious conduct and valiant service to their country.

About 70 of these program "graduates" have been employed by the Division for Youth to work as trainees in various capacities in Division facilities and in the Division's aftercare program. In about 80 per cent of these cases employment has been rated "satisfactory."

(Continued on page 40)

The Students' Page

Attractive to mosquitoes

Often people have complained that they are especially good mosquito bait and the pesky insects seek them out in preference to other people nearby. U.S. Department of Agriculture scientists have determined this may be true. The human skin produces lactic acid and carbon dioxide, which in combination, is an effective mosquito attractant. Some people's skin produces more of this acid than others and they are those who have the biggest ich-and-bite problem. However, now that the chemical nature of human attraction for mosquitoes has been determined, after a ten-year search, it is hoped that this information can be used to develop effective mosquito traps. A summer without mosquito bites may yet become a reality.—CONSERVATION NEWS, *National Wildlife Federation*

Careers in fish and wildlife work

Many young men are highly motivated to make fish and game work their lifetime vocation. A couple of years earning a living in routine work turns the motivation into action, and they offer their services to the local fish or game manager. Too often it comes as a shock that the love of hunting and fishing aren't the main qualifications of a wildlife biologist.

Planning for a career in fish and wildlife work should start in high school, just as the planning for any other career does. The more training one has in preparation for the career, the better the job possibilities that will be open. For professional level jobs a minimum of graduation from a four-year college offering natural resource conservation work is required. Several two-year colleges turn out well trained technicians.

Students interested in entering the field of fish and wildlife work would do well to study the leaflet, "Planning a Career in Fish and Wildlife." This may be obtained free from the Division of Conservation Education, New York State Conservation Department, State Campus, Albany, New York 12226.

Fawns seldom orphaned

Most of the fawns in New York are born during the last two weeks of May and the first two weeks of June. The last of the summer's fawns, however, may not be born until August or even early September. These would be the occasional fawns which still have their spots during the hunting season.

The actual birth site appears to be where the doe happens to be at the time. As soon as possible the fawn is moved to an area which has good, low vegetation for protective cover. Since good, low vegetation is dependent on sunlight, thin woods edges, or overgrown fields or burns where ferns, grass, blueberries, and similar plants thrive, are most often selected.

A fawn can get to its feet when only ten minutes old, though it is an hour before it has the strength to take its first shaky steps. It is actually about six days before the fawn is strong enough to jump up and beat a hasty and effective retreat when approached.

During the first five days of life it has two things going for it to help it through this critical stage of growth. It appears to be scentless. On many occasions dogs which are known to track deer have passed within a few feet of a concealed fawn without showing any sign of recognition. In an environment where most predators depend mainly on their nose to point the way to prey, this is a big advantage.

Coupled with its lack of scent is also the fact that during these early days the doe stays away from her fawn most of the time, approaching it only eight or ten times a day to let it nurse. The mother isn't far away and will quickly appear to defend her young or to draw away a dog or similar enemy. When a human approaches, however, the mother stays in the background and is normally never seen.

The second safety factor is its ability to remain motionless. During the first five days it depends almost completely on remaining hidden. When danger is near it will lay back its ears and extend its head and neck out on the ground. In this way it becomes an inconspicuous mound like a sunspotted log.

During late May and June, as the good weather draws the public out of doors for picnics, flower picking expeditions, and the like, a surprising number of these little fawns will be found and "saved" by well-meaning persons. In only an exceptional case will the fawn actually be an orphan.

The chance that it is a kidnapping rather than a rescuing is so great that it is safe to say that fewer fawns would die of being orphans than of being saved. Proper care of little fawns is a critical and time-consuming job; one few people are prepared to undertake.

The Conservation Law recognizes the very limited need to take care of orphans and makes no provisions for issuing permits to possess them. This is further recognition of the fact that a pet deer, particularly a male, can be an extremely dangerous animal. Perfectly charming pets most of the time, fawns grow to be big deer with sharp hooves. A blow from a 150-pound deer—buck or doe—can cause serious injury, particularly to a child.

Stories are legion of the buck that has been a friendly pet and suddenly turned on its keeper with its sharp antlers and powerful neck. In the wild, their natural fear of man eliminates this hazard. A released pet has lost this natural deterrent and can turn up in the most unwanted places. Because of this it is a Conservation Department policy that male deer never be returned to the wild.

One of the myths about fawns is that they will be abandoned if touched by human hands. This is not so. Human scent around today's deer range is so common that it is little cause for concern. Fawns returned to their hiding place the same day have not been rejected. How long this period can be extended probably varies with individual does.

MINNOWS
Of New York

Part I: Facts About Some Of Our Chubs And Dace

by Edward C. Raney, *Prof. of Zoology, Curator of Fishes, Section of Ecology and Systematics, Division of Biological Sciences, Cornell University*

NEW YORK State has nearly 200 fishes, classified in 28 families, that spend most of their life in fresh-water. The minnow family (*Cyprinidae*) is by far the largest family in the State. Some 48 species are known; of these, five have been introduced from abroad.

The best known of the exotics are the carp and goldfish. Of the two most closely related families, the sucker family (*Catostomidae*) includes 15 species and the catfish family (*Ictaluridae*) has ten species. Other large families are the sunfish family (*Centrarchidae*) with 14 species and the perch family with 20 species. Under natural conditions, outside tidal waters in the State, minnows (individuals) may outnumber all other fishes.

Generally, minnows are found in all fresh-waters in the North Temperate Zone and throughout Africa. Worldwide more than 2,000 species exist. Large numbers of diverse forms are found in Asia and China. Most American minnows are built on the same general pattern and the species are often difficult to identify. Few specialists in the United States can identify minnows properly without recourse to fish collections such as that located at Cornell University. However, each year much is added to our store of knowledge of these interesting forms.

True minnows are often called chubs, dace and shiners, without reference to their evolutionary relationships. Many small fishes of other families are called minnows or "minnies." Two species of mud minnow are found in New York; they are related to the pike, pickerel and muskalonge (*Esocidae*). Top minnows, which are often used as aquarium fishes, belong to the family *Cyprinodontidae*.

Some of the larger minnows, especially creek chub, fallfish and hornyhead, may constitute a boy's introduction to fish life. These are easily caught on a hook and line using a worm or fly. The author recalls many happy boyhood days spent lying on the bank of a small stream observing the antics of the creek chub and other species of minnows.

Their Habitat

Various species of minnow are found in almost all habitats except full strength salt-water. This includes headwater bogs and swamps, small headwater tributaries, rivers, ponds and lakes. At a given place in a moderately large stream it is not uncommon to find 10 to 15 kinds of minnows. Their habits vary greatly. Some occur in schools all or part of the time and others are mostly seen alone or with few companions. Some types are found only in cold water within the State and others are widely distributed. Some, like the fallfish, inhabit larger streams, rivers and lakes, and others, like the pearl dace, are normally found in headwater tributaries.

Most of the native minnows in New York State are small and seldom exceed four inches in length. The creek chub, river chub, hornyhead chub and fallfish are exceptions. The latter reaches 18 inches or more in length. Of the introduced species, the carp often exceeds two and a half feet in length and weighs more than 30 pounds. The smaller minnows seldom live more than three or four years; the larger species may live from seven to ten years, and the carp even longer.

The spawning season for our minnows may extend from early spring through early August although each species has a more precise time within the above range. Eggs may be laid on or in the bottom, in algae or other aquatic plants, or the male may hold a territory and build a nest (redd) in which the eggs are deposited. This is true of the creek chub, fallfish, river chub and hornyhead chub which are treated in this installment. Males of these species assume bright colors including red and orange just before the spawning time. In species which build a nest the male is usually larger and more brightly colored. They often develop temporary nuptial tubercles (pearl organs) on the head or other parts of the body. These assist in holding the female during spawning or serve as protection. The tubercles are sloughed off after the end of the spawning period and at this time the males lose most or all of their bright colors. These changes are such that the creek chub is thought to be a different species (horned dace) by many when during the spring it has the large tubercles on the head and bright colors. Immature minnows normally are colored like the female.

Minnows are not considered game fish although a large fallfish may readily rise to a fly and is fun to catch. The creek chub and river chub often are taken but are seldom eaten. Minnows at various sizes are eaten by game fishes and some are raised in ponds as bait minnows. Minnows, where common, may also compete with game fishes, particularly trout. Many minnows are interesting aquarium animals but they do better in cooler water than do the typical tropical aquarium fishes. The study of minnows is somewhat difficult, both because they are difficult to identify and because nets are usually needed to capture them. The latter may not be used without the proper license.

This installment on the minnows in New York State includes accounts of 14 forms. Of these, nine are illustrated in color. The illustrations were painted from life by Miss Ellen Edmonson and Hugh

P. Chrisp and originally were included in the Biological Surveys of the various drainage systems in New York State carried on by the State of New York Conservation Department from 1926 through 1939. The names used generally follow those given in the American Fisheries Society Special Publication No. 2, 1960, "A List of Common and Scientific Names of Fishes from the United States and Canada," second edition. Departures from this list reflect conclusions based on reconsideration of relationships. As additional studies are made, other changes in nomenclature may follow.

How may minnows be separated from related species at the family level? The mouth is not adapted for sucking as it is in the sucker family but like the sucker, they have no teeth in the jaws. The teeth are located in the throat only and are spoken of as pharyngeal teeth; the latter are arranged in one to three rows and number fewer than nine on one side. In suckers the pharyngeal teeth are numerous, and are arranged like a comb in a single row. Details regarding the number and sculpturing of the individual teeth serve as identifying characters to separate different species of minnow. The reader who wishes more information on how to identify minnows of New York is referred to "Fishes of the Great Lakes Region," by Carl L. Hubbs and Karl F. Lagler.

Creek Chub

The creek chub, *Semotilus atromaculatus* (Mitchill), or horned dace, is widely distributed from Montana eastward to the Gaspe Peninsula and southward on both sides of the Appalachians to Georgia and other Gulf States. It consists of several subspecies which have not as yet been studied adequately. It is known mostly from small creeks but has also been taken in lakes and occasionally to depths of seven fathoms. In New York it is found in creeks of all drainages outside of Long Island. It is rare to take a stream collection of fishes anywhere in the State without including this species. The male reaches a length of 12 inches but specimens eight to ten inches are uncommon.

The male is much larger than the female. At spawning time he assumes the bright coloration shown in the illustration and develops at least four large tubercles on either side of the head and at this time is known as the "horned dace." These tubercles are useful as he guards his nest and dashes to repel intruding males or other species. In the Ithaca area spawning occurs in late May and early June when the water temperature is 65 F. or more. Some apparently stunted populations, where the breeding male is less than four inches long, have been observed in northern New York where eggs were found on July 3 when water temperature was 55 F. in a trout stream. This adaptability in regard to spawning may be an important factor in the wide distribution of this minnow.

In building the nest, an area in the lower end of a pool usually near a riffle is normally occupied. The male chooses and defends a territory within which he clears an area approximately ten inches in diameter by picking up gravel and sand by mouth or by pushing stones along the bottom. These are moved upstream and form a mound of small pebbles. As he continues to work on the nest for several days or even as much as a week, it finally appears as a conspicuous ridge of clean gravel located upstream from a shallow pit which may be ten inches in diameter and up to four inches deep. Spawning occurs both in the pit and on the lower edge of the upstream ridge. Ultimately, the eggs are buried by nest building activities. The activities of the male creek chub on the cleaned ridge and nest attracts many other species of fishes. The common shiner and blacknose dace particularly like to spawn here. They usually occupy the nests without being attacked. Occasionally, smaller male creek chubs may occupy the periphery of such a nest and they even occasionally spawn while the dominant male continues to work on the nest.

The growth of the creek chub has been studied by Dr. John R. Greeley by an examination of the scales. It reaches a length of two or three inches during the first year and is from four to seven inches by the end of the fourth year. By the fourth year the rate of the growth of the male is greater. Females mature first in their fourth summer after which growth slackens. The males mature in their fifth summer after which the growth slows. Maximum age is seven winters for the male and six for the female. Maximum length is 12 inches for the male and 11 inches for the female.

The creek chub is carnivorous. It often may be seen rising for flies, but also feeds on aquatic insects, snails, crayfish, and worms from the bottom. Occasionally, it feeds on small fishes and in turn serves as a forage fish for bass and other fishes. It is a popular bait fish for large game fishes such as pike and muskalonge. Although it reaches its maximum density in small creeks, it occurs often enough in small brook trout streams to be a serious competitor. It is fished for by small boys and the flesh is edible.

Illustration from a male 9¾ inches long in breeding colors, presumably taken in the Ithaca area.

Fallfish

The fallfish, *Semotilus corporalis* (Mitchill), ranges from James Bay and from the Lake Superior drainage of Ontario in the vicinity of Lake Nipigon eastward to the Maritime Provinces and southward east of the Appalachians to Virginia. In New York it is found east and northeast of the upper Susquehanna River system. It is common in the Delaware and Susquehanna systems where it is a common associate of the smallmouth bass. Few are present in the Adirondacks and it is generally absent at higher elevations. It prefers rivers and lakes and does not occur in headwater streams. It is the largest native eastern North American minnow and occasionally reaches a length of more than 18 inches, and a weight of over two pounds. The fallfish is a large-scaled, silvery chub which is called such names as silver chub, whitefish, windfish, chub, Mohawk chub and roughnose chub (alluding to nuptial tubercles on snout). Generally in New York, it is used as a bait minnow, particularly for bass and pike. Because it rises to the fly readily and feeds largely on insects, it may be a serious competitor for some game fishes. The flesh is soft and rather bony and it is not considered good although it is utilized to a considerable extent in the spring in the Delaware River Basin. It can be considered as a game fish for boys.

