THE CONSERVATIONIST

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For Parents Only

Recently a tough-nosed executive revealed to the writer that his son has been set on becoming a Forest Ranger for many years. His son is 12 years old.

Such experiences come to mind, hecause now that the school year is over. parents and youngsters are prone to look ahead. Pretty clearly, there is a need to clarify the prospects in conservation.

Enough has been said by others of the hard work, long hours and down-to-earth pay of Rangers. Surely time will bring enough depressing views of conservation to these youngsters. We would rather review some of the more encouraging avenues of conservation which do hold promise for the bright, serious student.

One opening field is that of atmospheric research and control. Some of the developments in this field are explored by Dr. Lemon and Dr. Kane in articles in this issue. Not only in this State, but throughout the nation, people are becoming aware of the pollution of our air streams, as well as of our water courses. Thus, recently, the Mayor of New York said that he would not tolerate conditions which could lead to a lethal smog formation, while the University of Pennsylvania announces a new degree in air pollution control engineering.

New vistas are emerging also in the study of animal behavior. Many researchers have shifted from merely counting and describing animals, to studying why they act like they do. As we approach Independence Day, it is refreshing that we are finding our national symbol, the bald eagle, has other human traits beside fierceness. Another article in this issue. by Professor Alexander, emphasizes how close the animal world is to ours.

Then, too, it appears there is room today for new Darwins and new Pasteurs. The idea of the evolution of species is being refined and reshaped, and it is even proposed that at some time there was a spontaneous generation of life.

In another field-amid all the excited talk about LSD-Professor Peakall discloses in another article of this issue that a colleague is examining the effects of drugs and chemicals on the way that spiders build their webs. He explains that study of how they produce their silk may give us new information on how all animals build body cells.

Granted only a few children should be encouraged to undertake the arduous disciplines of the researcher or the Forest Ranger. But we do think there is value in showing youngsters that there are more than beautiful sunsets and Bambi in the outdoors. Perhaps if we can show them more of the mystery and challenge in the natural world, they will take better care of it than we have .- Editor

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Fishing The Surf On Long Island*

What Does The Lonely Surf Fisherman Seek, What Does He Get, And Where And When?

Moriches Inlet

Jones Inlet Fire Island Inlet by Philip T. Briggs, Conservation Biologist, D.-J. Fish Research Unit, Oakdale, L. I.

HAT is the lure of surf fishing? Is it the moment at dawn when the sun shoulders up over the ocean horizon? Is it the isolation and rhythm of the beach? Or is it the inclination of all boys and men to throw stones in the water?

Whatever it is, day and night, surf fishermen may be found along the entire coast of Long Island. From Norton's Point in Brooklyn to famed Montauk Point, wherever there is access to the beach and fishing is allowed, you will almost certainly find a surf fisherman heaving his lure and brooding.

In 1961, the Conservation Department decided to find out a few things about surf fishing on Long Island. How many people surf fished? What did they fish for and what did they catch? How successful were they? These were some of the questions that we tried to answer.

To try to get the answers to all these questions for the whole coast of Long Island would have been impossible. Because of this. we selected the area between Jones Inlet and Shinnecock Inlet as being typical of our surf fishing beaches and jetties. We went out on the beaches there both day and night from 1961 through 1963 and interviewed over 11,000 surf fishermen to find out what they were fishing for and how successful they were. In addition, we flew nearly one hundred airplane census flights to count how many people were surf fishing during the day and where they were located.

We found that there were nearly 19.-000 daytime surf fishermen in 1961. By 1963 their numbers had swelled to over 25.000. This increase can be explained in part by the abundance of striped bass resulting from recent successful spawn-

ing years and by the wide newspaper publicity given to outstanding catches of striped bass. The general population increase in the metropolitan New York City area has also contributed to the increasing numbers of surf fishermen. At night there were from two to five times as many more. What might surprise some people was that more than three-quarters of all these surf fishermen were found at the popular Jones Beach State Park and nearby town-owned beaches, locations customarily thought of as only havens for swimmers. Probably the reasons for the smaller numbers of surf fishermen east of Fire Island Inlet were that those areas are further away from New York City than Jones Beach and that access to the beaches themselves is limited.

What attracted all these surf fishermen to our beaches? Whether they used live bait or artificial lures. the surf fishermen's answer was usually the samestriped bass, northern kingfish and bluefish. Almost all the surf fishermen were after one or more of these three fish. In the spring and fall, our surf fishermen fished almost exclusively for striped bass. In the summer, large numbers of people flocked to our beaches to fish for northern kingfish and bluefish. Many surf fishermen often fished for these species in combination with striped bass. At night the northern kingfish was ignored by the surf fishermen, who fished then only for stripers and blues.

What then did the surf fishermen catch? During the day they caught mostly northern puffer (better known on Long Island as blowfish). The surf fishermen took home more of those tasty little devils (over 23,000) than any other fish. That was not because the surf fishermen wanted northern puffer, for they did not. It was just that the northern puffer simply gobbled up the surf fishermen's bait before a northern kingfish or a striped bass could find it. The rest of the surf fishermen's catch was made up almost entirely of the fishes they were after. In three years the surf fishermen (during the day) took home 19,000 striped bass, 11,000 northern kingfish and 10,000 bluefish. At night it was a somewhat different story. Very few northern puffer and northern kingfish were caught, while striped bass and bluefish made up about 90 per cent of the surf fishermen's catch after dark.

Shinnecock Inlet

These fish were not easy to catch. In the summer during the day, the surf fishermen needed ten trips of about 434 hours in duration just to land one or two striped bass. In the spring and fall, striped bass fishing was much better. At those times the surf fishermen took home from three to 16 striped bass every ten trips. Northern kingfish were easier to catch. The surf fishermen that went after northern kingfish averaged about a fish a trip. Bluefish fishermen in the surf usually were intermediate in their success between striped bass and northern kingfish fishermen, although at times they did do as well as three fish a trip.

Surf fishing was better at night. The average trip was much shorter. only about 2¹/₄ hours, and the surf fishermen caught as many as three stripers every ten trips in the summer and up to 18 in the spring and fall. In general, the surf fishermen who tried the beaches east of Fire Island Inlet were more successful than their friends to the west. One interesting note is that while the spring run of striped bass was generally more productive to the surf fishermen than the fall run in the Jones Beach area, the reverse was usually true east of Fire Island Inlet.

With rates of success so low that they

^{*} A contribution of Federal Aid in Fish and Wildlife Restoration Project F-15-R.



Surf fishing at Montauk in the '90's

are measured in terms of fish every ten trips, one might wonder why anybody would want to go surf fishing. The answer lies partly in the low success rates themselves. It is a great challenge to many people just to catch a striped bass or a bluefish. In addition, the fish grow large. Although most striped bass caught on Long Island are from two to six pounds in weight. 10- and 20-pounders are not rare and a few stripers in the vicinity of 50 to 60 pounds are caught every year. Bluefish do not grow as large as striped bass. Most of them run from two to six pounds, and any over ten or twelve pounds are exceptional. What they lack in size, bluefish make up in fight. Many surf fishermen consider bluefish to be "the fightingest fish that swims." Northern kingfish are small, rarely over a pound, but they hit live bait viciously and are a delicacy on the table. Kingfish were so named by our early Colonists because of their excellent flavor.

In summary, surf fishing on Long Island can be described as rapidly increasing in popularity, but dependent upon only a few kinds of fish with relatively low returns to the fishermen for their efforts. Despite the low returns, surf fishing is a glamour fishery, with the angler primarily seeking large and elusive fish. We feel that it will continue to increase in popularity. As it does, access to the beaches may well become a serious problem. At present there is adequate access only between Jones Inlet and Fire Island Inlet. There is a need now for greater access to Fire Island at night and during the spring and fall (Continued on page 38)

Conservation In The Suburbs

Rockland County Takes A Searching Look At Its Front Yard And To The Future

> by Ira Caplan, Jack Focht, Co-operative Extension Agents, Rockland County



Suburban living can be beautiful

RESIDENT JOHNSON summed up the suburban plight when he said: "People move out from the city to get closer to nature only to find that nature has moved farther from them."