It usually spawns in June in New York. The large male chooses an area, makes an excavation by shoving stones aside with the snout and picking some up with the mouth. Later this hole is filled with stones which may be one or two inches or more in diameter. The larger nests exceed six feet in diameter and as much as two feet high and may be the largest nest built by any fish. Occasionally as the water drops, the top of the nest is only a few inches under or protrudes above the surface. The size of the nest seems to be roughly proportionate to the size of the male. The male con-

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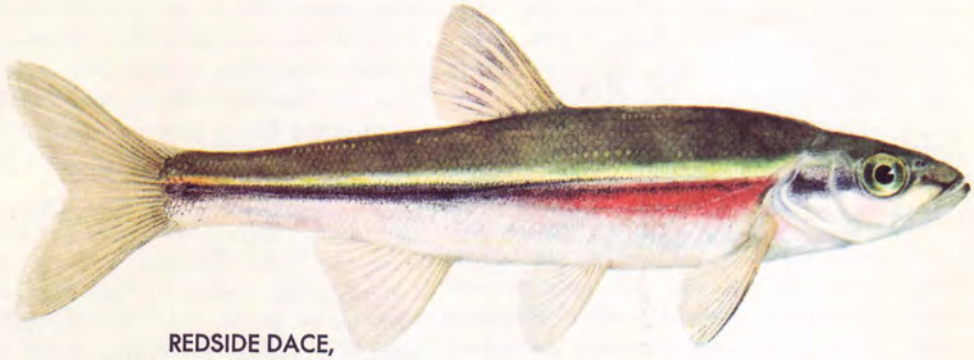
Some Of Our C



REDSIDE DACE,
Clinostomus elongatus (Kirtland)

NORTHERN REDBELLY DACE,
Chrosomus eos Cope

FINESCALE DACE,
Chrosomus neogaeus (Cope)

HORNYHEAD CHUB,
Nocomis biguttatus (Kirtland)

hubs And Dace

NORTHERN PEARL DACE,
Semotilus margarita nachtriebi (Cox)

LAKE CHUB,
Semotilus plumbeus (Agassiz)

CREEK CHUB,
Semotilus atromaculatus (Mitchill)

FALLFISH,
Semotilus corporalis (Mitchill)

(Continued from page 23)

tinues to work on the nest until he meets a female coming upstream and spawning occurs on the downstream edge of the pile of stones. She is held in a brief spawning clasp which is terminated when the female is tossed upward and may break the surface of the water with a splash. The male goes back to gathering the stones and ultimately the eggs are covered. Smaller males will occasionally approach a nest but are driven away by the large male. However, occasionally they are successful in spawning. Normally the male fallfish is not disturbed by large numbers of the common shiner which may hold positions over these nests and spawn thereon.

The illustration is from an adult male in breeding colors, 15½ inches long, taken in Paul Brook (upper Hudson River watershed) on June 10, 1932. An examination of the scale of this specimen indicated that it had passed through eight winters of life. Note the small, white nuptial tubercles on the snout and above the eye of this specimen. These are lost after the spawning season is over.

Northern Pearl Dace

The northern pearl dace, *Semotilus margarita nachtriebi* (Cox), occurs widely through Canada south of the tundra from the Peace River to the Maritime Provinces and southward to northern New York and westward to the Dakotas. In New York it is limited to the Adirondacks and adjacent regions, particularly tributaries to southeastern Lake Ontario. It is found in lakes, ponds and creeks; more specifically it lives in bog waters and cold headwater streams where it is usually found with trout.

Spawning was observed in Michigan by Dr. Thomas H. Langlois at a temperature of 63 to 65 F. on June 12 to 13, 1928 in a clear stream one and a half to two feet deep, in or out of the current and on sand or gravel bottom. This form does not build a nest. Adult males average smaller (3¼ inches) than the females which were 3¼ to 4¼ inches long. The nuptial male is easily recognized by the brilliant red lateral stripe on the lower side of the body. His paired fins (especially the pectoral fins) are longer, wider and more rounded. The upper side of the pectoral fins bear paired rows of small, sharp tubercles and the membranous areas between are greatly swollen. The belly of the nuptial female is swollen and her body is obviously deeper and thicker than that of the male.

The male holds a territory about eight inches in diameter. It is without definite outline except that its margin is indicated by the behavior of the male. He does not transport material. Territories are about six feet apart. The male holds a territory against other males and drives them away. When a female enters the two take a position side by side, close to the bottom heading upstream. The pectoral fin of the male is slipped beneath the anterior part of the female's body and his tail crosses over her back. He raises the pectoral fin and depresses his body and in this way may assist in oviposition. The two vibrate rapidly for about two seconds during which the eggs and sperm are deposited. The female then swims away upstream. Relatively few eggs are deposited at a given time. A 4¼-inch female contained 1,686 eggs.

Although this is a relatively primitive stage in the development of nesting in fishes, it is a step beyond that found in many because the male does hold a territory. A further step is illustrated by the stage of development in the creek chub where a pit is dug with the gravel placed in an upstream ridge. Within this genus the fallfish first digs a pit but then fills it with pebbles so that the nest in a huge pile of gravel. Nesting in the fourth member of the genus, the lake chub, is unknown.

RIVER CHUB, *Nocomis micropogon* (Cope)

The northern pearl dace feed partly on surface drift. Their stomachs contain insects, water mites and some aquatic plants.

Illustration is from a male 3⅜ inches long in breeding colors taken in Sucker Brook near Waddington, New York, July 12, 1933.

Southern Pearl Dace

The southern pearl dace, *Semotilus margarita margarita* (Cope), ranges from the Allegheny River system of Pennsylvania and New York eastward through the upper Susquehanna River and southward on the Atlantic slope to Virginia. In New York it is common in small tributaries of the Allegheny, Susquehanna and Genesee rivers systems. Scattered populations through mid-New

York State may represent intergrades between this and the northern subspecies but they have not studied in sufficient detail for positive identification.

It is most common in pools of small headwaters where it often is found with trout; seldom exceeds three inces in length and is short-lived. Food consists largely of insects and other small aquatic animals and fragments of higher plants have been found in the stomach. In turn, it has been found in trout stomachs.

In the Ithaca area it spawns earlier than related species. Nuptial males with a brilliant red stripe along the lower side, which are ready to spawn, have been taken in April and early May. Unlike its two larger relatives, the creek chub and fallfish, it does not build a nest but spawns over fine gravel.

Lake Chub

The lake chub, *Semotilus plumbeus* (Agassiz), is known from the Yukon River of Alaska and Canada eastward through Labrador and Nova Scotia to northern New England and the Great Lakes drainage basin; it is represented on the Pacific slope by a different form. It is an inhabitant of lakes or of the streams in the north and prefers cool water. Like many widespread minnows, the systematic status of various populations are not known. At various times it has been put in other genera such as *Couesius* and *Hybopsis*. Its placement in *Semotilus* used herein follows recent studies by Robert E. Jenkins (unpublished).

In New York, the lake chub is most common in the Adirondacks. Scattered populations occur along the shore of Lake Ontario and in the easternmost Finger Lakes (Owasco and Skaneateles), in central New York. Populations found in the East Branch of the Delaware River and in a few scattered streams near Albany, may represent a different form, but is said to closely resemble *plumbeus*.

It is a long, slim species which reaches a length of up to six inches. Spawning, which occurs early in the season, has not been adequately described. Specimens in breeding condition taken on April 19, 1939 in a small stream near Webster, New York may have represented a run of fishes out of Lake Ontario. Young specimens were found in some shore collections made in Lake Ontario. Supposed observations that it may be a nest builder need confirmation.

The lake chub is almost always taken in trout water and may compete with trout for food. Small specimens may be locally available as food for trout.

Illustrated from a male 3 15/16 inches long in breeding color taken in Lake Clear Outlet, near Saranac Hatchery on June 10, 1930.

Redside Dace

The redside dace, *Clinostomus elongatus* (Kirtland), is a midwestern species which reaches the eastern extreme of its range in New York where it is known from the Allegheny, Genesee and upper Susquehanna rivers systems, from tributaries of Lake Erie and scattered populations through the Mohawk River system and nearby tributaries of the Hudson River. A concentration occurs in the tributaries entering the eastern end of Lake Ontario. It is present in the Oswegatchie and Black rivers systems but is absent from the St. Lawrence drainage. Absent from Adirondack waters and like many of the fishes which entered from the west, it is absent from the Delaware River system. It is typically found in headwater creeks. It tends to avoid both very warm and very cold waters.

It occurs in schools in pools of small creeks and spends its active (daylight) hours searching for food. A large portion is taken from the surface. As the spawning season approaches in mid-May, the males move from the pools and approach the gravel spawning beds located in or above a riffle. The males ripen first and remain ripe longer than do females. Spawning was observed by William J. Koster in the Ithaca area in late May when water temperatures were 65 F. or more. At this season, females which approached males, now located over the gravel area, were pursued with vigor by one to ten males. Later a male would defend a small territory. A favorite territory was the depression in the nest or redd of a creek chub. These territories were small, poorly defined, being approximately the diameter of a given male.

Males were not seen to fight but occasionally carried on deferred combat where two males would swim off side by side and later return to again occupy a territory. However, as the precise spawning period approached, the territorial holding instinct became weaker and finally disappeared. At this time adults concentrated in dense schools behind a creek chub nest which also was often overrun by the common shiner which was spawning. The male redside dace were in a group; the females were restricted to the posterioral and lateral areas. When a female ready to spawn approached the males, she was joined from either side by a male or on some occasions six or more males crowded about her. Usually several minutes elapsed between successful matings, the eggs being laid among the gravel on the bottom of the nest. The male redside dace has larger fins and particularly the pectoral fin. At spawning he is an object of beauty. A black band extends from the snout through the eye to the end of the tail. At and slightly before actual spawning, the region from the gills to the dorsal base is largely replaced by red. Outside the spawning season the female does not have red along the side but does when she is on the spawning bed.

Most of the body of the male bears scattered, small nuptial tubercles or pearl organs. Females also develop nuptial tubercles but they are smaller and less widely distributed. These are obviously of value in enabling males to maintain position against a female in a current during spawning. The number of eggs produced by nearly ripe females varies from 409 to 1,526. Both sexes spawn for the first time after having lived through two winters. The older specimens were in their fourth year. They apparently spawn each year after reaching sexual maturity. At one year they are about an inch and a half in length. At two years they are slightly more than two inches in length and the largest specimens are from three and a half to nearly four inches long. Hybrids between the redside dace and the common shiner or the creek chub are frequently found. This results from nearly simultaneous spawning of the three species in a given gravel area usually within the nest (redd) of the creek chub.

Where it does occur in trout waters it is a competitor since it feeds largely on insect food drifting at the surface much as does the creek chub. The gape of the mouth is exceptionally large and it is extremely quick in striking at surface food and often hits artificial flies intended for trout.

Illustration shows breeding colors from a male about three inches long. Location of capture unknown, but probably from the Genesee River system.

Northern Redbelly Dace

The northern redbelly dace, *Chrosomus eos* Cope, is found from the Peace River system of northern British Columbia

eastward to Nova Scotia and occurs as an isolated glacial relict to the south. It is found in all the Great Lakes basins except the Lake Erie drainage of Ohio. In New York State it is primarily found in the Adirondacks. It is also recorded in the Mohawk and the upper Hudson rivers systems; isolated populations occur in central New York, particularly in Fall Creek near Ithaca, where it is to be regarded as a glacial relic. It is found in lakes, ponds and creeks but is most common in bog water or headwater streams which are often spring fed. A small species, it seldom exceeds two and a half inches in length. Stomach contents reveal its food to be mainly plants.

At spawning time the male is brightly colored with red and yellow. Breeding occurs from late May to August in New York. The eggs are deposited among filamentous algae and clumps or masses of soft rootless green vegetation. A single female is accompanied by several males. They dash into the algae mass where the spawning act takes several seconds. The eggs are non-adhesive and are scattered through the plants. They hatch in eight to ten days at water temperatures between 70 and 80 F. Spawning occurs first in their second or third summer of life and some live at least three years. It regularly hybridizes with finescale dace.

It is often very abundant in brook trout waters and small specimens serve as food for trout. Even though small, it is a good bait fish and lives well under crowded conditions. Some success has been obtained in raising it in ponds for sale as a bait fish. Illustrated is a male 2 5/16 inches long in breeding colors, presumably taken in the Lake Champlain area.

Southern Redbelly Dace

The southern redbelly dace, *Chrosomus erythrogaster* (Rafinesque), is known from the upper Mississippi River system to the Ohio River drainage of western New York and Pennsylvania, and southward west of the Appalachians. In New York it is limited to a few areas in tributaries of the Niagara River and the adjacent Lake Ontario drainage, and in the Conewango Creek system of the Allegheny River. Lives in ponds and sluggish streams. Its distribution complements that of the northern redbelly dace. The two species are difficult to identify unless both are at hand. The southern form is characterized by two dark stripes along the side; the lowermost ends in a large basicaudal spot. The northern redbelly dace is similarly marked but the mouth is strongly oblique and more curved, and the snout is shorter. The finescale dace differs from both in having a single dark stripe which reaches from in front of the eye to the base of the tail.

Adults are usually 1.5 to 3 inches long; the longest are less than four inches. This is a gregarious species, both before and during spawning. Several hundred have been seen in a breeding group. Spawning occurs in late May and June. At this time it is beautifully colored with red on the lower sides and belly. In the male, small, pointed pearl organs practically cover the entire surface of the body, head, tail and fins, and his pectoral fins are larger. The females average slightly smaller than the males. It spawns in shallow water adjacent to rapids and large numbers of both sexes are present. At the moment of spawning, two males press against a female from opposite sides and the eggs are laid during a period of rapid vibration. Other males may attempt to crowd in but no combat among males was observed. The female remains passive. At the moment of spawning, many other fishes immediately dash to the spot and eat eggs. Those which fall into the gravel may hatch.

Feeds on the bottom and stomach contents consist mostly of ooze and slime containing algae and some animal plankton. Because of its scarcity it appears not to be a significant component of the minnow fauna of the State. It is an interesting aquarium fish.

Finescale Dace

The finescale dace, *Chrosomus neogaeus* (Cope), is widely distributed from northwest Canada to Maine, New Hampshire, and the Adirondack region of New York. Its range encompasses the area formerly covered by the Pleistocene glacier and it appears to have reached New York from the northwest. In New York State it is found only in the Adirondacks and in the adjacent area, in tributaries in the eastern end of Lake Ontario. Although it occurs in lakes, ponds and creeks, it is most commonly taken in bog waters. Here it is frequently taken with northern redbelly dace and northern pearl dace. Both it and related forms acquire a broad band of red along the lower side in the male during spawning season. It seldom exceeds three and a half inches in size and is short lived. It is assumed that the spawning habits are like those of the northern redbelly dace because it hybridizes with it regularly. Spawning probably occurs in algae or other aquatic plants during at least June and July. An intensive study of the hybrids was made by Dr. John G. New. Often the number of hybrids taken at a given locality outnumber either parent. These hybrids seem to be invariably females and contain large eggs and possibly are fertile. Hybrids generally are intermediate in their characters between the two parent species. Adults are known to eat aquatic insects and vegetation. Small specimens may be eaten by trout.

The illustration is from a female 2 11/16 inches in length taken in Sucker Brook in the St. Lawrence watershed of New York on July 6, 1930.

Hornyhead Chub

The hornyhead chub, *Nocomis biguttatus* (Kirtland), also known as the redtail chub, is a midwestern species which reaches the eastern limit of its range in New York State. Here it is spottily distributed in tributaries of French Creek and the Niagara River, in scattered tributaries entering Lake Ontario from the south, and in a few streams in the Mohawk River system. It does not occur in the Susquehanna, Delaware or Hudson rivers. Its range complements that of the river chub and they are taken together in some tributaries of Lake Ontario west of Rochester. It occupies warm rivers and creeks and specifically inhabits areas where aquatic plants are found. Males average larger than females and attain a length of about six to nine inches in approximately four years, an age which is rarely exceeded. All are mature at three years; faster growing specimens of both sexes may mature when two years old.

Spawning occurs during late May and June. A nest is built by a male which sweeps or carries away material from an area and then piles pebbles in and above the level of the cavity. Nest building may be interrupted by intermittent spawning. The eggs drop between the stones and thus are partly shielded from silt. The nests vary from one to two feet in diameter and are as much as six inches high. They average somewhat smaller than those built by the river chub. The male of the hornyhead drives off others of the same species but mostly tolerates other fishes. Those utilizing these nests for spawning (and foraging) include blacknose dace, common shiner, rosyface shiner, southern redbelly dace and stoneroller minnow.

Larval stages of aquatic insects are its important food although other small animals, such as earthworms, crustaceans, molluscans are eaten. Much filamentous algae is engulfed. It is popular locally as a bait fish.

Illustrated from breeding colors of a male 4⅞ inches long (locality unknown). The red spot behind the eye is a distinctive mark of the adult male.

River Chub

The river chub, *Nocomis micropogon* (Cope), is found from the Wabash River system and southern Michigan to New York, and southward on the Atlantic slope to the James River system. West of the Applachians it occurs southward to the Tennessee River tributaries of Georgia and Alabama. In New York State it is found in warm rivers and their larger tributaries in western New York, including the Lake Ontario drainage, and in the Susquehanna River system. It is absent from the Delaware, Hudson, and Mohawk rivers and from the streams to the north and east of the latter. Its distribution in New York generally complements that of the hornyhead chub. It has a longer snout than the latter and the caudal fin is slate colored (never reddish), it lacks a crimson postocular spot and the caudal spot is absent or poorly developed even in small young.

It avoids headwaters; normally is associated with clear water and gravel bottom. It is one of our large minnows; adults are usually four to eight inches long but it reaches a size in excess of eleven inches in the male, which averages larger. It matures when three years old and rarely lives longer than five years.

It spawns mostly in late May and June in New York. At this time the snout and top of the head of the male swells greatly and this area is adorned by large, sharp nuptial tubercles. At this time he is often called crested chub. These tubercles may protect him when he attacks to drive other fishes away from his nest. Its nest, which consists of a heap of pebbles piled by the male, is a prominent feature of a stream where this species occurs. A large nest may be two and a half feet in diameter and extend as much as 12 inches from the bottom of the stream. Pebbles used may be an inch in diameter. Normally nests are located in the shallower parts of deep pools and often just above the break of a riffle. Spawning usually occurs in the downstream side of the gravel pile and a single male will spawn at various times with several females. Other fishes, such as the common shiner, aggregate and spawn over these nests. Occasionally. a hybrid between the river chub and common shiner is found in nature. These hybrids are due to chance meeting of egg and sperm as the two species spawn independently over the same nest.

The river chub feeds largely on or near the bottom on aquatic insects, crustaceans, molluscans and algae. It takes a bait and is easily caught on hook and line especially when the water is somewhat turbid during a summer freshet. It is common in bass streams and young may serve as forage for large game fish; is considered a good bait fish.

The illustration shows a male in breeding colors about 6½ inches long. The specimen was collected from Sandy Creek near North Hamlin, Monroe County, June 3, 1941.

Silver Chub

The silver chub, *Hybopsis storeriana* (Kirtland), is a western form, found from the Red River in Canada to Lake Erie, and southward west of the Appalachians to the Alabama River system and westward to Texas and Wyoming. It prefers large waters and is locally common in large silty rivers and in lakes. In New York, it is known from Lake Erie and the mouths of its tributaries, where it is often common, and possibly near the mouth of the Niagara River. Sometimes it ranges into rather deep water in a lake and occasionally is caught in gill nets. It is one of our largest native minnows and reaches a length of approximately ten inches, although usually is four to seven inches in adults.

The coloration is silvery on the sides to milky white below. The ventral edge of caudal fin has two or three milky white rays, a distinctive feature in adults which are slender with large fins. It appears to spawn relatively late in the season. Females ready to spawn were taken June 21 in New York; reported to spawn from late May to June elsewhere. Is used occasionally as bait fish.

Bigeye Chub

The bigeye chub, *Hybopsis amblops* (Rafinesque), ranges from the Ozarks upland to western Lake Ontario and southward through the Ohio River system to the Tennessee River in northern Alabama. In New York it is widespread in the Allegheny River system and is found in a few tributaries of Lake Erie and western Lake Ontario east of the mouth of the Niagara River. It is found in rivers and creeks in moderate current and prefers clean sand or fine gravel. Adults are usually 2 to 3.5 inches long. Spawns during late May to June.

Streamline Chub

The streamline chub, *Hybopsis dissimilis* (Kirtland), is a western species which in New York is found only in the Allegheny River and its larger tributaries where it was taken by the 1937 Biological Survey at nine collecting stations. It is a slender, silvery species which has a bluish lateral stripe on the side; the dark is intensified at intervals to form approximately nine blotches. Adults are two to four inches. It inhabits the riffles and nearby pools.

Rare Visitor Victim Of Hunter

Onithologists in Central New York were thrilled last fall with the report of the second sandhill crane ever recorded in the Finger Lakes, when one appeared on October 20 at the Montezuma National Wildlife Refuge. The only previous Finger Lakes record was one seen 20 years earlier at Montezuma. Since the 1880's, only four other records exist for this bird in upstate New York: May, 1965 in Schroeppel, Oswego County; November, 1966 near Delhi; November, 1967 near Whitehall; and November, 1967, near Kinderbrook.

Last year's visitor was seen off and on around the Refuge until November 14, when Richard Rand of Tyre found it walking along a back road near the west boundary of the Refuge, dragging a broken and bleeding wing. Refuge Manager Clayton Hardy took it immediately to the Laboratory of Ornithology at Cornell, where arrangements were made with a team of doctors from the Veterinary College to repair the wing. After a pin was placed in the wing and the wound was sutured, it was bandaged and returned to the Lab. where it was placed under the care of George Archibald, a graduate student from Nova Scotia, who is studying sandhill cranes.

At first "Ichabod," the name bestowed upon the crane by the folks at the Lab., appeared to make progress and was getting along nicely with Archibald's two hand-reared cranes in their large outside pen. In spite of the tender loving care it received, a week after its encounter with the irresponsible hunter, "Ichabod" died.

—Paul M. Kelsey, *Sr. Wildlife Biologist*

Fishes That Grow Horns

STONE ROLLER,
***Campostoma anomalum* (Rafinesque)**

Some 300 Species Grow These Horns Prior To Spawning Season. The Structures Play An Important Role In Reproduction

by **Robert F. Denoncourt, *Cornell University, Ithaca***

"LOOK at this!" my fishing companion exclaimed.

He showed me the third fish he had caught that May morning. It was only a common shiner, but it sure didn't look common then! The general silvery appearance illuminated and contrasted with the brilliant, iridescent pink and red of its sides and lower fins. Its head was the strangest of all, studded with sharp-pointed, whitish protuberances—covered with horns!

Unknown to most people, these pearl-white protuberances, more correctly called breeding or nuptial tubercles, are found in at least thirty families of fishes. The United States alone has over 200 minnows, 50 suckers, and dozens of darters possessing tubercles.

Close examination has shown the structures to be growths from the outer layer of skin or epidermis. They become hardened or cornified, and in some fishes are a very effective weapon.

A combination of environmental factors including temperature and light stimulate the growth of breeding tubercles. Normally most obvious a few weeks before the breeding season, some species show small buds as early as November. The tubercles are usually sloughed off a few days to weeks after the breeding season, leaving a temporary, small scar.

Ichthyologists, scientists who study fish, have found that breeding tubercles are most often located on the head and upper part of the forward (pectoral) pair of fins. However, some fishes such as the "stone-roller" minnow (*Campostoma anomalum*) are almost completely covered with tubercles. Each spring more fishermen learn to recognize the roughness of the male smelt, (*Osmerus mordax*), its entire body having small tubercles. The common sucker (*Catostomus commersoni*) and the colorful "green-sided" darter (*Etheostoma blennioides*) have only a few on the anal fin and tail. This distribution and frequently the actual count is quite distinctive for some species and assists taxonomists in their classification of certain fishes.

Except for a few species, only males produce breeding tubercles. Thus, during the breeding season, one can determine when looking at certain kinds of fishes whether he has a male or a female.

What is the function of these cornified growths? What are some tuberculate fishes one is apt to see or could easily observe in New York waters? A great many surprising and fascinating things await the careful observer each spring.

Nest Building

One of the interesting functions of breeding tubercles is the protection offered while the fish literally bulldozes gravel and small stones in the process of nest building. Nest building activities can often be observed in many small streams throughout the United States. That nest building has fascinated many people is well-illustrated by an incident occurring to Dr. C. F. Millspaugh, a former lecturer at Cornell University, who as a boy in 1868 was startled to see a man in full dress suit on his knees in a small creek near Ithaca, New York. Overcome by curiosity, he ventured closer. "Come here little boy, I'll show you something," he said. Soon, both Millspaugh and Louis Agassiz were absorbed watching a minnow push small stones into a pile.

Many a trout fisherman or budding sportsman with homemade pole is apt to call several different minnows the "horned dace." This name belongs to the "northern creek chub" (*Semotilus atromaculatus*) found in most streams in the central and eastern part of the United States. It grows to about twelve inches long and can be recognized by its small, round scales, black spot at the base of its top or dorsal fin, and a moustache on its upper lip. From April to June the adults migrate to small gravel-bottom streams to spawn. The males have three to five large, sharp tubercles on each side of their heads and a red flush to the breast, while the rest of the body is sometimes a variety of blues, greens, and rose.

The "creek chub" builds a unique nest with the help of its head tubercles. The male forces his head into gravel and sand, plows a small furrow, picks up the

loosened stones with his mouth, and deposits them a few inches upstream. As eggs are deposited in the hollow, he moves backward a few inches, digs a new furrow, and covers the first. The result is a ridge, a few inches high, and up to several feet long!

The "stone-roller" is another minnow that uses its tubercles as an aid in pushing small stones. Found in parts of New York and throughout the Mississippi drainage, this minnow shows a most extreme development of tubercles—almost completely covering the entire upper half of its body. Not only are these used in nest-building, but also in fights between rival males. An occasional individual may chase another with such force that he throws himself out of the water and onto the bank. A rather distinct feature of the "stone-roller" is a cartilaginous lower lip used to scrape its food, diatomaceous scum, from the rocks.

The "stone-roller" probes into the gravel at the lower ends of pools in small streams. He may even stand on his head, tail splashing out of the water in an effort to drive his tuberculate snout into the sand. Then a toss of the head and another probe until a pit three or four inches deep and twelve to eighteen inches in diameter is constructed. Several males may be seen working in the same pit, digging and fighting. The effectiveness of their tubercles as weapons, as well as protection while digging, is demonstrated by the high number of individuals with missing eyes.

A nest of a Fallfish

Sense Of Touch And Clasping

Fishes spawning in running water and coping with the problem of protective body slime are greatly benefited by any adaptation that helps to assure fertile eggs and the production of the next generation.

The common shiner (*Notropis cornutus*) has been extensively studied by Dr. Edward C. Raney of Cornell University. He states that the tubercles on the dorsal side of the pectoral fins are " . . . undoubtedly of use in enabling the male to hold the female in spawning." The male holds his pectoral fin under the female's head or abdomen and curves his body into a semicircle up and over her during the momentary spawning act. Without the frictional aid of tubercles the two fish could readily drift apart.

Found throughout New York State the common shiner is recognized by its tuberculation and coloration, deep body, and the large, elongate, diamond-shaped scales on its side.

The common white sucker is another fish for whom tubercles aid in maintaining the spawning position. As in many darters, the sucker's tubercles may also help in sensing the closeness of the female—a sense of touch. Found over most of the northeastern two-thirds of the United States, the white sucker is often the first fish sought by hook and line (or spear) as they migrate into small streams in early spring. A cautious observer may be able to see the female, flanked by a male on either side, spawning in the upper ends of the rapids. The cleaned stones of their nests contrast sharply with the silt-covered nearby rocks. Watch for the flash of their white abdomens as they roll slightly in their upstream travels. You might also observe that an individual is not adverse to eating the eggs in another's nest.

Most of the fish mentioned can be seen using their tuberculate heads in defense of nests or in fights between rival males. The degree to which this is effective can be surmised by the extent, location, and size of the tubercles.

One needs only to rub his fingers over the sides or back of any of the heavily tuberculate minnows to learn they can be formidable weapons. The "blunt-nosed" minnow (*Pimephales notatus*), raised extensively in special ponds and sold or shipped as bait minnows, has a snout very effectively covered with three rows of large tubercles. After the fertile eggs have been deposited under a stone, stick, or tin can, the male will guard the opening leading to the nest against all adversaries. The "horned-dace," "stone-roller," and common shiner are additional fishes that use their tubercles to keep rival males and other species away from the nest. The "stone-roller" and suckers have actually been seen to ram another fish, knocking it senseless temporarily!

The "river chub" (*Hybopsis micropogon*), one of many species having a small barbel at the corner of its mouth, and the common shiner have developed an interesting association. Spawning at a depth of eighteen to twenty-four inches in small gravel-bottomed streams of moderate current, the "river chub" builds one of the most striking nests—a mound of pebbles that may be three feet by four feet and six inches high! One investigator calculated that this eight-inch individual may travel sixteen miles in short three- to twelve-foot trips, carrying 235 pounds of stones. As it goes about its task, this industrious contractor appears to be unconscious of the many dozens of other fishes that may be about its nest. However, the common shiner is frequently found over the nest, driving away would-be egg-predators and the other fish. Should he get too close to the nest owner, he in turn may be repelled with a sideward thrust of the "river chub's" tuberculate head. Normally a sort of mutual acceptance prevails—the "river chub" is left more or less unmolested and the common shiner has a ready-made nest.

Thus, the hundreds of species of tuberculate fish use their tubercles in a variety of mechanical ways: Digging nests, clasping and touch during breeding, and fighting in defense of their home territory. Distribution of the organs appears to correspond to the use.

Although a great deal of fascinating things have been learned, only a few species have been studied in detail. Broad horizons of study and observation await the interested scientist and sportsman.

Right way to crawl through fence

Need For Bright Clothing And Cooperation Of Parents Of Youngsters Shown In Details Of Fatalities

by Bryan E. Burgin, *Supervisor, Hunter Training Program*

Hunting Accidents Decline In 1968

LAST year's accident toll showed a sharp reduction from 1967. The 1968 report just compiled shows 130 hunting accidents including 9 fatalities while the figures for 1967 were 159 accidents and 11 fatalities. Such a reduction is very gratifying, but we hope for a better record in years to come.