One disillusioned county citizen echoed the same thoughts as he felt the pinch of the problem close to home: "We hought our house in Rockland County because of the beautiful old trees . . . if it's concrete we're looking for. we don't belong in the county, but back in New York City."

Another long-time resident commenting pessimistically on the changing scene, observed that: "Newcomers to the county want everything to stop just the way it is the moment they arrive. What they don't figure on is the arrival of the next fellow, and the fellow after that. What they're getting is another Queens."

Why people come and keep on coming to Rockland County may have many reasons, but none is more basic than the desire to make a home where the trees are. New Yorkers are firm believers that a man's castle should include an outdoor living room, carpeted with a green lawn and shaded with trees. By crossing the Hudson River via the George Washington Bridge and the Tappan Zee, millions find sanctuary from the ugly side of city life by escaping into the trees.

This bubble of paradise soon bursts when the newcomer from the city buys a house surrounded by big trees that look little better than telephone poles after they drop their scanty leaves and stand dead within a year or two. With bark battered by bulldozers and their roots suffocated by the grading operation, trees succumb to a slow but sure death, leaving their owners with a costly legacy. Invariably, the pride of home ownership proves tough enough to endure the rest of the sacrifices peculiar to the suburbs, like the rising costs for new schools, transit, highway, hospital, recreation, sewage and water supply improvements. Somehow, most still claim that life in a suburban crackerbox is more comfortable than in city apartments and worth the cost despite the additional burden of a proposed commuters' income tax.

The great suburban sprawl that has taken over 27 counties in the tri-state metropolitan area, began invading Rockland County little more than a decade ago, with the opening of the Tappan Zee Bridge and the Palisades Parkway. The population practically doubled between 1950 and 1960, and will double again in the next twenty years. Today, Rockland is the fastest-growing area and the smallest county in the State outside of the city boroughs of New York. How to make room for a million more people, who will be moving into Rockland County and the three river counties to the north by 1985, without destroying the clean air. scenery, open space and other amenities of the good life is a problem of state-wide concern.

Governor Rockefeller recently announced his plans to establish a State agency to help curb this disastrous loss of crop land and open space that's being swallowed by urban sprawl in New York State at the rate of 20,000 acres a year. Although 95 per cent of Rockland's crop land was taken out of commercial production from 1900 to 1960, it wasn't all developed and much of it has been allowed to go back to trees until the price is right for development.

People still like to say that they come

to Rockland County for the country atmosphere, but the word "rural" just doesn't apply any more, even though the U.S. Census calls it "rural nonfarm." In an area where commercial agriculture has practically passed out of the picture, and where houses are becoming the fastest-growing cash crop, the problems of controlling the pattern of development are becoming very real and very acute.

Unquestionably, the county is going to have to face up to living with a lot more development in the next few years. The big feat is to make that development as attractive as possible. The threat of elbow-to-elbow living in an atmosphere of concrete and ugliness is increasing, and homeowners fear they will soon lose the open space and trees that they came to Rockland County to enjoy.

This is no idle threat, for our burgeoning population is swallowing up areas of natural beauty, and giving way to insensitive commercialism—commercialism led by individuals having no ties to the landscape in which they earn their livelihoods; people whose eyes have lost the art of seeing.

As a consequence, the wholesale removal of top soil and trees from subdivisions is occurring at an alarming rate. The pollution of the Hudson (our entire eastern boundary) and other inland waterways have become an area of increasing concern. As the county grows, little attention is given to the setting aside of land for parks, open space and green belts. Conflict occurs in those areas where single family dwellings abut apartment houses or where apartment houses are adjacent to light industry.

How much land must be given over to industry, business and housing is a question of balance and county goals that



But neon alleys like this can spoil it



Must prosperity exact such penalties?

is still being hotly debated. Once the issue of whether we become a dormitory county or a hub of employment is finally settled, we must still face the bigger problem of awakening public opinion to conservation issues.

Somehow, the basic principles of conservation must be interpreted for Rockland County in terms meaningful to the Board of Supervisors, right on down to school children like Johnny, and the thousands of home owners like Mrs. Smith, who plant trees and tend their front yards. Unfortunately, only a small percentage of the population is getting the conservation message and large numbers of people are still deaf, dumb and blind to the importance of conservation in an urban setting.

Unfortunately, many people still associate conservation with little old ladies and whooping cranes and fail to see that it applies as much to the individual homeowner and businessman as to the preservation of wildlife in the backwoods. In fact, all of us are concerned directly or indirectly, knowingly or unknowingly, with the environment that surrounds us.

However, there are more conservationists in Rockland County than one might expect. They are the children of Sloatsburg who climbed the sugar maples to stop the drone of chain saws: they are the irate citizens of Tappan whose outdoor recreation has been curbed because of the mosquitoes that breed in the pol-

The Conservationist is an official publication of the N.Y.S. Conservation Dept., published every two months at the Department's office, State Offices Campus, Albany, N.Y. No advertising accepted. Subscription rate \$2 per year. Special rate of \$1 per year for subscriptions received by a primary, secondary school or at school by lution of the Sparkill Creek; they are the builders who have taken the positive approach by using landscaping, providing trees, malls and green areas: and they are every citizen who considers himself a part owner of the Hudson River and is concerned in its fate.

In addition to its scenic resources. Rockland has an abundance of intellectual resources. There are many individuals vitally interested in devoting time and ability to constructive and imaginative ways of working for preservation; nevertheless. we desperately need a united front on the matter of trees and junk. just as in every other aspect of natural beauty in the county.

For example, when 100-year-old maples go down in Sloatsburg, the people of Tappan should be concerned: and when children in Tappan can't play along the polluted Sparkill, the citizens of Stony Point should worry. Nature is above factionalism.

Although the plight we are in regarding urban sprawl and public apathy is too serious to be ignored, and too complex to be dealt with at the local level *alone*, it would be a denial of civic responsibility to allow disorderly and unrestrained growth to continue destroying our environment by default.

What then? Are we so *helpless* that we must smother in our own prosperity? The Rockland County Conference on Natural Beauty. last March 5th, was an all out county effort to say *NO*!

teachers. NO STAMPS PLEASE. Second Class postage paid at Albany, New York. Printed in U.S.A. POSTMASTER (Re undeliverable Second Class matter): Please send form 3579 to THE CONSERVATIONIST, Room 324, State Campus, Albany, N.Y. 12226. SUBSCRIBER ZIP CODE NECESSARY This event was the nation's first county-level conference on natural beauty; a follow-up of President Johnson's White House Conference last May. It also followed Governor Rockefeller's New York State Conference on Natural Beauty by one week.

Over 400 delegates were addressed by Supreme Court Justice, William O. Douglas. Experts from the nation. State and county, including Assistant Secretary of the Interior. Dr. Stanley A. Cain. led panel discussions on roadways. waterways. trees and the landscape, parks and open spaces, townscape and education.

The Agricultural Division of the Rockland County Extension Service was the sponsoring agency of the Conference. Being an educational organization only, its efforts are strictly limited to making people aware of the problems.

The splendid co-operation of the local press and radio helped create that awareness for the Conference. The day turned into a historic event for the county, as housewives, supervisors, businessmen, educators and conservationists focused their attention on the county's problems.

To continue the work of the Conference, the Board of Supervisors has created a Citizens' Advisory Board on Natural Beauty, and several miniature conferences have also been held on the town, village, subdivision and civic association level.

In his letter of congratulations to the Conference, Governor Rockefeller said that Rockland was blazing a trail for other counties with acute urban problems.

What the county will be like in twenty years can now be determined by how its citizens face up to the question everyone is asking: "Where do we go from here?"

Taking Stock Of Your Rural Property Part 1-Location, Topography, Physical Features and Soils

by Lawrence S. Hamilton, Professor of Forestry, Department of Conservation, Cornell University

AVE you acquired a piece of rural New York to put down roots, to escape the asphalt jungle, to serve as a week end retreat, to develop a country year-round home, to retire to? Thousands of New Yorkers have and the "flight" to the country is rapidly increasing.

No matter what your motivations may be for joining this migration to sun, sky, tree, water and soil you will sooner or later decide that you want to do something to enhance the value of your land and the flora and fauna which it is providing.