We checked the reports of the nine fatalities and found some interesting and rather shocking facts. Of the nine, but one was self-inflicted. In another instance, a hunter was found dead but the shooter was never found. Shooters' ages ranged from just under 14 years to 48 years. The victims' ages ran from 14 years to 59 years.

Shooting accidents do not just happen—they are caused. How were these nine caused? What were some of the contributing factors? Were they avoidable?

During the deer season, a young man was found dead from a wound caused by a 12-gauge shotgun slug. His own loaded and unfired gun was beside him. The shooter was never found. The victim was wearing no bright clothing. Since there were no witnesses, it is unlikely anything more will be known about the case. The shooter may not have known he killed another hunter. On the other hand, he may have known, viewed the results of his carelessness and will live with his conscience.

The victim of the self-inflicted fatality lived only to reach the hospital and was able to give little information to those who aided him. Officials who attempted to reconstruct the events at the scene theorized that the hunter may have used his shotgun as a support while walking down hill when the stock broke and the gun discharged. There is a possibility he fell on the gun but the first idea appears more probable from the report.

An experienced deer hunter who claimed he had killed a number of deer in this and other states, killed a hunting companion at a distance of about 90 feet. The victim was wearing green and black checked clothing which does not show up well in any cover. Definite arrangements as to the location each hunter was to have and the area each was to cover had not been discussed prior to the hunt. The shooter fired twice at a deer, killing it on the second shot. It is not known which shot struck the victim. The action took place in the late afternoon in November. The experienced hunter has a responsibility to carefully plan his hunt with other members of his party. Each party member should remain on the stand or move according to prearrangements and always wear a bright color, preferably fluorescent orange. If necessary to change the plans, whistle signals should be used. Plastic police whistles are effective—and cheap.

A Fatal Ricochet

Another deer hunter shot twice at a deer, killing it. One shot struck a rock on which his hunting companion was standing. The bullet ricocheted upwards killing the other hunter. The distance was nearly 100 yards; the cover prevented the shooter from seeing his companion. Who was to blame? Perhaps both individuals contributed to the negligence. The victim may not have gone to the location agreed upon beforehand; he was not wearing bright-colored clothing. The shooter should have been aware of the general location of his companion and not fired in that direction.

Two rabbit hunters were crossing a plowed field when one stumbled and fell. His shotgun discharged, killing his friend. Certainly the gun was fired accidentally, and anyone may lose his footing at times. What is unknown is the position of the trigger finger of the shooter and the position of the gun safety lock. The shooter claims the safe was on and his finger was off the trigger and the impact of his fall discharged the gun which was in good condition.

A housewife, age 59, was killed in her own yard by the son of her neighbor. The young man was hunting woodchucks and the shot traveled about 300 yards. Since the hunter was familiar with the area and knew of the location of various homes adjoining the farm, the need for extra care on his part was indicated.

Two separate accidents involved those under 16 years of age hunting without the required adult supervision. Two boys, 14 years of age were hunting rabbits when one tripped and his gun fired, killing the companion. The second case was that of a 16-year-old and his 14-year-old brother. The younger brother died when the older boy shot at a grouse. The shooter was aware of his brother's location but was so intent on a flying

grouse that he swung his gun too far. This is another case of a violation of the safe zone of fire ahead of each small game hunter enjoying his sport in a group.

The final accident involved two youngsters hunting ducks. They were accompanied by the father of the victim. The shooter in this case was actually under 14 years of age. In order that he might hunt, his father had falsified his son's age. The son was licensed illegally. He admitted to crawling through a fence with the gun safe in the "off" position and with his finger on the trigger at the time of the accident.

Need For Supervision Of Youngsters

Hunting accidents are particularly tragic when they involve youngsters. All of the foregoing were preventable and the parents must share in the blame. It is not unusual for Conservation Officers and members of the State Police to apprehend those 14 and 15 years of age hunting without adult supervision and, sometimes, with the knowledge and consent of the parents. The usual procedure is to take the young offenders home and have a talk with the parents. Some parents appreciate the Officers' consideration. Others are frank to say they think "the Officers have more important things to do than pick on kids." The Conservation Law provides that the hunting licenses of those 14 and 15 years of age who are hunting without supervision may be revoked. Perhaps more should be so forfeited.

The recounting of these nine fatalities makes them a cause for concern for all sportsmen. What can be done to prevent recurrences? Several things are obvious. KEEP THE MUZZLE ALWAYS POINTED IN A SAFE DIRECTION. Wear bright clothing—fluorescent orange. Plan your hunt and know the location of your hunting companions. Keep in contact by voice or whistle. Use the gun safe and keep your fingers off the trigger until about to shoot. Attempt to control your gun if you stumble or fall. Be aware of the 30-degree safe zone of fire when hunting small game in a party.

As for those who are 14 and 15 and must be accompanied when hunting small game by a parent, guardian or other licensed adult with written authorization from the parent, the wholehearted co-operation of all concerned is necessary. This must begin with the parent who sets an example of law obedience, not because of fear of the penalties for law violation, but because laws are the rules by which we must live to maintain an orderly society. The parent, whose 14-year-old is found hunting in violation of the law and is brought home by an Officer, must co-operate with that Officer to prevent tragedies and to build respect for the Officer and for law enforcement in the mind of that youngster.

CAUSES OF ACCIDENTS

Causes	1965	1966	1967	1968
In Line of Fire	44	37	37	32
Carelessness	8	22	33	26
Ricocheting	18	16	15	15
Mistaken for Game	10	18	11	4
Loading or Unloading Gun	0	5	2	1
Falling or Tripping	27	33	23	24
Gun Falling	3	0	13	6
Crossing Fence	3	0	0	2
Loaded Gun in Car	1	0	0	0
Clogged Gun	0	1	0	0
Other and Unknown	43	34	25	20

MANNER OF ACCIDENTS

How Injured	1965	1966	1967	1968
Self-inflicted	48	52	61	42
Shot by Companion	100	93	81	73
Unknown	9	21	17	15

ACCIDENTS RE GAME HUNTED

Game Hunted	1965	1966	1967	1968
Big Game	18	8	15	42
Small Game	77	76	62	73
Other and Unknown	62	82	82	15

HUNTING ACCIDENTS SUMMARY

Year	Fatal	Non-Fatal	Total	Licenses	Ratio
1962	11	91	102	998,596	1:9,791
1963	9	138	147	993,153	1:6,756
1964	7	117	124	993,640	1:8,013
1965	11	146	157	996,541	1:6,348
1966	13	153	166	1,039,852	1:6,264
1967	11	148	159	1,095,997	1:6,850
1968	9	121	130	1,131,592	1:8,705

Finger Lakes trail

Traditionally, the great bulk of the outdoorsmen have been hunters or fishermen. There has always been a limited number of campers, hikers, canoeists and nature watchers.

Until about a decade ago, most of the serious hikers headed for the Adirondacks or Catskills where they could tramp through the big woods; however, this meant a real expedition. In the meantime, the Southern Tier hilltops which had been abandoned during the depression days and reforested under the C.C.C. work program, were becoming "big woods" and about a decade ago it began to dawn on hikers that there was a lot of recreational opportunity right in their own backyard.

Working closely with the State Conservation Department and private-landowners, Finger Lakes hiking clubs began to establish trails. Among these groups there was germinated an idea of a long trail connecting the Allegany State Park with the Appalachian Trail as it crosses the lower corner of the Catskills. Originally referred to jokingly as the "Alley-Cat Trail," it is now becoming a definite reality under the official title of the Finger Lakes Trail.

To accomplish this end, hiking clubs and individuals formed the Finger Lakes Trail Conference in 1962. Sections of the rough trail plan were assigned to groups to scout and make final recommendations. The miles and miles of true wilderness that the trail traverses between the Connecticut Hill Game Management Area in Tompkins and Schuyler counties, and Bowman Lake in Chenango County, is testimony to the careful scouting which went into the plans.

Tramping along any of the 50 some miles of trail built and maintained by the Cayuga Trails Club, one finds a well-marked trail using 2x6-inch paint blazes. For good walking and reasonable climbs, old log roads or abandoned roads are often followed. Wherever they go, however, they are well brushed for good quiet walking. Several lean-tos have already been built with the co-operation of the Conservation Department at attractive sites far enough from the road so they will be used only by hikers. The clubs request lean-to users to carry out all trash they can't burn in an effort to keep the sites clean. It is refreshing to see that nearly all hikers are doing this.

The Back of the Book

Air pollution

The next cold you have may be due more to air pollution than to the weather. After a three-year study, a study team determined that at times, air pollution plays a significant part in the incidence of all upper respiratory infections—such as colds and flu. The study team reported that if air pollution could be eliminated, at times "there would be a drop of 10 to 20 per cent" in colds.

New Council head

Marty Turner of Lakeview, long a leading light in State Conservation circles, is the new president of the New York State Conservation Council. This marks the first time since the Council's inception back in 1933, that a western New Yorker has been chosen president of this statewide organization of conservationists.

Scenic Hudson award

The Scenic Hudson Preservation Conference has been selected as the Conservation Organization of the Year by the National Wildlife Federation, the world's largest conservation organization, for focusing national attention on Storm King Mountain on the Hudson River and on river basin protection generally.

In the five years the conference has been able to assist in the protection of Storm King and the Gorge from major industrial encroachment, the efforts of some fifty conservation organizations, large and small, and some 20,000 members have triggered such things as: 1. Establishment of the Hudson River Valley Commission. 2. Passage by Congress of a Hudson River Compact Act calling for a Commission including New York, New Jersey and the Federal government in the management of the Hudson as a resource. 3. The acquisition of Little Stony Point by New York State to block the industrialization of this key portion of the Gorge, and to promote ultimately the acquisition of a Hudson Highlands State park on the east side of the River preventing "another Storm King battle" at Breakneck Ridge, across the River.

"A happy land" but . . .

"Estuaries are natural resource . . . complexes. Here the fresh waters of streams meet the salt waters of the sea, bound on the landward side by the limit of tidal and wave influences and seaward-side by offshore bars and open ocean. Everywhere within, it is a maze of stream and tidal channels, bottoms of peat and muck, silt and sand, and patches, islands, and peninsulas of marsh and salt-tolerant brush.

"Estuaries are a happy land rich in the nutrients of the continent itself, stirred by the forces of nature like the soup of a French chef; the home of myriad forms of life from bacteria and protozoans to grasses and mammals; the nursery, resting place, and refuge of countless species . . . and estuaries are an unhappy land because of pollution, dredging, and filling, and all of the things that man does to alter and destroy them."—Dr. Stanley A. Cain

Cayuga DDT levels

The New York State Conservation Council has awarded a $1,500 grant to Cornell University's Department of Conservation to aid a research program concerned with DDT levels in lake trout in Cayuga Lake.

The project was selected for support by the Conservation Council because it involves an area in which they are particularly interested. The Council was instrumental in initiating the Teachers' Conservation Workshops 20 years ago, and the grant was made in celebration of the 20th anniversary of the program. The workshops are offered for about 120 teachers from throughout New York State.

"Golden Smokey"

The U.S. Forest Service awarded the 1968 "Golden Smokey" for outstanding public service in forest fire prevention to the Fire Weather Service of the U.S. Weather Bureau. An award certificate was presented to Ernest Johnson, Meteorologist in Charge of the Albany Weather Bureau, and to Richard Neave, Fire Weather Forecaster in the Albany Bureau.

The State Conservation Department, in co-operation with the Weather Bureau's Albany office, issues a daily Fire Danger Report to the news media during the spring and fall fire seasons. The report provides the press, wire services, radio and television stations with accurate up-to-date information on fire danger conditions.

Wild greens

In springtime, the human body seems to crave green food. Although, with our modern systems of transportation, it is available all year 'round, many of us have enough of the spirit of adventure to seek and use some of the wild plants eaten by the Indians and frontiersmen.

Probably, some primitive instinct is satisfied by experimenting with such foods. Wild greens are used much more in Europe than in America but they can furnish an interesting and important part of our diet, once we learn to know them.

Of these wild greens, the dandelion is most commonly known, gathered and eaten. It has been used since ancient times and, in recent years, it is cultivated for the markets in New York and other cities. The "crowns," or rosettes, should be gathered when the leaves are very young and tender. Like many wild greens, they have a slightly bitter tang, but are equally good in a salad or cooked-either alone or with other varieties. Being rich in vitamins A and C, the water in which they are cooked can be saved and sipped as a spring tonic.

There is a weed which grows in shady places around outbuildings called lamb's quarters, or pigweed or goosefoot. It is a fast-growing plant with pale bluish-green leaves shaped like a goose's foot and is a relative of spinach and the beet, and equally edible.

Wild mustard is another famous potherb, preferred by many people for cooking with fat, salt pork. Sour dock or curly dock, purslane, sorrel, wild chicory and even the plantain which plagues our lawns, are others. Once you know them, the trick lies in picking only young, tender plants and in cooking them properly.

The common burdock, although a pest, can furnish good eating if its young sprouts are peeled, scraped and boiled. Wild onions and leek can be as good as domestic onions in salads, soups and stews if used in moderation. The young succulent shoots of milkweed and pokeweed, cut off just above the ground, can be cooked and eaten like asparagus tips.

Our native water cress and the domesticated water cress, which thrive best in cool, clear spring water, have become the favorites of gourmets for salads and as a garnish for meats.

One of the best publications telling which plants to pick and how to use them is the book: *Edible Wild Plants of Eastern North America,* by Fernald and Kinsey, published by Idlewild Press.

Now is the time to exercise your taster and smeller!—From NATURE BULLETIN, *Forest Preserve District, Cook County, Ill.*

Conservation Education at Buffalo State

The Biology Department of the State University College of Buffalo will conduct its seventh Conservation Workshop at its Franklinville Camp in Cattaraugus County, August 4 to 15.

The workshop carries two hours of college credit, and is open this year on the graduate level for elementary and secondary teachers and administrators. A majority of the registrants are teachers, but Audubon Society members, general college students, wildlife managers and recent high school graduates are also included.

The unifying theme of the workshop is applied ecology or biological conservation. The workshop stresses a detailed study of soils, water, forests and wildlife including land judging, erosion control, soil profiles, pond and stream management, forest management, multiple use of forest lands, wildlife foods, and hunting and its impact upon wildlife. A high priority has been placed upon the problems of water and air pollution. The recreational use of the natural environment and its close relationship to conservation and methods of teaching conservation to young people through the use of demonstrations are covered.

A highlight of the two-week adventure is a tour of the Ischua Creek Watershed, including visits to flood control sites, a mature forest plantation and land treatment areas. Professional conservationists from the United States Department of Agriculture, and the New York State Conservation Department accompany the registrants during this trip. A number of afternoon and evening programs feature specific conservation subjects. The two permanent instructors are supplemented by ten to twelve experts in their own areas of biological conservation.