Before changing or re-arranging landscape components to achieve your general goals, it would seem prudent to take inventory of the natural resources of your domain. It may be that your general goals became somewhat modified, or focussed into specific goals, by virtue of the material you have to work with. The property may contain a gravel deposit of considerable value, a rare plant which merits preservation, a good spring to be protected and developed, or a topographic situation suitable for a pond.

Taking stock is not simply a matter of naming the resources or counting them, but involves the matter of location. Where are they on the property? How do they relate to one another? A number of kinds of maps and photographs are useful in such stock-taking.

Topographic Maps

The standard U.S. Geological Survey topographic map is a useful and interesting representation of a portion of the landscape covering $7\frac{1}{2}$ minutes of latitude and longitude. It does not supply specific information about what is on your particular property, but it does re-

This is the first in a series of articles by Professor Hamilton designed to guide the new rural landowner toward greater returns and satisfaction from his investment. Subsequent articles in the series will discuss soils, vegetation and wildlife. late it topographically to surrounding country, and physically to nearby roads, villages, cities, water bodies and other physical features of your locality.

The maps are printed in at least three colors—blue, black and brown. Most of the maps published since 1951 show wooded areas in green, and in ordering maps you should specify whether or not you wish the woodland coverage. Features of relief such as hills, mountains and valleys are shown by brown contour lines. The contour interval differs according to the scale of the map and the relief of the country.

These maps are available from the U.S. Geological Survey, Washington 25, D.C. for areas east of the Mississippi River and from the same agency at the Federal Center. Denver 25, Colorado. for areas west of the Mississippi. They cost approximately 30 cents per sheet, and may be obtained by indicating the township and county where your property is located. Map scales are usually 1 inch = $\frac{1}{2}$ mile, 1 inch = 1 mile, 1 inch = 2 miles and in certain western states, 1

inch = 4 miles. Some areas have been covered by maps made at different scales, so that you should specify the preferred scale (one might ask for the largest scale available, if in doubt).

Aerial Photographs

One of the most valuable stock-taking aids is the aerial photograph. All of the United States has been photographed once, most of it twice, and some of it even more frequently. The most recent pictures, of course, give you the best idea of what resources currently stock your property, but if you are interested in the changes which have taken place on your property, you may wish to avail yourself of earlier photography as well. Particularly if you own land that once was farmed, but has been retired for some time, you may find the picture of this former land use of some interest.

The standard vertical aerial photograph print is 10 inches by 10 inches and covers an area approximately 3.2 miles by 3.2 miles. A single photo, therefore, is usually large enough to cover all but very large land holdings. The scale of these photos is approximately 1.660 feet to the inch. Cost per photo in single prints or small quantities is about \$1. Larger scales in enlargements such as 14" x 14". 18" x 18" and 26" x 26" are also available at approximately \$2, \$2.20 and \$2.60. One good source of photographs is the United States Department of Agriculture. If located east of the Mississippi, send to the Eastern Laboratory. Aerial Photography Division, Agricultural Stabilization and Conservation Service, U.S.D.A. 45 South French Broad Avenue, Asheville, North Carolina. West of the Mississippi, send to the Western Laboratory of the same agency, at 2505 Parley's Way. Salt Lake City 9, Utah. To obtain the photograph of your property, mark its location accurately and clearly on a road map, and send map, money and size of picture desired.

A single picture will give you a twodimensional plan view of your property. If you wish a three-dimensional representation, you must obtain the overlapping adjoining photograph in the same flight line in order to make a stero pair. These can then be viewed and studied by obtaining a pocket stereoscope for about \$12 from many commercial suppliers of equipment for foresters or agricultural workers. Two such concerns are: Forestry Suppliers Inc., P.O. Box 8397. Jackson, Mississippi or Ben Meadows Company, 1423 Dutch Valley Pl., Atlanta, Georgia. Your local Forester or County Agricultural Agent can give you the name of other suppliers.

What can be obtained from the aerial photograph? A trained interpreter can

tell much about present and past land use, types and relative depth of soil, bedrock, kinds of vegetation and so forth. Even a novice may obtain useful information. From a single photograph of recent vintage, you may often determine property boundaries because of fencelines, hedgerows, transition from forest to field, and other indicators. You thus have a map of your holding and can trace one for reproduction to give friends and visitors. Also depicted are any interior boundaries, which divide your property up into sub-units which may be useful development or management units. The photo shows the nature and shape of forest land, whether natural forest or planted, and the relative proportion of conifers to broadleaved hardwoods. It shows the extent of invasion of trees and shrubs into fields, which fields are cultivated and which are pasture. Streams are shown and any ponds or lakes. Structures, roads and well-used trails are visible (even deer trails). The relation of land-use pattern on your property to surrounding properties is revealed better from the air than from the ground. With a stereo pair you can see the topography clearly-hills, depressions, steepness of slopes, over-all landform, and after some study can get a good idea of the texture of the soil and whether it is well or poorly drained. Trees appear to have height, and the taller older trees and stands can be separated from younger trees and stands.

Relating what you see on the ground to what it looks like from the air as seen on a vertical photo, is a most engrossing study and will enable you to learn much about the whole area covered by your photos.

From the Ground Down-Soils

Given a climate and topographic position, the characteristics of the soil resource beneath your feet largely determine the kind, amount and quality of the living components of the landscape, both plant and animal. For instance, woodchucks do not inhabit soils of poor drainage, and neither sweet corn nor tulip poplar trees will grow well in soils of low fertility. Moreover certain kinds of soils are more suitable than others for many man-made uses such as ponds. septic tank disposal fields and roads. Given enough money of course, you could modify the inherent properties of soils and make them suitable for any use; but practically, these properties present opportunities or limitations to the use of a given soil for a given purpose. A knowledge of the characteristics of the various soils on your property is therefore an important part of stock-taking. for it provides what might he called a "basic capability" map. Least costly, as well as most easily maintained and usually most esthetically pleasing uses result from operating within the general constraints of these soil capabilities.

Fortunately in most areas, soils maps are available to you at low cost. The Soil Conservation Service of the U.S. Department of Agriculture, in co-operation with the State Agricultural Experiment Stations conducts soil surveys and publishes the results, usually on a county basis. These surveys have been confined largely to counties which are now or have been predominantly agricultural. Thus for a county in the Adirondack Region of New York State, or the Sierra Nevada of California, no standard U.S.D.A. soil survey map would exist. Such regions may have other types of soils information, however. For example. many California counties are mapped by a program known as the Soil-Vegetation Survey, especially adapted to range and timber lands.

Your local county Agricultural Extension Service or Soil Conservation Service can advise you of what soils information is available for your county. The maps available may be of differing vintages and scales of mapping. Obtain the most recent maps and information. The current Soil Survey mapping, done on an airphoto base is available at a scale of 3.2 inches to the mile. Soil areas as small as one acre are mapped at this scale. Older maps are at scales of 2 inches to the mile and one inch to the mile. In addition to a map, there is text material describing each of the soil types mapped and some interpretation for possible uses of these soils.

Once you have located your property on these maps, you will probably find that it includes several soil types. Each of these types is described in the text in terms of such properties as depth, texture, color. stoniness. drainage. slope. acidity and parent material. These properties will be of considerable importance to you if you are planning to alter the existing use of the land. Particularly is this true if you plan to plant new vegetation such as Christmas trees, wildlife food plants or landscaping plants, or to engage in such activities as impounding water for a pond or building some structure on the property. Consider a soil type in the Hudson Valley with the following characteristics: Fine sandy loam, welldrained, at least 4 feet deep to shale bedrock, low in fertility. quite acid. 3 to 8 per cent slopes. This would not be very suitable without modification for planting walnut trees nor corn, because of the low fertility and low lime level. It would have severe limitations because

(Continued on page 38)

Wildlife And Man

The Author Shows That Wildlife Affects The Lives Of Each Of Us, Not Only The Sportsman

IKE it or not, man is everywhere intertwined with wild animals from the cockroach to the coydog.

Some of these relationships are biological because man is an animal, a biological organism. whatever else he may be. He, therefore, has physiological and psychological relations with other animals.