In 1968 the workshop was fully supported by the New York State Education Department, which provided full tuition grants and stipends for qualified teachers.

For information concerning the 1969 workshop, contact Dr. George M. Laug, Conservation Workshop Co-ordinator, State University College at Buffalo, 1300 Elmwood Ave., Buffalo, New York.

New York's water resources

"Developing and Managing the Water Resources of New York State", is a very informative bulletin of 52 pages outlining the proposed development and management of New York's water resources.

The report has been developed after exhaustive studies by several consultant engineering firms and deliberations of the New York Water Resources Commission.

Divided into regions and principal drainage basins, each is considered from such criteria as physical characteristics, economic aspects, climatology, water supplies, water demands (public water supply, industrial water supply, agriculture, recreation, power generation, navigation, flood control, water quality management), and the general water development resources plan. The management plan considers proposed water sources in the form of impoundments throughout the State.

Floyd Hoover retires

After 20 years of service as a Game Protector and Conservation Officer in Tompkins County, Floyd H. Hoover has taken disability retirement from his duties with the Conservation Department.

On a routine patrol of Cayuga Lake one day during the summer of 1963 he rescued a woman trapped under an overturned sailboat and pulled the boat ashore. Later, when preparing to leave his patrol boat, he found he was unable to move. Three weeks' hospitalization followed. Lifting deer twice reinjured his back and returned him to the hospital for operations.

Floyd's sincere interest in the wildlife problems of the people of Tompkins County, and his sensible and impartial enforcement of the Law, has earned him the respect of his "constituents"

Foresters' meeting

The New York Section, Society of American Foresters held their Annual Winter Meeting in February with an attendance total of some 80 foresters.

The general theme of this meeting was "Timber Harvesting Methods and Equipment of Today and Tomorrow—Needs, Goals, and Limitations in New York."

One technical session dealt with the subject of regional planning and the role of the Office of Planning Co-ordination in New York State, especially as such planning affects the future of forestry, forests, and forest uses in the State.

Another technical session focused on the situation and needs in New York State with a major concern for public attitudes. The multiple-use concept of forest land management, which is considered a firm policy in New York State, must include and influence the development of timber harvesting machines, techniques, and systems applicable to New York State. The concept that timber harvesting and other forest uses are compatible, when properly co-ordinated and allocated, is generally accepted within the professional forestry atmosphere in New York State. The primary challenge to foresters and forest engineers is to develop this within the real constraints that exist pointing towards maximum total benefit to all interests.

Gun control confusion

The Gun Control Act of 1968 became effective December 16, 1968. The Act has been one of the most universally misunderstood and misinterpreted pieces of legislation to come out of the Congress in a long time. It has generated considerable confusion, ranging from a lack of proper interpretation at the time of the Act's implementation to nearly complete misinterpretation of certain controversial provisions.

Some of the confusion can perhaps be attributed, in part, to over-reaction in the wake of a hard-fought and often emotion-charged battle between the Act's opposing forces. The major villains, however, were complexity and speed of enactment. The law was set to go into full effect less than a month after receiving the President's signature and the resulting juggernaut of public inquiries caught Alcohol and Tobacco Tax regional offices without adequate interpretations. Much of the initial furor has subsided, but there is considerable public misunderstanding over certain general provisions of the Act. The Washington, D. C. office of the Alcohol and Tobacco Tax Division has offered the following clarification of five primary sources of confusion:

1. The Act *does not* require registration of conventional firearms.

2. The Act *does not* prohibit over-the-counter sales of ammunition to nonresidents.

3. The Act *does not* prohibit transport of firearms and ammunition to another state for hunting, showing, or competition.

4. The Act *does* prohibit sale of any firearm or ammunition to anyone under 18 years of age, and sale of handguns and handgun ammunition to anyone under 21 years of age.

5. The Act *does* prohibit mail order sales of firearms and ammunition except to licensed dealers, importers, and authorized government agencies.

Specific questions regarding these or any other provisions contained in the Gun Control Act of 1968 can be addressed to the nearest regional office of the Alcohol and Tobacco Tax Division, Internal Revenue Service, U.S. Treasury Department.

New dispersant

A new dispersant that will disintegrate oil slicks and clean oil-fouled beaches without harming marine life has been developed by the Standard Oil Company of New Jersey. Laboratory data indicates that a half-gallon of this dispersant can dissipate a 50-gallon oil spill.

State Conservationist Award

Howard Bobseine, Regional Game Manager with the State Conservation Department at Olean, has received a State Conservation Achievement Award on behalf of the State Conservation Council, Sears Roebuck Foundation and National Wildlife Federation.

The award is in recognition of his efforts in the restoration of the wild turkey to New York State and for management of the wild turkey program, leading to the present increasing turkey population across the State.

The award also recognized Mr. Bobseine's direction of the management of deer and Korean pheasant populations.

Dr. William H. Fruden of Amherst, chairman of the Allegany State Park Commission, received the Forest Conservationist Award sponsored by the agencies "for his outstanding park conservation efforts and the development of multiple-use programs of park lands, as evidenced by the growth and use of Allegany State Park under his leadership."

Pure Waters Authority

The New York State Pure Waters Authority has become operational in its assigned task of helping local governments meet their liquid and solid waste management responsibilities in the statewide campaign against environmental pollution.

The Authority was created by the Legislature when it became apparent that many municipalities were not launching sewage treatment projects, despite the availability of State and Federal aid of up to 60 per cent of construction costs.

The Legislature empowered the Authority to carry out whatever phases of the work were needed to help a community obtain treatment facilities. The agency can provide technical services associated with engineering design; provide the advisory services needed to carry a project to completion; and loan the money needed by a community to build a plant. Also, the Authority can plan, finance, build and operate a facility for a community and charge a "rent" periodically for the service.

One of the most imaginative undertakings in potential water clean-up involves eight Hudson River communities in three counties. These communities—the City of Glens Falls, the Villages of South Glens Falls, Hudson Falls and Fort Ed-

ward, and the Towns of Kingsbury, Queensbury, Fort Edward and Moreau—are jointly considering the feasibility of curbing their pollution of the Hudson through a regional program. They have contracted with the Authority to provide services to help "tool up" for the project.

Basically, such services include assisting in the development of municipal-industrial agreements and helping the municipalities meet State and Federal requirements on applications for grants, and on clearances for engineering reports. At the organizational level, the Authority can assist towns in the creation of sewer districts—a crucial preliminary step.

In another area of New York's waste management program—solid waste disposal—a major study under way in Westchester County also has statewide implications. The study, being carried out by an engineering firm will help determine the feasibility of squeezing solid waste into compact bales and transporting it by railroad to a disposal point.

How not to get lost

No one plans to be lost in the woods or unsettled areas of the country and yet every year there are many reports of such experiences.

Each year, thousands of dollars are spent and hundreds of search parties are sent out to look for people who have taken unnecessary risk in going on hikes or hunting trips.

Sargent Camp in Peterborough, N.H., owned by Boston University, offers to a limited number of children and young adults the opportunity to learn some of the skills of coping with emergencies in the outdoors. During their school camping program, sixth grade students from area schools spend a week at camp on compass use, pacing, map reading and outdoor living.

The children spend the first three days in camp learning skills from qualified instructors. The fourth day, they are blindfolded and taken by a bus to a drop-off point within a six-mile radius of camp. Each group of about twelve children has a teacher and instructor with them; however, the instructor only acts in an emergency. The children are literally on their own to choose a leader and follow their map and compass to chart their course back to camp. When lunch time comes and there are no lunches in the pack there is even a more serious attitude for the remainder of the day.

Smelt Fishing

During the three or four weeks that the smelt run in the tributaries of Cayuga Lake, they probably draw more people to the lake than any other type of fish does all year.

The smelt is a close relative of the trout and salmon with its ancestral home in the salt-water of the Atlantic. Ages ago, it modified its migrations up the St. Lawrence and adapted itself to life in the fresh-water of Lake Ontario. A similar long-established natural population is in Lake Champlain.

In the Finger Lakes, they are relative newcomers. The Conservation Department made introductions during the period of 1917 to 1930 in Cayuga, Canandaigua, Owasco and Skaneateles lakes.

As for all other fish, the water temperature is more important than the calendar in determining when spawning starts. It is usually after the snow water is gone in early April that the smelt leave the deep lake water and move up into the tributaries after dark.

Spawning usually occurs behind some obstruction or in a depression in the stream bed, which protects them from the main current. A 7.5-inch female smelt may lay 25,000 eggs, while one that is 9.5 inches long may lay more than twice as many.

The eggs are heavier than water and drop to the bottom, adhering to whatever they first touch and remaining there until they hatch. The incubation period is several weeks, depending on the temperature of the water.

After the spawning season the smelt scatter throughout the lake below the thermocline. Being dispersed like this, instead of schooled up near the bottom like the alewives, they are not heavily preyed upon by the lake trout. It is only during the spawning period that they are important forage fish for lake trout.

The diet of smelt usually consists of small aquatic life, including insects, rotifera, cladocera, copepoda, minnows, and even small individuals of their own species. For this reason, it is not advisable to stock water indiscriminately with smelt; they could possibly prey heavily on a desirable species.

Smelting regulations are designed more to distribute the catch than to protect the fish. An ample number of spawners escape the nets or enter the stream after closing hours to insure adequate reproduction.

With proper regulation and sound biological research, the smelt fishery in New York State can be expected to provide excellent fishing opportunity to New Yorkers for many years to come.—PAUL M. KELSEY, *Sr. Wildlife Biologist*

Triple-horned deer

Three-horned deer are most uncommon and when one sports a rack like the one pictured it is even more unusual.

This deer had some 16 points arranged on two conventional antlers, and a third separate antler growing much like the brow tines of a caribou. All three antlers were massive.

The head was discovered by Robert Emborski, Jr.. Route 1, Salamanca, in the woods off State Park Avenue, south of Salamanca. As near as could be determined, the deer must have been hit by a car, but was able to get into the woods where it died. Dogs and wild animals had scattered the hide and bones around the area, making any other conclusion difficult.

The deer was six years old and deer researchers indicated it had one of the few racks with the definite third antler.

Cohos

The first of the 25,000 coho salmon experimentally stocked in Mar., '68 by the New York State Conservation Department have been caught in Lake Ontario.

The Conservation Department and sport and commercial fishermen have been eagerly awaiting news concerning the progress of the newly-introduced game fish. A report from the Department's fisheries research station at Cape Vincent on Lake Ontario indicates that a commercial fisherman caught eight of the coho salmon in nets placed in water from 90 to 120 feet deep in eastern Lake Ontario. Six of the eight fish were released, the others were turned over to the research station for examination.

Coho salmon are known for their phenomenal growth rate and this was borne out in the examination. When the yearling cohos were planted in March they were 3 to 5 inches in length. The fish caught in Lake Ontario just four months later measured 12½ inches and weighed slightly over one pound. This is the expected growth rate and the fish were in excellent condition and very fat.

The Lake Ontario cohos were stocked in the Pulaski Village Recreation Pond in March and migrated down the Salmon River to Lake Ontario in May. If all goes according to plan the main run of cohos should return to the river to spawn in the fall of 1969 weighing up to 15 to 20 pounds.

Tree planting service

The State Conservation Department's Bureau of Forest Management and Nurseries has compiled a listing of Custom Tree Planting Services available to help New York landowners plant seedling trees. The listing provides the name and address, area serviced, size of acceptable job and type of planting done by firms in the custom tree planting service business.

Last spring, the Conservation Department distributed 14,130,000 tree seedlings to encourage private landowners to put idle lands to good use. These trees are produced at nurseries operated by the Conservation Department and are not for ornamental planting. Landowners must order at least 1,000 trees and have at least one acre of open land available for planting. The trees are priced at $10 per thousand. State and local sales taxes do not apply to tree seedling orders.

Your Forest District Headquarters can furnish order blanks and information on what kind of trees are suitable for your land and details on what types of assistance may be available to help plant the seedling trees.

Copies of "Custom Tree Planting Services" for your area can be obtained by writing to your local Forest District Headquarters or to Division of Lands and Forests, State Conservation Department, Albany, N.Y., 12226.

Park and parkway facts

Letchworth State Park's three major waterfalls and its 600-foot deep gorges make the park of national significance. Annual attendance figures approximate 750,000 visitors. Long Island's Southern State Parkway set national records in 1967, carrying 38,900,000 cars.

Natural resources planner

Herbert E. Doig, of Schenectady, has been appointed to a newly-created post of Associate Natural Resources Planner in the Program Planning Unit of the State Conservation Department. Mr. Doig was promoted from his post of Fish and Wildlife Management Act Co-ordinator, a position he has held since its establishment in 1967. His new position will utilize the experience he has gained in planning and co-ordinating State-wide programs of sound management on private lands, the formulation of long-range plans for the wise utilization of both public and private lands in the State and co-ordinating management decision-making within the Department. Far-sighted planning is essential in these areas in view of projections of an increasing population and consequent demands on available land areas.

The needs of desirable fish and game species for adequate water and land resources must be recognized and planned for if they are to survive into the future and Mr. Doig's background as a biologist in the Division of Fish and Game also will be valuable in these areas.

Sniffing air pollution

New York City has put 38 mechanical noses to work to sniff the air. The $500,000 network has 38 measuring stations that will tell the city where its air pollution is high and where masses of bad air are moving. Data on soot, carbon dioxide and sulfur dioxide will be sent by wire from the stations to a computer for analysis.

Camper activities

A U.S. Forest Service report on the activity patterns of campers shows some interesting trends. Covering a 12-hour period, the report is intriguing in that it illustrates the characteristic diversity of camping as a recreation activity and the multitude of reasons people have for camping.

According to the report, the average time budget in hours, of families camping in auto camp grounds on one National Forest was: Relaxation, 8.3; swimming, 1.1; fishing, 1.0; auto sightseeing, 0.9. The rest of the 12 hours was spent in picnicking, hiking, boating, nature study, gathering forest products, canoeing and water skiing.

Highways and conservation

The Federal Department of Transportation plans to implement a public hearing procedure for all highway projects receiving Federal aid financing. The regulations seek to give the public an opportunity to express its views on highway locations and designs.

Some highway officials, construction equipment manufacturers and suppliers and others involved in the multi-billion dollar national road program are protesting the regulations. Giving the public a voice in how its money is to be spent on highways, they intimate, will cripple the road program.

The Department of Transportation needs vigorous support from conservationists to avoid further cutting up of parks and recreation areas.

Red Cross honor

Victor D. Schrader of West Athens has received a Red Cross Certificate of Appreciation for his outstanding service in the development of the Red Cross first aid programs throughout Greene county. He is a Forest Ranger in District 12 of the New York State Department of Conservation, which covers Greene, Albany. Columbia and Rensselaer counties.