Man has an ecological relationship because he is but one kind of animal among more than a million other kinds sharing this earth, and, as a consequence, is interrelated with and dependent upon many of these other kinds. Also, to a very large degree, he is subject to the same forces and influenced by the same factors that rule them.

Another relationship is economic because man is to a woefully unrecognized degree affected by these other kinds of animals for good or ill. He is completely dependent upon them for certain essential services, benefiting from their innumerable values and suffering enormous losses in both health and wealth from their injurious activities.

Any discussion of wildlife and man must deal to some extent with all three of these relationships, but mostly with the latter two. In order to make clear at the beginning what is meant by economic relationships, it is necessary to define the term "total economic value" of wildlife, and then elaborate and illustrate the definition as we proceed. The total economic value of the wildlife resource is the sum of all its positive values plus the worth of the many services performed, minus the sum of all its negative values plus the cost of control and harvest.

Man has since his beginning been associated with wild animals, although more intimately in his early history than now, when he was dependent upon their flesh for food, their skins for clothing and shelter, their bones, teeth, antlers and sinews for tools, weapons and ornaments. In early civilization it was from this source that he derived his domestic animals; first the dog as an aid in hunting; later, goats, sheep, cattle, the ass, the camel, swine, the horse and poultry. Some of these provided materials for clothing and shelter, such as skins, hair and wool: or foods such as meat, milk, butter, cheese and eggs. Some served as beasts of burden, transport and war; and each of them provided additional materials utilized in the manufacturing of such essentials as waterbags, bowstrings, quivers, feathers for arrows, cordage and thread, tools, ornaments and even media of exchange.

In addition to the debt man owes wild animals for these very practical aids to his survival and development as a civilized creature, it is well for him to remember his ancestral relations in this connection and to keep in mind that wild animals constitute the very roots of his being, the source of his beginnings and as such are due some consideration, if not respect, as remote relations.

Today's Six Values

Man is still making much use of wholly wild animals and profiting to a very large extent from the services they perform, although most people are in large part, if not totally, unaware of these uses and services. All of these beneficial uses and services constitute the positive values possessed by wildlife and may be listed as six values: Commercial, recreational, biological, esthetic, scientific and social.

Commercial values include the income derived from the sale of wild animals or their products or from direct and controlled use of wild animals and their progeny. The best example of this type of value is provided by the commercial fisheries and all their products, such as food for human consumption, livestock foods, fertilizers, oils. pharmaceuticals, pearls and literally scores of by-products used in the manufacturing of paints, varnishes, glues, leather dressings, printing inks, soaps, explosives, fabrics and lubricants, as well as buttons, costume jewelry and numerous articles of wearing apparel and accessories.

Other examples are wild-caught furs and fur and game farming to the extent that these latter two are based on wildreared stock. The annual retail sales of products derived from these sources is well in excess of \$2 billion and their harvesting, processing, wholesaling and retailing provide employment for thousands of people, to say nothing of the employment provided in supplying and subsidiary industries.

Recreational values are usually measured in terms of money expended in the pursuit of wildlife in connection with sports and hobbies such as hunting, fishing, hiking, touring, camping (to the extent that these last three are based on the attracting properties of wildlife), non-scientific and non-commercial collecting and wildlife photography. They, therefore, include sums spent for equipment, supplies, wearing apparel, license fees, transportation, provisions, board and lodging, hunting dogs, guide services and all other items required in connection with such sports and hobbies.

This is, however, actually only the measure of the worth of the wildlife resource as the economic basis for the industries and businesses catering to those who make purchases for the recreational use of wildlife. It is just another aspect of commercial values and is in nowise a measure of the true value of wildlife as a recreational asset providing as it does wholesome outdoor activities.

by Ralph T. King, Professor Emeritus, State University College of Forestry at Syracuse University

absorbing interests, a sense of adventure, engrossing hobbies and renewed physical and mental health and vigor.

The fact is, these truly recreational values are intangibles and not amenable to measurement in terms of dollars. It is true, however, that sums so expended make up a considerable part of the income in some cases, and the entire income in many cases, of industries, businesses, communities and individuals, thus contributing significantly to the national income. On the basis of the most reliable figures, the addition to the national income annually from expenditures made by hunters and fishermen alone exceeds \$1.75 billion.

It is quite probable that an equal amount is spent each year in connection with the recreational use of wildlife by those who neither hunt nor fish, although there are as yet no reliable figures available to substantiate such a claim. Another significant fact is that much of this income accrues to small businesses or is spent in small and poorer communities, thus making it even more important in the national economy.

Biological values include the worth of all the services rendered to man by wild animals. Unfortunately, they either are not obvious or so very obvious and taken so much for granted that they are not appreciated. It is impossible as yet to measure or express them in monetary terms, but they nevertheless are very real and very important-perhaps the most important of all wildlife values. Examples are pollination, reduction of losses from harmful insects, rodents and other injurious species; soil formation and enrichment; water conservation; sanitation: culling; suppression of diseases: recovery and conversion of materials not otherwise practically recoverable and utilizable. Pollination requires no explanation except to point out that it is not the exclusive perogative of insects. Other kinds of animals serve in this capacity also, especially birds and some kinds of molluses such as slugs and snails.

Insofar as harmful insects, rodents and other injurious species are concerned. it is true that their natural enemies do not exercise complete control. Because of their diversified feeding habits, predators never eliminate their prey. When one kind of prey has been reduced to the point where it is difficult to find, they transfer their feeding activities to a more numerous and easier to find species. Their predatory habits, however, do keep prey populations to much lower levels than would otherwise be the case. In the absence of the predators man would either suffer increased losses or be put to the additional expense

of increasing artificial controls with all their attendant evils,

Anyone, who has had the experience of growing domesticated plants whether in connection with farming or gardening, knows that provisions must be made for maintaining a soil satisfactory in both physical and chemical make-up, The processes of cultivation and fertilization are necessary to counteract soil compaction and allow for the penetration of air and the percolation of water to the plant roots; to provide for the incorporation of humus; and to maintain a sufficient supply of plant nutrients. Without these provisions there would be little hope of growing much in the way of crops, and so man has devised many kinds of machines and devotes much labor to maintaining satisfactory soll tilth and fertility.

Wild plants such as forest trees, range forage and other natural growth are also dependent on the same soil conditions. But the way they grow and economic considerations make it impractical-in most cases actually impossible -to use the machines and the methods employed by the farmer and the gardener and the orchardist. How, then, are these essentials for plant growth provided in the case of wild plants? Through the agency of wild animals whose activities result in loosening, churning, and mixing the soil, bringing subsoil with its accumulated plant nutrients from the lower levels to the surface, and the incorporation of humus and the addition of fertilizing elements. Their combined activities accomplish exactly the same things in the way of cultivation and fertilization for wild plants that man's activities accomplish for domesticated plants.

It is commonly recognized that animals are dependent upon plants: it is not so commonly appreciated that plants are in their turn equally dependent upon animals. This is just one of the many examples of this interdependence.

To the extent that the processes mentioned above result in maintaining the porosity and penetrability of the soil and incorporation of humus, they enhance water conservation by retarding its runoff and providing for its retention in the upper layers of soil or its addition to the ground water supply. The activities of beavers in constructing dams and maintaining ponds also contribute in this respect.

The scavenging propensities of many species are important in maintaining sanitary conditions and esthetic appearances not only in isolated communities without benefit of public sanitation facilities, but also on our modern highspeed highways, along our recreationally im-



They should build a monument to the beaver

portant beaches and around our busy harbors and waterfronts. Here again, wild animals are performing a service without which man would suffer serious ill effects or be put to much additional expense in order to alleviate the condition.

The usually much-maligned predators serve to maintain the generally high genetic quality of wild populations through their culling effects, that is the early removal of the unfit and poorer quality individuals. Predators also aid in the suppression of diseases in wild populations. They hunt not as a matter of sport but because they are hungry and in need of something to eat. Usually their prey consists of those individuals easiest to catch, those whose reactions are just slightly less rapid than others of their kind. These are in many cases individuals whose responses are slowed by the effects of disease or parasitism and they are as a consequence removed from the population before their condition has run its course and resulted in the infection or infestation of numerous additional individuals.