Schrader is responsible for the conduct of first aid training classes in the Greene County District of the Albany Area Chapter, American Red Cross and has trained many instructors who are now teaching similar courses assigned to them by him. He was instrumental in the promotion of Red Cross first aid as a mandatory training requirement for all Forest Rangers throughout New York State. Mr. Schrader is also a key instructor in the New York State ambulance attendants' training course, which spans an eight-week compulsory training period.

A scholarship forest

A scholarship tree is a bit unusual, but many a rural lad has added to his personal education fund by planting trees and marketing the end products.

Carrying such a program a step further, a group of individuals in Wisconsin began a unique experiment. Some ten years ago, members of the Wisconsin Press Association were attending a forest management conference. They came back from a bus tour of the area disturbed because they had seen good fields lying neglected and forest lands producing only a small percentage of what they could have produced. The newspapermen decided to go out and buy some land of their own where, hopefully, they could demonstrate their faith in good management practices. If they were successful, there would be a profit which could be used for scholarships. They bought a 78-acre tract of land which seemed just right for their purposes. It was an abandoned farm and had a nice stand of timber covering about half its area.

Over the next three years the newspapermen worked together to plant 16,500 Norway pines by machine methods and then supervised the planting of 4,000 more by willing volunteers from high schools in the area. By 1968, some 50,000 trees had been planted!

The "worthless" farm began to pay dividends in 1966 when 100 cords of pulpwood were harvested. In 1967, 50 scholarship trees were sold at $10 apiece, each with a special explanatory tag. The same number was marketed in 1968 and in 1969 there will be 2,800 trees placed on the market—the first really sizeable commercial venture.

The value of this 78-acre plot lies not only in the cash crop of Christmas trees, but in the fact that it also serves as a very effective laboratory for the study of good forest management. Managed according to plans set up by the staff of Trees for Tomorrow, the forest provides a living laboratory for the thousands of students and adults who visit each year.

Just like any other business venture, the forest doesn't just stand there and produce the sound of a ringing cash register. Throughout each year, the newspapermen tramp through the forest trails, examining annual growth, ordering aerial spraying if necessary, and rolling up their sleeves to work.

Help for streams

The Conservation Department reports that stream improvement projects were carried out on 24 streams last year with more than 550 structures and 13 fishermen's parking areas created along 20 miles of public trout fishing streams.

Dream deer

Every sportsman dreams of that very special hunt when a huge buck whitetail will cross his path and a squeeze of the trigger will bring him the envy of the neighborhood. That dream came true for Dick Johndrow of Ticonderoga this past fall when on November 30 he bagged a twelve-point buck near Shcroon Lake in Essex County.

Like all good things, Johndrow's success did not come easy. His hunting companion first saw the buck two days before but was unable to get a shot. The pair continued their hunt, attempting to outsmart the deer but never got any closer than fresh footprints in the snow.

The second day, November 29, Johndrow and two members of his usual hunting party trudged the four miles back from the road to enter the stag's domain but again failed to get a glimpse of the prize. On the 30th, a clear, crisp, late fall day, Johndrow and Bob Musser returned to where the deer was originally seen and worked the big woods together. After completing a drive, Johndrow was silently following two tracks when the buck and a doe came to him from the crest of a hill. The buck dropped with the first shot from about 70 yards but it took three more to make the kill.

Three and one-half hours later, the trophy was beside the car and Dick Johndrow had experienced "the hunt of a lifetime."—H. Doig

Fishing Again With The Russians

(Continued from page 13)

general abundance of fish of most species was lower than in the previous year's cruise. In the 1967 cruise, we had many catches which completely filled the sorting tables and spilled over onto the decks. In 1968, we had very few such catches. There were few catches of scup and the individuals in the catches were small, indicating that the population is probably at a low level. Not many fluke were caught, confirming the low abundance of this species. The low abundance of fluke, however, may be due to hydrographic conditions, especially low average water temperature. At the same time, herring abundance is high and this too may be a result of the lower water temperatures which favor this species.

There were good catches of yellowtail flounders, another valuable food fish. The greatest catches, however, were of spiny dogfish. This little shark has very slight commercial value and is more of a nuisance to most fishermen. It is extremely abundant and if the way is cleared to turn it into fish protein concentrate it would open up a new fishery for New York.

The good quantities of three- and four-year-old silver hake and older age classes of red hake suggest that these two species —direct objects of the U.S.-Soviet fishing agreement—had been spared by the Soviet fishing abstention and thus were left to reproduce.

Despite the public criticism of the agreement, and the abuse heaped on those who helped to draw it up, it seems to have been beneficial. Additional dialogue between American and Soviet fishery experts, and another, perhaps longer, agreement could very well mean restoration and conservation of the valuable marine fisheries in the waters off Long Island.

The Decline Of The Adirondack Painters

(Continued from page 17)

city directories indicate L. W. Prentice as an artist and landscapist. In 1875, the "promising young artist" was given a boost through an advertisement in E. R. Wallace's *Descriptive Guide to the Adirondacks* as one who showed "not only a high order of talent, but a fidelity to nature and the subject really remarkable." We cannot be sure just how much or how good the Wallace advertisement, which ran in annual editions of the *Guide* for a number of years, did for Prentice, but we suspect that as with the artist himself Wallace was about twenty-five years too late to bring him a great success. By 1879, Prentice had moved to Buffalo, perhaps in search of a better market. There he married in 1882, and there he probably did the painting of "Smith's Lake, Adirondacks" (the present Lake Lila in the Nehasane Preserve).

By 1892, Prentice turns up in yet a more concentrated urban area, Brooklyn, and significantly, his principal involvement appears to be with still-life. The implication is that the market for large, colorful, sharply realistic landscapes had pretty well dried up for him, but that apartment dwellers and small home owners still had hallways and living rooms crying out for the modest decorative touches of apple and plum paintings.

Philadelphia In The '20's

It was probably about the turn of the century that the Prentice family settled finally in Philadelphia, although the artist himself appears to have spent a great deal of his time at his studio in Bridgeport, Connecticut. He appears to have returned home permanently only in the 1920's when old age and a cataract operation slowed down his efforts for a time. It is said that he continued his work until death overtook him on Thanksgiving Day, 1935. It is curious, perhaps even somewhat touching, that a number of the obituaries which appeared in the papers about his passing particularly identified him even then as having been a painter of Adirondack landscapes.

We said that all indications suggest Prentice was self-taught, and this combined with his reputation as something of a jack-of-all-trades—he is said to have built his own frames, painted parlour ceilings to supplement his income, and is known to have done some stained glass work in Connecticut—points to an individual whose formative years were spent in the country or small towns and who absorbed the old traditions of versatility and the handcrafts. His work itself—and a Prentice landscape with its shaggy birches and deeply etched boulders, its vivid lighting, and hard, extraordinarily detailed, almost medieval, execution is unmistakable—bespeaks the self-disciplining character of such a background as well. And yet, much as farming and the small town were rapidly losing dominance in American life, while Prentice was growing up and setting out on his profession, so did his art turn out to be seriously out of step with the times in which he reached maturity and sought to make a successful career for himself. There is nothing to indicate that his success as an artist amounted to anything more than the tenuously modest, and it may well be, as is often the case with the arts, that only at this late date, in the comfort of retrospection, are we in a position to appreciate with some comprehension Prentice's work, his perhaps rather naive vision of a pristine natural world, as the expression of a perhaps lonely yet strong individuality which was determined to say what it had to say in oil on canvas whether the world of his own time was prepared to accept it, or not.

Kids, Crime And Conservation

(Continued from page 20)

Several of the youth have gone on to permanent positions in the State Civil Service structure with the Division for Youth and other State agences.

Some years ago a former great New York State conservationist, Milton R. Hick, then District Director of Delaware County, related a conversation he had with the late President of the United States Franklin Delano Roosevelt when the President was Governor of New York. Mr. Hick was riding with Governor Roosevelt in a car, viewing conservation work along the highways of New York State. The Governor was impressed by what seemed to him to be a wonderful use of man's labors on the State's lands and forests. He declared that, if he ever became President, he would put such a plan into action throughout the United States. We have only to look to the history books to see

how this great conservationist put this plan into effect during the years of depression that followed him into the greatest office of the land.

In 1933, a Civilian Conservation Corps was located at Masonville, New York. In those years the men pruned and thinned trees and planted seedlings. Today, over 30 years later, youth have returned to the exact site to continue on with the pruning, thinning and planting of another era. The conservation work helped men of the '30's provide for their families and at the same time helped prolong the legacy of our State forests. Today, in the same area, help and guidance is being provided for young men of a space age who are still struggling with the basic problems of three decades ago —personal adjustment, leading to contributing citizens.

Financing fun

If you have a "back-forty," why not convert it into a public playground? However, it would be wise to think it over carefully because it is a complex and costly undertaking. A number of private owners of idle woodland, lakes, streams, open pasture and cropland have established recreation facilities (for camping, swimming, picknicking, fishing and snow skiing) on their land. They have found that it can be a profitable business venture.

A recent study, conducted in Ohio by three land development economists, has been published as a guide of items the potential investor should consider before undertaking a commercial enterprise on his land. By following five sample recreation ventures through their development phases, the experts provide suggestions and warnings to the potential owner on investment, finance, development, policy-making, fees and advertisement. They also discuss how much developers should charge users, what types of activities complement each other, whether to develop gradually or fully, what safety restrictions to impose, how much capital investment is needed and what income to expect.

This publication, "A Look at Commercial Recreation on Small Woodland in Ohio," U.S. Forest Service Research Paper NE-101, can be obtained from the Information Services, Northeastern Forest Experiment Station, 6816 Market St., Upper Darby, Pa., 19082.

Tiny mirrors save deer

Two 3-inch square metal mirrors keep wildlife from death along highways in the Netherlands.

The mirrors, set on slender posts across from each other on highway shoulders, reflect light from approaching cars into the forest at a 90-degree angle.

The reflected light expands as the car approaches. At 30 feet, the reflected light covers an area about 30 feet square. When the deer see the light, they freeze still, thus preventing them from crossing at the time a car is passing.

The system has been used for some time in the Netherlands and has been found to be very successful.

Boating safety award

A New York boatman, intimately identified with the Young Boatman's Safety Training Program and a long-time member of the Advisory Committee on Motor Boats, C. Wesley Jackson of DeWitt, was the first New York recipient of honors in the Olin Marine Safety Award.

The Olin Award, established to honor an individual for his contribution to boating safety, was presented to Mr. Jackson at the annual awards dinner in Syracuse by Bob Collins of the Olin Mathieson Corporation.

"Wes" was selected by the awards committee for his contributions to the establishment of the Division of Motor Boats of the New York Conservation Department, to the organization and operation of the Young Boatman's Safety Training Program, and the establishment, maintenance and operation of devices to further the safety of the boating public.

Since 1960, when Mr. Jackson was appointed to the position of Regional Coordinator of the nine county area in central New York, he has solicited and trained over 700 volunteer instructors to teach the safety program. With the assistance of school administrators, boating organizations and service clubs which he elicited, over 20,000 youngsters have been educated in the principles and practices of safety afloat.

Marine Fisheries exhibit

The Bureau of Marine Fisheries participated in the Suffolk County Sportsmen's Show held in Bayshore in the fall of 1968 and exhibited a variety of items having to do with research and management programs in the Marine Region. The exhibit was highlighted by a large mural painted by Peter Anderson, a summer aide in the Fisheries Management and Development Unit. The mural depicted a cross-section of Great South Bay and included detailed illustrations of 42 species of finfish, shellfish and other marine organisms native to the bay. The exhibit was awarded a certificate of Honorable Mention for the most attractive exhibit in the show.—A .C. JENSEN, *Asst. Chief, Marine Fisheries.*

LETTERS
to the editor

Sees no magic in woods

Dear Sirs: The letter by A. C. Shilling, Brooklyn, interested me because of its popular premise that nature living can cure delinquency. The dream-ballet of "Westside Story" had this premise.

How then account for "juvenile problems" in the country? In Rockland County, some youngsters, within 20 minutes' walk of the Ramapo Mountains, prefer hot-rodding, the "candy store," and the pizza "palace," plus trouble, to that supposed purifying outdoor life.

I teach on the lower east side of Manhattan, and I would rather walk down any street there than go past the LaFayette Theatre in Suffern on Saturday night.

Being near woods and mountains all year round doesn't seem the answer to "juvenile problems".

Are there any simple answers?

Jesse Beers, Jr., New York City

• *Nope.—Editor*

The origin

Gentlemen: I have been wondering how the Adirondack Mountains got their name. The story was almost told in an article on a painting by the artist, Charles C. Ingham, in the June-July, 1968 issue of your fine magazine. I have heard, from "eminent authority," that the word Adirondack is an Indian word which is translated as "he who eats bark." I am, however, beginning to doubt the veracity of this "authority."

I am sure we, the readers, will be interested in seeing the accurate story of how these beautiful mountains got their name. They are, truly, the hills of home.

Reginald F. Merril, Merrill

• *We don't blame you for doubting the story—because there are several versions. However, let's settle for this:*

"The Mohawk Indians of the Iroquois Confederation and keepers of the Eastern Door of the Long House and who had long asserted their ownership of the 'Beaver Hunting Grounds' in the Adirondacks, had as their hereditary enemies the Montagnais of the Alogonquins who roamed the country south of the St. Lawrence and were called in derision by the Mohawks, 'Ratirondacks' or 'Tree Eaters.' These Indians, the Montagnais, subsisted solely upon the fruits of the chase; they grew no corn like the Mohawks. When game was scarce they subsisted upon buds and the bark of trees, hence the word 'Tree Eaters.' The name that Emmons [Prof. Ebenezer Emmons, in his Report of the Geological Survey of New York in 1838] gave to the lovely Adirondacks stuck and we remain in his debt."—William L. Wessels in his "Adirondack Profiles."—Roland B. Miller

The Conservationist

Gentlemen: A few months ago, I wrote and told you that I didn't care to receive THE CONSERVATIONIST magazine any more, and like the seven-year itch, you keep right on sending it to me. It's my money that paid for the subscription and I don't want you to send me your rotten magazine any more. If your magazine teaches conservation, why are you in favor of opening the Adirondack Forest Preserve? It's the Almighty dollar. Opening the Forest Preserve will destroy it forever. Just because a lazy bunch don't want to hike back in the woods; it's much easier to drive in and throw garbage and beer cans around. Game protectors going around schools and teaching kids conservation? Hypocrisy is the correct word. I repeat, don't send me your stinking magazine any more or I'll take the matter up with the Postal Inspector.