Thus predators serve as the only natural agencies of isolation and quarrantine functioning in wild populations. Admittedly, there are two sides to the predation picture; there must inevitably be some losses of healthy wildlife and domestic livestock. But except under quite unusual circumstances these are never large and much more than counterbalanced by the beneficial aspects. A predator that has been feeding on destructive rodents 99 per cent of its time may one day swoop down and take a barnyard fowl or a healthy pheasant, but it isn't customary in this country to shoot the hired man when he comes in to lunch.

Wild animals for the most part subsist on food materials-browse, forage, wild fruits, nuts, seeds, plankton-which, even though useful to man, are often so sparsely distributed or so inaccessible that harvesting is impractical or physically impossible. Oftentimes they cannot be profitably utilized by domestic livestock. In many cases these non-utilizable (from man's point of view) but otherwise useful materials are recovered and converted by wild animals into harvestable and useful products. Small and widely dispersed quantities of food, often produced on so-called wastelands, are converted into flesh by the small organisms which are in turn used as food by valuable fur and game species. It might not be wise policy to remind one's lady friends that their prized fox skins and mink stoles were originally mice and frogs, but this is literally the case.

Certainly the most important example of this recovery and conversion by wild animals of materials not otherwise practically recoverable or utilizable in their present state or location takes us back for a moment to consideration of the commercial fisheries. Ever since the beginning of geologic history the soils of the earth have been through the processes of erosion and leaching losing chemical elements including those essential to plant and animal growth. These chemicals have for the most part accumulated in the oceans. Since the beginning of civilization, and more particularly since the beginning of industrialization, with their concommitants of sewage and waste disposal, these losses have been greatly augmented. Fortunately for the welfare of man this enormous quantity of rich "chemical soup" can through the process of photosynthesis and the presence of plant and animal plankton be drawn upon to replenish the nutrient materials lost from the land.

The plankton organisms convert the chemicals in the sea water into living substance, these small organisms are then eaten by somewhat larger organisms, and they in their turn by still larger ones until finally they become food for the commercial fishes which are returned to the land to supply these essential nutrients directly to man as food fishes or indirectly as livestock foods or even more indirectly as plant fertilizers to provide human food or food for livestock to be used as human food.

In some instances the entire process is accomplished by wild animals as in the case of the vast Chilean guano industry where enormous colonies of sea hirds catch the fish and even perform a part of the conversion process. It is possible that man's ingenuity will enable him eventually to recover these chemicals



People spend thousands of dollars each year pursuing wildlife, some with cameras, some with guns

from the ocean directly and economically, but for the present at least he is dependent upon fishes, a wholly wild resource, to perform this essential function.

Esthetic values are the values of objects and places possessing beauty, affording inspiration and opportunities for communion, contributing to the arts through music, poetry, literature, sculpture and painting and possessing historical and patriotic significance.

Regarding historical and patriotic significance, native species of wild animals in their natural surroundings are not different from sites or objects of physiographic, political, military and biographical interest. Some species of wild animals have played such an important role in our national development or entered to such an extent into our culture as a people that their consideration in this connection is amply justified. With no intention of being irreverant or unpatriotic isn't the same respect due the wild turkey that played such an important part in our Pilgrim Fathers' first Thanksgiving dinner as is due the rock upon which they supposedly landed?

Isn't the bald eagle, our national emblem, symbolizing as it does all our founders hoped for and all our country stands for, as deserving of preservation as are Mount Vernon and Monticello?

Isn't the beaver deserving of our everlasting gratitude and a permanent place in both our national memory and our country's fauna for the part it played in the early exploration, settlement and commerce of the continental United States? One American historian has gone so far as to say it "was the most important fact in American history."

There are few of us who do not retain

childhood memories of native animals ranging from the heroes of Uncle Remus' tales to their prototypes in Thornton Burgess' bedtime stories, to be added to but not displaced in the current generation by Walt Disney's better efforts. These have entered into America's folklore, they are a part of America's history and heritage and as deserving of consideration, respect and preservation as its other national shrines, monuments and memorials.

Although esthetic values are intangible and purely personal, they are nevertheless of vital concern to everyone spending any time in the out of doors and in addition, are the values that induce a



For every chicken, a hawk kills many harmful rodents

goodly number to become interested in the welfare of other natural resources and actively concerned in their conservation.

Scientific values are realized through the use of wild animals and associated widespread natural phenomena that may affect man's welfare either directly or indirectly. Examples are population behavior, diseases and their spread, varying virulence of pathogens, certain aspects of nutrition and reproduction, ecological relations, population dispersal, social organization, effects of stress induced by overcrowding, and so on. These values are of particular interest to the ecologist, ethnologist, pathologist, epidemiologist. demographer and sociologist and indirectly of value to all of us as we are benefitted by their investigations.

> Social values can be disposed of briefly, not because they are unimportant but because they are not different from the values already discussed except in the one respect that the benefits in this

case accrue to the community as a whole instead of to individuals. industries or businesses.

The difference between these values and those previously discussed will not be clear unless this distinction is kept in mind. The following examples will illustrate and perhaps clarify this point; Increased opportunity for wholesome and economical outdoor recreation, hobbies and adventure: utilization of leisure time: enhancement of interest in surroundings and required activities: increased real estate values; income from otherwise idle land; the offsetting of carrying charges incurred in other connections: creation of marketing possibilities for minor products; alleviation of monotony; improved physical and mental health.

Maintenance Costs

So far we have dealt with only positive values, but there is obviously an opposite side of the picture consisting of an equally imposing list of negative values. Due in part to space limitations and in part to that human perversity that so frequently makes us more familiar with the evil than the good. I am going to present a summary of negative values in the belief that it will suffice to both define and illustrate this category of values. It includes the value of property destroyed or damaged by wild animals and costs incurred in efforts to limit or reduce wild animal populations and prevent their access to or use of crops. stored products and structures. It includes losses to standing and stored crops on farms, forage and livestock on the range; standing, stored and manufactured timber and timber products; processed and stored foods, manufactured goods; damage to buildings, rightsof-way, dikes, levees, dams, irrigation and drainage ditches, terraces and other structures; losses from diseases harbored or transmitted by wild animals; costs of protecting, repelling, poisoning, trapping and other means of control; and harvesting costs.

In fairness, however, we must make some distinction between legitimate maintenance costs and negative values. In our daily living we do not ordinarily designate costs of operation, maintenance and repairs as negative values. We admit that these costs reduce profits, but we accept this fact, make allowances for it and consider ourselves fortunate to have those appliances and facilities that lighten our labors, provide us with the necessities for life and add to our comfort and pleasures. We do not discard our automobiles because their operation requires expenditures for gasoline, oil and repairs. We do not abandon our homes because we must pay for fuel. water, electricity, repairs and taxes. We realize that no good thing comes free of cost. When we apply these ideas of values to wildlife we must keep these distinctions in mind-the difference between normal allowable costs and losses incident to the use and enjoyment of the resource, and negative values-that is, excessive costs or losses due to abnormalities in or malfunctioning of the resource.

In concluding, I would like to paraphrase Professor Aldo Leopold: The objective of a wildlife conservation program is to retain for the average citizen the opportunity to see, hear, admire, enjoy and use and the challenge to understand the varied forms of wildlife living in his region. It implies not only that these forms he kept in existence, but that the greatest possible variety of them exist in each community. Wildlife management is, then, the art of making land produce sustained animal crops of wildlife in order that we (all the people) may realize the several values possessed by, and benefit from the many services performed by, this resource.

The admonition to "Be fruitful and multiply, and fill the earth and subdue it; and have dominion over the fish of the sea and over the birds of the air and over every living thing that moves upon the earth" (Gen. 1:28) implies not only use, enjoyment and control of the earth and its products, but understanding and appreciation and responsibility for these things as well,

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Pellets are dropped and cloud begins

New York's Drought vs. Quebec's Floods

by Julian Kane, Lecturer, Hofstra University and Earth Science Teacher, Garden City High School



Nine minutes later cloud emerges



The cloud belches up 19 minutes later

The artificial "thunderhead" in 38 minutes



HILE New York and the Northeastern States have been suffering the discomforts of a water shortage during the last few years, their Canadian neighbor to the north, the Province of Quebec, has experienced a 25 per cent precipitation increase in much of its territory.

This deluge, while not without major benefits, has not brought unqualified happiness to the citizens of Quebec. Instead, they have been seriously disturbed by the effects of increased rains and are convinced that cloud seeding activities over the past decade throughout the Province are largely responsible for their troubles. Periodic floods have washed out crops and eroded valuable leaving farmers with heavy soils. economic losses. In addition. continual overcast skies have curtailed tourist business and aroused fears of Ouebec mothers that their children would be growing up without the benefit of sufficient sunlight exposure. The ire of many Ouebec citizens has been aroused against the scientists and other individuals associated with the rain making activities. Mounting public pressure (in the form of a 60.000-signature petition, television and radio advertisements and unsigned letters to newspapers threatening harm to the cloud seeders) caused the Quebec government to step in last spring and enjoin all further cloud seeding activities. The Provincial government, which has paid out hundreds of thousands of dollars to farmers for crop damages caused by recent floods, is

careful to deny that the rain making activities were responsible for the increased inundation. Officials of Quebec's Bureau of Natural Resources claim that it was pure chance that the rainy decade occurred at the same time the cloud seeding was going on. The rain-weary citizens of Quebec, however, are not at all ready to accept this theory and feel that the government is merely trying to protect itself against future damage claims.

About ten years ago, the Laurentian Forest Protection Association (a private co-operative owned by Canadian pulp and paper companies concerned with forest fire prevention) and other groups who were interested in raising reservoir levels for hydroelectric purposes hired a private firm to perform cloud seeding operations in various sections throughout Quebec Province. This firm, the Weather Engineering Company of Dorval. Quebec, seeded clouds throughout the Province off and on during the past decade. During this period. there was as much as a 25 per cent increase in precipitation over much of the area; and also a net decrease in certain restricted areas of the Province.

The increased precipitation resulted in fewer forest fires and higher water levels in lakes and reservoirs. However, it also caused heavy flooding, soil erosion and washing out of seeds and crops in farmlands. In addition, the curtailed sunshine and general bad weather depressed tourist activities in the hinterlands and resulted in over 60,000 women signing a petition to halt cloud seeding so that

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This is a three-mile-wide hole in a supercooled cloud deck made by dropping CO, pellets. Air Force Cambridge Research Laboratories developed the technique with a "Cloudbuster" machine

their children could once again enjoy the benefits of normal periods of sunshine. In the face of mounting pressure from farmers, mothers, businessmen and just plain people who were tired of the prolonged periods of bad weather, the government decided to step into the matter.

Last May, the Quebec government issued a report, Silver Iodide Cloud Seeding by Aircraft in Western Quebec, Over 1959-1963, by Godson, Crozier. and Holland, which claimed that cloud seeding activities actually had a 5 per cent diminishing effect on local precipitation patterns. According to the government, the 25 per cent precipitation increase over the previous decade was the result of natural climatic changes which just happened to coincide with the cloud seeding done over that period. This report did little to placate the general public, and not everyone was satisfied as to its accuracy.

The government then ordered Weather Engineering to cease all rain making activities for the balance of the year. It is doubtful that cloud seeding will be resumed in the near future. This, of course, infuriated the Laurentian Forest Association and their allies who were quite happy over the precipitation increase. But here the matter rests in Canada for the present.

Cloud Seeding Techniques

Modern rain making efforts involve introduction of dry ice particles or silver iodide crystals into cumulus clouds containing an abundance of super-cooled water droplets. The droplets quickly freeze around the particles and effect two reactions: (1) The released latent heat enhances local updrafts so that large cumulo-nimbus thunderclouds develop as adiabatic cooling induces large amounts of sudden condensation. and (2) electric charges cause condensing cloud droplets to coalesce into large drops which then may fall as rain.



A type of cloud seeding generator

Success or failure often involves dropping the crystals into the right part of the right cloud at the right moment.

The General Electric Laboratories began experimenting in 1946 with cloud seeding as a means of inducing precipitation. (The American Indians. of course, were involved in primitive but scientifically correct rain making procedures at a much earlier date.) Since then, many private and public undertakings have been performed in the United States, Canada and Australia with varying degrees of success.

In many cases, cloud seeding activities have been hampered by a general reluctance on the part of public officials to tamper with natural phenomena. Law suits could evolve either from flood damage or from people in adjacent areas that remained parched and who might claim their drought was caused by the cloud seeding. In addition, early cloud seeding did not always produce the desired results. This has discouraged many potential users from trying it. The latest techniques, however, have been generally more successful. There is a new type of airplane-dropped silver iodide generator developed by Pierre St. Amand at the Naval Ordnance Test Station at China Lake, California which is much more effective than older models. Also, continued testing and experimentation has enabled cloud seeders to restrict their activities to more fruitful periods.

It seems odd that the Quebec region should have experienced an over-abundance of rain while New York and the Northeastern United States (which is south of and immediately adjacent to Quebec) should at the same time be in the throes of a severe drought. What is even more odd, however, is that so little has been done by American officials concerned with our diminishing water supply to check with their Canadian counterparts as to whether their cloud seeding techniques might be useful to increase rainfall on our watersheds. As one Canadian official pointed out to me last August: "One of the problems we have found in seeding clouds is that sometimes we get much more rain than we want." One wonders whether he would have felt that way if Quebec had just gone through a prolonged dry spell rather than a lengthy rainy period.

Certainly, cloud seeding should not be ruled out as a means of encouraging rainfall in parched areas despite its erratic performances in the past. It is admittedly still in the experimental stage, but the recent Canadian experiences are worthy of serious investigation by authorities in New York and the other Northeastern States affected by the current drought.

New York's Big Game Season* 1965-66

by Stuart Free, Senior Wildlife Biologist, N. Y. S. Conservation Department

HE 1965-66 New York big game season brought hunters a record buck and bear harvest. A successful party permit hunt, good weather, a three-week southern season, and a high deer population as a result of two preceding mild winters, all contributed to last fall's successful season.

The regular season deer take of 67,073 was New York's third highest and included a record harvest of 43,809 bucks. The previous buck take record was 41,367 set in 1957. Archers contributed 843 deer including 208 bucks; party permit hunters downed 23,631 deer including 1,002 adult bucks. In addition to this regular season take, 346 deer were harvested during two January post-season hunts; 277 from the Lordville area in Delaware County and 69 from the Seneca Army Depot in Seneca County.

Record Bear Take

A record of 648 bears were taken by hunters last fall, topping the previous record of 622 set in 1960. Adirondack hunters took 545 bears, exceeding the previous high take of 495 set in 1960. Fulton, Hamilton, Herkimer and Warren counties in the southern Adirondacks had record hear harvests. A higher than usual percentage of these bears were taken during the early part of the season, apparently as a result of good weather and abundant mast. A good beechnut crop in the southern Adirondacks caused bears to concentrate in beechnut stands where they were more easily spotted by watchful hunters.

The Catskill harvest of 89 bears was the fifth highest recorded with Sullivan County setting a new bear take record of 32, just exceeding the previous high of 31 in 1958. Only one bear was reported taken during the Catskill extended bear season(through December 15); this one from Delaware County.

The Allegany Region (Allegany, Cattaraugus and Chautauqua counties) take of 14 bears has been exceeded eight times in the past ten years. Allegany County had a record harvest of 7 bears, just exceeding the previous record of 6 in 1958. Chautauqua County was open to bear hunting for the first time since 1959 but hunters did not report taking any.

Adirondack Deer Take

Hunters in this Region harvested a

* Contribution of Pittman-Robertson Project W-89-R-10, record 17.819 whitetails. exceeding the previous high deer take of 15.690 in 1959. The buck take of 11,382 has been exceeded only in 1954 when special wilderness hunts were held and 12.176 bucks taken.

There were virtually no starvation losses during the past two mild winters and no heavy starvation losses for several preceding years. The bonus crops of deer surviving these winters have caused a population increase. This large population must be adequately harvested or excessive starvation losses will occur during the next moderate or severe winter. Part of this bonus crop of deer showed up in the last fall's harvest. The highest percentage (25.6) of yearling females in the adult female harvest and the second highest percentage (39) of yearling males in the adult male harvest were taken. These were deer that survived the 1964 gunning season and the 1964-65 winter as fawns. Mild winters enable deer to forage widely and secure abundant food, thus making it possible for a larger number of yearling bucks to grow legal antlers.