Stanley Loguin, Delhi

• *Well, you can't win them all.—Editor*

Atlantic salmon not coho

Dear Sir: I have read in the newspapers that New York State plans to release coho salmon in Lake Ontario.

In common with other Atlantic salmon fishermen, and perhaps with all anglers who are primarily fly fishermen, I would hope that full consideration will be given to stocking with the Atlantic salmon rather than with a Pacific species.

The coho salmon is undoubtedly a great fish for the offshore angler, fishing with trolls and baits. As a species for the rivers, however, and for the fly fisherman, he has but small appeal compared to the Atlantic salmon, the latter being present and catchable in the rivers from late spring to early fall, or all through the vacation months. Meanwhile, the commercial fishermen are also taking their share off the bays and harbor entrances. In early spring the fish return to the sea, and on the way down again provide a period of excellent fishing.

The point I wish to emphasize is that the Atlantic salmon in the Great Lakes would provide sport for both the offshore angler *and* the stream fisherman.

Now that trawlers have discovered the concentrations of *Salmo salar* in the Davis straits, we may soon be seeing the end of this species in the coastal river. Perhaps a stocking program in the Great Lakes, where commercial fishing could be restricted when and as necessary, might be the means of ultimately preserving the species.

I have recently returned from a fishing trip to Wisconsin, Michigan, and Canada. The midwestern anglers I talked with were by no means all persuaded that the coho was the best fish for Lake Michigan and the other Great Lakes. They prefer the Wisconsin program which emphasizes rainbow, brown and brook trout along its shore of the lake. I have photographs of 7- and 8-pound rainbows taken last spring, and heard re-

ports of 15- and 17-pounders, although the fish were stocked only a few years ago. These fish are being taken by spin casters and fly fishermen in the evenings off the shoals and jetties, as well as by offshore trollers. I enclose a clipping from the *Milwaukee Journal*.

Wisconsin unfortunately does not have the rivers along its Michigan shore line to provide summer runs of *Salmo salar*, or even for spring runs of steelheads. The rainbows were investigating every small warm water creek and irrigation ditch this spring to find proper spawning grounds. But Ontario could provide the rivers!

I hope you may be interested in this probably minority view.

Vincent Engels, Annapolis, Md.

• *Thank you for your very comprehensive letter concerning salmon management in Lake Ontario.*

You probably know that we have made an experimental release of coho salmon smolts in a tributary to Lake Ontario. The stocking was made early in 1967. A few reports and specimens of coho caught in the lake have been received.

We agree with you that Atlantic or landlocked salmon may hold considerable promise for future management in Lake Ontario. Until about 1880, Lake Ontario had an Atlantic (or landlocked) salmon population. The construction of dams, the degrading of tributary streams and other factors caused their demise.

Unfortunately, Atlantic or landlocked salmon are extremely difficult to propagate in large numbers. A large, modern fish hatchery is necessary. Our plans call for such hatcheries. We cannot anticipate any real Atlantic salmon management in Lake Ontario until facilities are available to rear smolt-sized salmon in quantity.

Coho salmon, on the other hand, are very easy to raise. We can produce enough for experimental stocking with existing facilities on a temporary basis. New York does not have many good salmon streams tributary to Lake Ontario. Both coho and Atlantic salmon management will be primarily dependent on hatchery stock of smolt-sized fish. If at any time it looks as if the number of coho salmon in Lake Ontario should be reduced, this can readily be accomplished by reducing the number stocked. We do not anticipate a great deal of natural spawning. Experimental work with artificial spawning channels in the near future may provide methods of increasing natural spawning in controlled areas.

Due to the size of Lake Ontario, it is anticipated that there will be plenty of room for both coho and Atlantic salmon and I assure you that Atlantic or landlocks will be tried as soon as they are available in large enough numbers. Actually, our initial interest has been Atlantic salmon for the various reasons that you mentioned in your letter.

New York State, under the direction of Dr. John R. Greeley, now retired, did a considerable amount of Atlantic and landlocked salmon research during the past 20 years. We are quite familiar with the requirements of this fish in New York waters and have also seen how successful proper plantings can be if suitable stock is available. We have considerable hope for Atlantic salmon in New York State, once we get adequate Atlantic salmon rearing facilities.

We have not ruled out management of rainbow as well as brown and brook trout. I might mention here that Michigan also has a fairly extensive rainbow, brook and brown trout program for Lake Michigan and their other Great Lakes.

Again, I wish to thank you for taking the time and effort to make your thoughts known. We sincerely hope that within a few years you will see some put into practice as part of our management program for Lake Ontario.—William A. Pearce, Chief Aquatic Biologist, Bureau of Fish

Need mounted specimens

Dear Editor: Regional Approach on Conservation Education (R.A.C.E.) is a project made possible by Title III of the Federal Elementary and Secondary Education Act of 1965. It is sponsored by the Ilion School District and will serve school districts in Chenango, Madison, Herkimer and Oneida counties.

Tentative plans include an in-service course in conservation education stressing backyard ecology and school site utilization. An inventory of "on-the-site" classroom areas including maps, lesson suggestions and information about the proper use of the site are being prepared. Loan kits with conservation-related teaching materials and descriptive information will also be made available to teachers. We are also constructing portable exhibits to help teachers conduct special conservation education programs.

Included in these exhibits we hope to have a number of mounts of specimens that are common in New York State. We are interested in small- and medium-size mammals and birds.

In an effort to obtain a sufficient number of animals to make available for our exhibit programs, we are interested in soliciting donations of mounted specimens from individuals, taxidermists or other parties.

We are closely associated with the Rogers Conservation Center at Sherburne; it is here that we run a four-week summer-program for disadvantaged children. Some of the mounted specimens will be on display at Rogers and will be permanently housed there.

Any assistance that you can extend to us in this regard will be greatly appreciated.

Richard W. Kaskoun, Rome

"Polluted" article?

Dear Sir: Please don't pollute your fine magazine with such articles as "Our Most Important Endangered Species" in the April-May, 1968 issue of THE CONSERVATIONIST. The obvious bias against gun control was apparent. A publically-funded magazine should not lobby in this manner. Let magazines like *Field and Stream* lobby against guns and thus molify their advertisers; but you don't have any advertisers to submit to. Now your only recourse is to publish an article *for* gun control and disguise it the same manner as Mr. Whitsell did in his article. Print both sides when taking up a politically sensitive issue in the same publication.

Lance M. Grolla, East Greenbush

• *For the record,* THE CONSERVATIONIST *is 95 per cent funded by its subscribers and their subscriptions, and a good many of them are hunters. As for "disguises," the article was notable for its plain speaking.—Editor*

A good deer trapper

Gentlemen: Last March, myself and three other fellas took a snowmobile trip into the Moose River Plains Area. After nearly nine miles of travel, we came upon a large trap. Upon inspecting the trap, we noticed a deer inside. Noticing a number on the trap, we then proceeded on to the Fish and Game Headquarters located in the Plains. Arriving at the Headquarters, we were greeted by a man we know only as Paul. We informed him of the deer in the trap and he told us he was just getting ready to make his daily rounds of fifty or so traps placed in different areas of the Plains. He invited us into the Headquarters where he poured us coffee and very politely answered our many questions. He showed us the charts that were kept for recording the number of deer trapped and the location. He explained the reasons this was done for at no harm to the deer.

After our conversation with Paul, we left on our snowmobiles to further inspect the Plains area. During the course of the day, we saw at least fifty deer. Later in the day, we met Paul checking the traps. We asked him if we could watch him release one of the trapped deer after he had recorded the tag numbers as this deer had already been trapped and tagged before. He cautioned us on the deer's behavior when it is released from the trap. He then placed us in a safe position. He then checked the deer and released it to join the rest of deer. He went on to tell us that some deer have been retrapped up to sixteen times, which proves that no harm is done to the deer.

Our hats go off to Paul for his fine co-operation in answering our questions and being so willing to show us how the trapping operation is carried on.

Curtiss E. Upham, New Hartford

Sierra Club commends Conservatioinst

Gentlemen: I am pleased to tell you that at the January 28th meeting of the Executive Committee of the Atlantic Chapter of the Sierra Club, the following resolution was unanimously adopted:

"Resolved, that the Atlantic Chapter of the Sierra Club express to the editorial board of the CONSERVATIONIST, published by the Department of Conservation of New York, special commendation for the excellence of the editorial features in the 1968 issues. These displayed consistently a very high degree of enlightened thought and effectively advanced the cause of conservation in a manner worthy of the State of New York."

Alfred S. Forsyth, Chairman, Conservation Committee, New York City

Rabbit with "horns"

Dear Sir: The subject of rabbits with horns, which appeared in Letters to the Editor, October-November issue of THE CONSERVATIONIST, prompted me to mail to you the enclosed photograph. It was given to me by the late Hanns P. Kniepkamp, Trumansburg, New York, attorney, who made frequent trips to Germany. Mr. Kniepkamp said the animal was shot in the Black Forest. The mounting occupied a conspicuous place on the wall of the attorney's office.

After your readers have made a careful study of the picture, they will no doubt wish to draw their own conclusions as to whether or not seeing is always believing.

S. E. Mekeel, Ovid

• *After examining closely how the fur is pushed up around the base of the "horns," we are inclined to believe the poor beast was captured and worked on by some of the famous gnomes of the Black Forest.—Editor*

"Rx for A Long Hot Summer"

Dear Sir: I read your article "Rx for a Long Hot Summer" (Feb.-Mar., '68) and many possibilities for working with teenagers not only from the ghettos but from all sections of our State, come to mind.

One possibility which I feel should work quite well is to enlist the aid of adult volunteer supervisors who are familiar with living out of doors and let them work with a small group of six to ten teenagers on a specific project for a week or however long the adult volunteer can devote to supervising the group. These projects could be set up by the Conservation Department and designed to require the amount of time that the group will be together. As for pay to the youngsters, I am sure that a small payment plus possibly letting them keep the sleeping bag that they have used for the week or two in addition to their food and transportation would be sufficient.

Since the youngsters involved in this program would not be well off financially, certain items would have to be supplied to them. For example, they could be given a sleeping bag, work boots, four tee shirts, two pair of trousers, a cap and three meals a day for fourteen days at a cost of about $85 each. This figures out to about $1 an hour if they work forty hours a week.

I am confident that obtaining adult supervision would be no problem. I would be willing, even eager, to participate in such a program.

The worst thing that could come out of a program like this is that the youngsters have a pleasant experience.

Wayne R. Clift, Brockport

Hunting approved

Dear Editor: I am writing this letter to compliment you on the reply you made to a letter written by Mr. James C. Moise in the October-November, 1968 issue of THE CONSERVATIONIST magazine.

Mr. Moise implies that we hunters have no right to shoot any animal. The conservation officials in all of the New England States regulate and maintain hunting laws and regulations for the protection and the welfare of the animals being hunted. If there were no hunting season for deer in the State, soon the deer herd would be much too large for the winter range. A large number of deer would starve in a slow, very painful death because they could not find enough winter food. The deer that survive the winter would come out sick and weak. The same situation would appear with any other animal that could not be hunted.

Ernie Finney, Vista

Complicated bark troubles

Dear Sir: I wonder if you might know what animal is devouring the bark on my sapling white pine trees?

The bark has been eaten right down to the wood. This occurs both near the ground and at heights of six feet and more above the ground. The eaten area usually completely encircles the tree, thus killing it. I have not observed this happening in the summer.

What strikes me as particularly unusual is the absence of any tracks on the ground. This leads me to speculate that the culprit may be a tree-abiding creature such as a squirrel but beyond that, I have no idea. Can you help? Also, are there any preventative measures that I could take?

John J. Moran, Broadalbin

• *From the photograph that you enclosed with your letter, we discovered that your white pine are infected with blister rust, and squirrels will gnaw the canker produced by this disease. This disease may eventually kill the trees so the squirrel damage should not be of any consequence; it is only secondary.*

If this particular planting is five acres or more, the State will undertake to control the disease for you at your request. From the photograph it appears as if the rust has a substantial foothold in the stand.—William H. Buzzard, Jr., Forest Biologist

Hot bees

Dear Sir: I note in your issue of October-November, 1968 in the article on "Hibernation and Winter Withdrawal," by Paul M. Kelsey, Sr. Wildlife Biologist, a statement to the effect that the bee colony generates heat during the winter by "movement of their wings."

It is true that bees in the hive use wing movement for circulation of air, for heat distribution, for ventilation and particularly during the honey gathering season to accelerate evaporation as part of the process of curing honey. But, wing movement alone does not generate heat. The basic purpose

of the storage of honey by a colony of bees is to provide fuel to keep them warm through the winter. They consume the honey or other food supplied them such as sugar syrup and their digestive process and metabolism is what generates the heat. Their rate of consumption of food is related directly to the temperature situation and is regulated depending upon the needs of the colony. In our northern latitudes, a normal colony requires from 30 to 60 pounds of honey or other equivalent food to carry it through the winter.

A colony of bees seldom dies out during the winter due to low temperature but they will not survive the winter if they are out of food.

William H. Latham, Lewiston

Conservation technician Praises Morrisville

Dear Sir: I am a recent graduate of the State University of New York at Morrisville (June, 1968). I would like to comment further on your article concerning natural resources studies in the October-November issue of THE CONSERVATIONIST.

As the co-ordinators of the Conservation Department will agree, there is a great need for technicians trained in the fields of natural resources and conservation.

Morrisville College has developed an excellent curriculum in this field under the leadership of Professors Louis G. Olney, Kingsley L. Greene and Robert Crane.

At Morrisville major subjects include general forestry, soil and water conservation, zoology, park and recreation management, wildlife management, fisheries management and other related subjects.

The student is not only trained in the above areas but is required to complete work in the social sciences and humanities.

All in all, I think Morrisville is providing an excellent opportunity for the young man of today to accept the challenging field of natural resources conservation. I think that the Conservation Department of New York should work more closely with Morrisville's development in respect of the need of the technician by the Department.

Jeffrey A. Rusert, Elma

• *The Conservation Department's Division of Conservation Education worked closely with the staff at Morrisville in developing the curriculum in natural resource studies. We are continuing to do so particularly through co-operative efforts at the Department's Rogers Conservation Education Center at Sherburne.—Editor*

Kill for kicks?

Dear Sir: In the Back of the Book section of the October-November issue, you listed four reasons for posting. You missed one. Some of us post our land simply because we feel it is morally wrong to kill for kicks.

Robert Gannon, High Falls

Explanation for fisher return

Dear Editor: I read John E. Carroll's very interesting article on "Fisher, Marten, Wolverine" in the December-January issue of THE CONSERVATIONIST. Several times the need was mentioned for a wilderness habitat and an undisturbed forest area but particularly with the fisher, it mentioned that they ranged with and fed upon porcupines.