Antler size is a good index to the physical condition of deer and enables biologists to gain an indirect appraisal of range conditions. Yearling bucks taken on party permits with antlers less than three inches were recorded from six

ADIRONDACK REGION

	Ma	Males		Females		
County	Adults	Fawns	Adults	Fawns	Take	
Clinton	217	3	14	3	237	
Essex	1,018	91	364	85	1,558	
Franklin	1,632	155	625	147	2,559	
Fulton	174	2	1	2	179	
Hamilton	1,696	258	1,022	243	3,219	
Herkimer	1,043	137	543	129	1,852	
Jefferson	133	3	10	3	149	
Lewis	820	95	379	88	1,382	
Oneido	337	3	9	3	352	
Oswego	231	6	26	6	269	
St. Lawrence	2,859	296	1,189	279	4,623	
Saratoga	159	5	17	4	185	
Warren	506	31	126	30	693	
Washington	557	2	2	1	562	
Adirondack Totals	11,382	1,087	4,327	1,023	17,819	

CATSKILL REGION

	Ma	Males		Females		
County	Adults	Fawns	Adults	Fawns	Take	
Albany	362	2	2	2	368	
Columbia	1,082	77	199	73	1,431	
Delaware	3,289	350	925	329	4,893	
Dutchess	959	14	24	12	1,009	
Greene	958	5	6	5	974	
Orange	600	11	26	11	648	
Otsego	1,014	50	131	48	1,243	
Putnam	252	1	1	2	256	
Rensselaer	347	1	1	1	350	
Rockland.	33		-	-	33	
Schenectady	72		-		72	
Schoharie	786	9	1		789	
Sullivan	3,139	323	845	303	4.610	
Ulster	1,804	68	172	64	2,108	
Westchester	14	13	15	12	54	
Catskill Totals	14,711	916	2,348	863	18,838	



The hunter meets challenges in the Adirondacks

End of a bear hunt



Adirondack counties. These poor antlered bucks indicate poor range conditions, generally a result of overbrowsed wintering areas, and point out the need for increased harvests in many areas of the Adirondacks.

Catskill Deer Take

The deer harvest of 18.838 in the Catskills exceeded the previous year's take of 15,879 and included a buck harvest of 14,711 which topped the previous year's buck harvest of 11.095. Successful hunters in Delaware County took a record 3.289 adult bucks. The previous record was 3.019 in 1962.

Two mild winters and two years of reduced party permit hunting resulted in a herd increase in portions of this Region. The per cent of yearling males (73) and yearling females (34) for the central Catskills was among the highest ever recorded here and indicate the high survival of fawns during the 1961-65 winter.

Yearling bucks with antlers less thar three inches long were recorded from the portions of Delaware. Sullivan and Ulster counties open to party permit hunting. Food supplies in these central areas are still being overbrowsed on some winter ranges and others are still suffering from the severe overbrowsing of past years.

Central and Western Deer Take

Hunters in this Region took 30,416 deer, including a record buck harvest of 17,716 topping the previous high buck take of 16.321 in 1963. Even with party permit quotas purposely designed to reduce the deer herd size in portions of this Region, six counties set buck harvest records: Cattaraugus, Chemung, Livingston, Ontario, Steuben and Yates. Three of these counties-Chemung. Steuben and Yates- have annually set buck harvest records since 1963.

Annual antlerless deer harvests through party permit seasons are necessary in much of this Region to maintain a balance between deer herd size, deer range food supplies and man's uses of the land. The high reproductive rates of deer in this region results in a high annual fawn crop. Numbers of deer equal to this fawn crop must be removed each year in order to maintain a stable population. One hundred fawns from this Region produce 45 of their own fawns when one year old. while 100 adult females (2 years and older) produce 180 young every year. Reproductive rates from poor areas, such as the central Adirondacks, indicate few, if any, fawns breeding, and 100 adult females producing only 115 fawns. Population explosions will quickly occur in much of the Central and Western Region in the absence of antlerless harvests.

Three-week Southern Zone Season

The Southern Zone season, as set by law, opens on the third Monday in November and closes on the first Tuesday in December. Since the third Monday (1965) fell on November 15 and the first Tuesday on December 7, a 23-day season instead of the usual 16-day season was held last fall. A check of the calendar shows that extended seasons will also occur in 1971 and 1976.

While opening day hunting pressure seemed slightly heavier than that on a regular length season opening day, hunting pressure during the remainder of the three-week season was spread out and generally light. Hunting pressure the last week was especially light, even though hunters who hadn't filled out, had ample opportunity to hunt.



CENTRAL AND WESTERN REGION

	Mal	les	Fem	ales	
County	Adults	Fawns	Adults	Fawns	Take
Allegany	2,138	438	1,013	414	4,003
Broome	805	131	301	124	1,361
Cattaraugus	1,684	323	738	305	3,050
Cayuga	275	38	32	25	370
Chautavava.	992	166	378	157	1,693
Chemung	727	122	280	116	1,245
Chenango	896	13	24	12	945
Cortland	445	1	1	1	448
Erle	395	49	114	47	605
Genesee	253	40	91	38	422
Livingston	791	149	337	140	1,417
Madison	481	1	2	1	485
Monroe	166	16	37	16	235
Nigagra	78	8	18	8	112
Onondaga	225		1		226
Ontario	839	186	426	175	1.626
Orleans	143	31	70	30	274
Schuvler	614	180	412	169	1.375
Senera	178	12	13	12	215
Steuben	3.033	705	527	668	6.033
Tiogo	853	188	430	178	1.649
Tompkins	508	9	13	9	539
Wayne	144	16	38	16	214
Wyoming	498	88	204	83	873
Yates	555	105	241	100	1,001
Central and Western Totals	17,716	3,015	6,841	2,844	30,146
Statewide Totals	43,809	5,018	13,516	4,730	67,073

POST-SEASON DEER TAKE

Area-County		Males		Female		*
		Aduits	Fawns	Adults	Fawns	Take
Lordville-Delaware Seneca Army Depot-Seneca	1	10 27	76 5	131	59 15	277
	-					
Post-season Totals	1	37	81	153	74	346

Party Permit Harvest

Six years of experience with the party permit system of hunting has given sportsmen an insight into the effects of sound deer management. This system has resulted in adequate deer harvests in much of the Catskills and Central and Western Region. Party permit seasons in future years for these regions will be designed to reduce the herd in small portions of both and to stabilize herd size in large portions of both. Party permit harvests in the Adirondacks have been a step in the right direction but harvests must be increased to bring herds in balance with winter ranges and permit the recovery of overbrowsed foods. In some areas where winter food supplies are adequate, particularly the large Moose River Plains wintering area, special quotas are needed to prevent population build-ups that will cause overbrowsing and eventual starvation.

Of the party permits available last fall, 97 per cent were issued. Permit holder success varied from deer being taken on 51 per cent of the permits issued for the Adirondacks, to 55 per cent for the Catskills and 65 per cent for the Central and Western Region. Success within areas varied from a low of 39 per cent in Area E (portions of Delaware, Sullivan and Orange counties) to a high of 75 per cent in Area N (portions of Lewis, Jefferson and Oswego counties).

The tools for good deer harvests in New York are available: (1) Party permit harvests with flexibility as to areas, quotas and party size. (2) Regular season buck harvests. (3) Post-season hunts. The intelligent use of these tools by game managers and the support of sound deer management programs by the public will ensure the best possible conservation of our whitetail resource.