As a long time forester in Massachusetts, I have observed a change in our forest cover which makes me question the observation that the fisher necessarily needs an undisturbed wilderness area to live in. Back in the Thirties, the porcupine and beaver were little known in Massachusetts, even in the Berkshires. Today, both these animals are found within 30 miles of Boston and, in some cases, have created a nuisance by their numbers intermingled in man's environment.

From my observations, I have come to the conclusion that the reason these animals have come back into places they had not been seen for several generations is that the forest cover has changed back into more nearly the original forest types. I believe the particular tree species that has made this difference is the hemlock. Back in 1850, three-fifths of Massachusetts' five million acres was open land; today, three-fifths of Massachusetts is covered with forests. The original clearing by fire plus uncontrolled wildfires and early colonial industries pretty well wiped out our hemlock. Beginning in the Thirties, the hemlock began to come back and today is widespread over all western Massachusetts and much of eastern Massachusetts. Although many people think of our original forests as white pine, actually there was much more acreage of hemlock and mixed hardwoods with scattered pine. Since the return of hemlock, we are also experiencing a return of some bear and even occasional moose. This is in spite of second or third growth forest on smaller, unbroken areas and nearby man. I believe the fisher and possibly the marten may return to these forests for the same reason, hemlock and the so-called climax forest types rather than an undisturbed wilderness.

John H. Lambert, Chief Forester, Department of Natural Resources, Boston, Massachusetts

Farewell

Dear Sir: I am a conservationist, since the first copy. But now? Silence at Sacandaga Lake since the 'plane went through, bending the tops of all the trees and billowing out an oily mixture that covered the cove of the lake for days. Finally, the wind shifted and the oily mess left our cove for some other shore front where another fisherman will curse. The birds left immediately, except for a few blue jays and they became vicious For 32 years, I have turned over rocks along my shore front to get crawfish, crabs, etc. Every rock turned would produce one or two good size crabs. Now, after two years of spraying, you can turn over 20 rocks in the same area before you find one small miserable crab.

Live bait—well they would jump out of the water for bread thrown to them and you could catch all you wanted. You could count as many as 14 ducks. They would spread out and swim toward shore and the bait would wind up on the beach to get away from them.

And now? As one of my old tenants said: "Willard, I don't hear the frogs."

"Well," I said, "just try to remember."

Even the ducks are gone.

I am well past 73 years old, always paid and still do for my combination fishing and hunting license, a sportsman's pleasure. Now, it is a losing effort so I will turn in my license and go back to Westbury and try and enjoy the jet set and noise. Farewell fishermen!

Willard Hall, Westbury

Nutty squirrels

Gentlemen: I have been a subscriber to THE CONSERVATIONIST for many years. Its G-R-E-A-T.

Now a couple questions, please:

(1) Who is there to defend the *red squirrel*? Personally, I don't think he should be defended.

(2) Several years ago, I bought 25 high class grafted "Thomas" black walnut trees and a couple of them are just beginning to produce but the damn red squirrels have cut off all the nuts just to hear them hit the ground where they lay worthless. They did carry some of them onto my lawn for me to remove. There's nothing in them; why do they cut them off? They and gray squirrels cut off the hickory nuts, too, before there is anything in them. Why?

Incidentally, I have an albino chipmunk here. He's nearly all white.

Robert E. Kleinstuber, Port Jervis

P.S. I recently purchased ten more "Thomas" black walnut for posterity; not for me.

• *My only answer to your question about the reason for squirrels cutting down immature nuts is that they are—as you know—excessively industrious anyway, and furthermore, are not too bright.*

In short, before they can get them down on the ground and open them, they cannot tell the difference between a mature and an immature nut. This is small consolation for you, but it is the best explanation I can give you.—The Editor

Let villages be over-run

Dear Sir: Reading some of the reader protests against reintroducing into the Adirondacks the wolf and cougar is a reminder of the need for more articles in THE CONSERVATIONIST on ecology and the balance of nature to further our understanding of predators and their needed rightful place in the world.

Speaking of needed and useful predators, how about a little legal protection for the fast-vanishing bobcat instead of the usual front-page writeup in local papers whenever some mighty hunter blasts a 20-lb. bobcat into oblivion? May their villages be overrun with field mice and their vegetable gardens chomped by cottontail rabbits!

Robert H. Woodruff, Jackson Heights

Light gray fox

Dear Sir: Find enclosed a picture of one unusual gray fox. The gray fox was hit by a truck when crossing the road near Mohawk, New York.

I would like to see the picture in the magazine as the fox is a rare one, the eye pupils are as white as in human eyes.

I have been doing taxidermy work for fifty-four years and never had any gray fox of such a change in color.

E. P. Smith, Ilion

Editor is whacked

Dear Sir: You are obviously not only a hunter, but one of the very hunters Mr. Moise is referring to. Like anyone, who has no defense against an accusation, you can defend only by misdirection; that is, since you cannot supply an answer, make the question seem foolish by making the questioner seem foolish. You, too, have "ducked the ethical question."

You, sir should be above equating the raising and merciful killing of animals specifically for food to the taking of life solely for the thrill and excitement of killing—even of merciful and quick killing. How many sportsmen merely wound the animal causing a lingering and painful death?

And don't use the "thrill of the hunt" answer, for a camera will serve that purpose.

Finally, may I call attention to the fact that your caption is as biased as your answer. Mr. Moise's letter does not question the morality of hunting but rather the morality of killing.

Not a very good job of objective editing, sir. Turn in your blue pencil.

D. Bruce Mathewson, Levittown

Fresh water medusa

Dear Editor: On a week end at Whaley Lake in Dutchess County a young fellow, who is a neighbor of mine at the lake, told me he had seen a mess of "jelly fish" down at the dam. I had never heard of them being in fresh water and wondered what he had seen.

My wife, the boy, and I went down to where he had seen them about an hour before but now we didn't see any. As the lake was now being roughed up by skiers, we assumed they moved to deep water.

Going to a quiet cove, my wife sighted a few and managed to scoop one into a pail. It was about the size of a nickel in diameter. Rather than to try to describe it, I will make a sketch of it as I remember what it looked like.

This thing contracted and expanded its diameter and moved about. The paddles also moved from horizontal to vertical positions while the "ring" remained horizontal.

I looked through some past issues of THE CONSERVATIONIST and found an article in the August-September, 1965 edition entitled, "Mysterious Blobs of Life."

The animals described don't fit the one I had seen.

Louis W. Milliot, Yonkers

• *In the literature available in this office there are only two genera of fresh water jellyfish (medusa) which are recorded from this continent. The one genus has only eight tentacles along the margin of the disc. It also is very small and would not generally be observed with the naked eye unless careful examination of a sample of water were made.*

The genus to which this reported species belongs is presumably Craspedacusta, *which has many more marginal tentacles. The only species reported is* sowerbyi *which is usually somewhat smaller than a nickel, but of size to be readily visible. Several reports of jellyfish have previousy been received by this Department from isolated locations.—G. E. Burdick, Supervising Aquatic Biologist, Bureau of Fish*

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Ponds Stocked By Airplane

(Continued from page 15)

Water (Township)	*Species*
Otter Pond (Fine)	ST
Round Lake (Fine)	ST
Simmons Pond (Clifton)	ST
Spectacle Pond (Clifton)	ST
Twin Pond (Pitcairn)	ST
SARATOGA COUNTY	
Palmer Pond	ST
WARREN COUNTY	
Buttermilk Pond (Horicon)	ST
Clear Pond (Chester)	ST
Crane Mt. Pond (Johnsburg)	ST
Crab Pond (Horicon)	ST
Duck Pond (Horicon)	ST
Gay Pond (Warrensburg)	ST
Hour Pond (Johnsburg)	ST
Island Pond (Horicon)	ST
Jabe Pond (Bolton)	Splake
Jabe Pond (Bolton)	RT
Little Joe Pond (Thurman)	ST
Kibby Pond (Johnsburg)	ST
Little Pond (Stony Creek)	ST
Long Pond (Horicon)	ST
Lower Siamese Lake (Johnsburg)	ST
Lower Twin Pond (Johnsburg)	ST
Mud Pond (Johnsburg)	ST
New Lake (Johnsburg)	ST
Peaked Mt. Pond (Johnsburg)	ST
Pole Hill Pond (Bolton)	ST
Puffer Pond (Johnsburg)	ST
Round Pond (Horicon)	RT
Second Pond (Johnsburg)	ST
Spectacle Pond (Hague)	ST
Upper Siamese Lake (Johnsburg)	ST
Upper Twin Pond (Johnsburg)	ST
Wilcox Pond (Stony Creek)	ST
WASHINGTON COUNTY	
Black Mt. Pond (Upper) (Dresden)	ST
Black Mt. Pond (Lower) (Dresden)	ST
Bumps Pond (Cambridge)	ST
Clear Pond	ST
Fishbrook Pond (Dresden)	ST
Greenland Pond (Dresden)	ST
Lapland Pond (.5 mi. S.E. Black Mt. Pd.) (Dresden)	ST
Milliman or Cranberry Pond (Dresden)	ST
Sand Pond (Lower)	ST
Sand Pond (Upper)	ST
Sawmill Pond	ST
Spectacle Pond	ST
Spruce Pond	ST
Vanderberg Pond	ST

How To Navigate Around Buoys

by Edward H. Moore,
Sr. Pub. Info. Specialist,
Division of Motor Boats

NEW YORK's "trailer sailors" are going to become real skippers this season. Some of them, at least, are going to learn all about buoys, a knowledge that has been essential for the big water sailors on the Great Lakes or salt-water —but not required knowledge for the outboarder on the inland lakes.

It's not required for the inland boater, actually, but a knowledge of the meaning of buoys and the reasons for placing them where they are located will add a substantial amount of pleasure and adventure to the boating season.

The buoys, located on salt- or freshwater, are the traffic signs of the waterways. Their shapes, and colors and numbering systems are standardized throughout the country. Once the system is understood the boatman can be sure of himself on any waters and that's the reason for the establishment of the system on our interior lakes.

Boatmen throughout New York, having become thoroughly familiar with their local waters, can zip around in perfect safety. They know every shallow spot, channel turn and weedy spot on their "own" waters and never have a problem in their navigation.

There is one problem, however, that many of these boatmen share and that is boredom. Just how much adventure can you have on the same square mile of water after a couple of years? And how can you dodge the growing traffic when there's no place to go to duck it?

That's the basic reason for the installation of the buoys in the interior waters. By marking the channels and warning of obstructions the buoys open up miles of new cruising waters and adventure for boaters who would hesitate to venture into strange waters. Now these waters won't be strange.

There's one simple rule to remember: Red, Right, Returning. When you are returning to port or entering a harbor on the Great Lakes or salt-water, the red buoys mark the *right side* of the channel. The black buoys are to your *left*, marking the left edge of the deep water.

The interior lakes, Tupper, Long Lake and others, don't have ports to return to, so it was decided that on these lakes the inlet would mark the head of navigation and that the red buoys would be on the right of the channel as you travel toward the inlet. (*See Wayne Trimm's diagram on the facing cover*). If there is more than one inlet, one is rated as headwater.

There's a numbering system too, that supplements the color code. All red buoys if numbered, are *even numbered.* All black buoys, if numbered carry *odd numbers.* Under some light conditions it is hard to tell the differenct between red and black on the water (believe it or not) so remember the numbers too, *red is even, black is odd.*

And there is still another distinction between the red and the black. The red buoys taper to the top and are called, in nautical parlance, "nuns." The black buoys, straight-sided, are called "cans," because they are shaped just like a can.

So it's a red, even numbered, nun or spar buoy that is on your right when you are running toward the head of navigation on an interior lake or headed back into port on the big waters.

To your left it is a black, odd numbered, can or spar buoy.

There are other buoys too, that carry special information for the boatman. These are either spar or can buoys.

The spar buoy, a slender tapering buoy, carrying orange horizontal stripes, is used to mark obstructions. If the obstruction or hazard is a single rock, for instance, that is a danger to boats the warning buoy will be placed adjacent to it—so give it a wide berth. Stay clear of this single warning buoy in every direction.

Where the hazard is a reef or shoal covering a considerable expanse, it will be ringed with these warning buoys. Stay outside of the enclosed area. It's not a slalom course designed to test your skill with the tiller.

Other orange topped buoys, cans, carry information for the sailor.

A diamond on the buoy indicates that it marks a danger area—the limits of a swimming area, a submerged object or similar reason for the boatman to stay clear. It is a warning marker which closes the area to boats.

A circle on the can buoy designates a controlling regulation—a speed limit for prohibition of certain activities. This regulation has the force of law and ignoring the control means that you are violating the law.

A square on the orange topped can conveys information. It is like a highway sign and may indicate distance, location, etc.

There are more, special buoys and markings and signals which convey information to the sportsman. There is the white buoy with its blue stripe to indicate a mooring, special anchorage markers and strings of floats on connecting lines to enclose bathing areas.

There is one signal that is coming to be seen more and more frequently with the growing popularity of scuba diving—the red flag with diagonal white band on a float. This indicates the presence of a skin or scuba diver in the vicinity and warns all vessels to stay at least a hundred feet away from the flag itself.

At present, buoyage systems have been completed on eight of the interior lakes. Tupper Lake, Long Lake, Cranberry Lake, Lake Placid, Racquette Lake, Schroon Lake, Upper Saranac Lake and the Saranac Chain are all marked. Lake George will be added to this list by the end of the 1969 boating season.

A chart, showing the channels and the location of the buoys in the Saranac Chain of Lakes has been prepared. Priced at $1, it is available from the New York State Conservation Department, Division of Motor Boats, State Campus, Albany, New York 12226.

Charts of the other lakes on which buoyage systems have been installed are being prepared and will be available at some future time.

BUOYAGE

A black can buoy, odd numbers, marks the left side of the channel when you are heading UP the lake toward the head of navigation. At night, if a lighted buoy, it flashes green.

"Red, Right, Returning" – the red nun buoy carrying even numbers marks the right side of the channel. It flashes red at night

A typical lay out of buoys marking the channel and indicating obstructions as might be found in New York waters.

WARNING

A diamond shape on a buoy warns the boatman of a hazard.
The cross inside this diamond denotes a swimming area – Keep Out.
Other warnings may be printed inside the diamond.

CONTROL

This is the law!
Violation of the restrictions printed inside the circle is a violation of the law.

INFORMATION

An oblong frame symbolizes general information, location, distance, etc.

Special purpose buoys, privately installed under permit from the Division of Motor Boats, may mark special areas or research sites.

A mooring buoy with its blue stripe and white reflective tape.

The light "package" developed by the Division of Motor Boats is completely self contained. Its batteries keep it operating for a year without attention.

The spar buoy, white with orange stripes, is used generally to mark obstructions.

Spars, colored solid red or solid black, are used as auxiliary channel markers in some locations.

Another design of the black can buoy.

Scuba divers warning flag. Stand clear.