Hunting Safety-1965

by Bryan E. Burgin, Supervisor of Hunter Training, N.Y.S. Conservation Department

Dr. Paul Cramer of St. Joseph's Hospital, Syracuse, instructs School of Nursing freshmen in firearms

Manner of Accidents

How Injured	1962	1963	1964	1965
Self-Inflicted	26	56	42	48
Shot by				
Companion	64	82	72	100
Shot by Known				
Hunter but not	1			
Companion	0	0	0	
Shot by Unknow	n			
Hunter	12	9	10	9
* Unknown				

Causes of Accidents

Causes	1962	1963	1964	1965
In line of fire	27	26	38	44
Corelessness	36	24	10	8
Ricocheting	9	16	9	18
Mistaken				
for Game	8	15	6	10
Loading or				
Unloading Gun	3	0	6	0
Falling or				
Tripping	11	21	16	27
Gun Falling	4	6	4	3
Crossing Fence,				
Loaded Gun	1	3	0	3
Loaded Gun				
in Car	1	2	2	1
Clogged Gun	0	7	4	0
Other &				
Unknown	20	27	29	43



UNTING accidents in New York State increased in 1965 over the previous year in spite of the best efforts of the volunteer Hunter Safety Instructors who trained more than 73,000 new hunters. Again, one-third of the accidents were self-inflicted. This is bad enough, but even worse is the number of accidental shooting by hunting companions. It emphasizes the need for all hunters to be

Accidents Re Game Hunted

Game Hunted	1962	1963	1964	1965
Big Game	15	12	9	18
Small Game	56	88	60	77
Other &				
Unknown	31	47	55	62

Hunting Accident Summary

Year	Fatal	Non-Fatal	Total	Licensees	Accident to License
1959	15	122	137	895,017	1:6.630
1960	15	128	143	924,231	1:6,463
1961	17	123	140	972,640	1:6,948
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	(Records	Not Complete)

STATE OF NEW YORK, CONSERVATION DEPARTMENT

continuously aware of the location of the members of their party.

Letters received from landowners often complain about hunter behavior. They suggest something be done. The "NRA Hunter Training Instructor's Guide" places emphasis on courtesy afield, landowner-hunter relations, and other responsibilities of hunters including property damage. It is stressed in New York's training course, and it is encouraging to note that a few landowners have commented on the courtesy shown by young, trained hunters.

Hunter Safety Training is growing on an international scale. More than 40 states and several Canadian provinces have some type of an official program, with training given by volunteer instructors. The courses run from a minimum of four hours to as long as 22 hours in Alberta, Canada.

Such a diversity of laws and training could lead to complications for the hunter who pursues his sport in several states and provinces. Accordingly, safety officers meet annually to discuss mutual problems. One of the first objectives is to develop reciprocal agreements among all states and provinces recognizing the training and certification of hunters by any other state or province.

New York instructors may well be proud that the hunter safety training program which they pioneered in 1949 has become so successful, and so widely adopted.



Secrets of the Spider

by Prof. David B. Peakall, State University College of Medicine, Upstate Medical Center, Syracuse A Scotch King Learned Persistence From It But Scientists Are Getting Clues To The Building Blocks Of Life From The Web

A S the first peep of light heralds the end of the summer night, the orbweb building spiders start the construction of their food-catching snare. The use of a trap to catch prey is almost completely limited to the spiders; it is interesting to note that none of the mammals or other higher animals construct snares for their prey-with the exception of man.

The white-crossed, orb-web spider, Araneus diadematus is shown in the photograph of Dr. Peter N. Witt and its internal anatomy in the drawing by H. Wayne Trimm. The drawing is a composite one made from a series of microphotographs of sections. No single section could show all the organs that are seen in the drawing since they are not all in the same plane.

This spider has five sets of silk glands, each having a specific function. The main threads of the web are anchored by a mass of fine threads called attachment

ANATOMY OF A SPIDER



discs. These are formed by the numerous. small aciniform glands. The web is started by the laying down of foundation threads. This may be done by crawling with the silk held clear of obstacles by one of its fourth legs or it may be floated across a space by the breeze. After the foundation lines are completed the radii are added; at the completion of the radii, a temporary spiral is laid down. The temporary spiral, consisting of some half dozen turns, is used to hold the web in place until the final spiral is laid down. All the material for the foundation, radii and temporary spiral are provided by the large ampullate glands which are shown in orange in the drawing. This has been demonstrated by examination of the chemical composition of the web at this stage and by sectioning of the spider and examinations to determine which glands were emptied. The sticky spiral is now laid down and this material comes from the aggregate glands.

During the course of laying down the sticky spiral, the temporary spiral is removed and eaten. The spider then goes to the center of the web and awaits its victim. When the prey hits the web it is caught, temporarily, by the sticky spiral. The spider rushes out and immobilizes the prey by poison and immediately swaths or wraps its victim in a vast number of fine threads. This material is produced from the small pyriform glands which have hundreds of fine spinning tubes to rapidly produce a sheet of silk with which to wrap the prev.

In the process of construction of the web and of catching the prev, four different silks produced by four different sets of silk glands have been called into play. The spider. Araneus diadematus. has five sets of silk glands; the one set not already mentioned are the cylindrical glands, which make the silk for the egg cocoon. Two other types of silk glands are known, although neither is present in our spider. These are the cribellum glands and the lobed glands. The cribellum consists of a sieve-like plate and threads issuing from the spinning tubes are exceeding fine. These threads are used in the formation of the looped bands which are a characteristic feature of the webs of spiders that possess a cribellum.

The lobed glands are found only in one family, the *Theriddiidae*. This family includes one of the commonest of all house spiders. Besides the lobed glands these species also have a comb of stiff hairs on the fourth legs. This comb is used by the spider to throw out ribbons of silk from the lobed glands to catch its prey. In these spiders, the aciniform glands those used to swath prey—are reduced in number or are absent altogether.

The above description of web formation and prey capture applies to francus and among the 40,000 species of spider in the world there are many variations of the types of web built and indeed many that do not build webs at all. Araneus sits, or better hangs, in the center of the web, Zilla, however has a signal thread which goes from the center of the web to the spider's retreat outside the web. The triangular web of the tiny Hyptiotes is remarkable. This web can be thought of as three sectors of an orb-web with a silk thread attached to the apex. The spider holds this thread and when an insect flies into the web it releases the thread and the web wraps itself around the fly. One may spare a thought for the muscles of the spider which enable it to hold the web in position for hours on end.

Spiders have evolved in such a way that they are completely dependent on silk, or to look at it another way, they have evolved silks that can serve a variety of purposes. It is a matter of speculation as to the course of this evolution. It is generally considered that the earliest spiders used silk merely for wrapping eggs and that other uses evolved gradually from this. The orb-web builders are considered by most workers to show the highest evolution of the use of silk.



The spiders are in the class of animals called Arachnida, which also includes the scorpions and mites. Although insects and spiders are both included in the phylum Arthropoda, the spiders are more closely related to the lobster and crab than to insects. The spiders, unlike insects, have only two major body compartments, the cephalothorax and the abdomen. The cephalothorax contains the central nervous system, the eyes, legs and poison glands. The abdomen contains the heart, lungs, and silk glands. The digestive system is found in both segments and is of some interest. Most of the digestion of the spider's food does not take place inside the spider but inside the fly. The spider injects digestive enzymes into its victim and then, after the contents of the body have become liquid, the spider sucks them up. This is accomplished by means of a sucking stomach; this is not a stomach in the true sense of the word but rather a pump.

The pre-digested material then passes into the abdomen via the narrow pedicel and thus into the area where most of the absorption from the intestine takes place. The branched tubes of the intestine occupy almost the whole of the upper and hind parts of the abdomen. This extensive area (shown in yellow in the diagram) acts not merely as a digestive organ but also as a food reservoir. The hindmost part of the intestine is for storage of fecal material.

The circulation of blood in spiders is also very different from that in mammals. In mammals there are two independent streams of blood; oxygen-carrying blood going to all the tissues and on the return circuit blood going to the lungs to receive oxygen. In spiders there is but one circuit of blood and even that is incomplete. The heart is simple, without division into chambers, the arteries are few and there are no capillaries to the various organs. In fact, the organs of the body are suspended more or less freely in a bath of blood.

The reason for referring to the lungs of spiders as book lungs is clear from the illustration. The sacs are filled with air via the lung slit. The blood passes from the body into the center of the leaves of the book-lungs and respiration takes places through the walls of the leaves. The oxygenated blood is then pumped through the pulmonary veins to a thinwalled sac that surrounds the heart.

The number of eyes of the spider ranges up to eight, but most including our species, have eight. These eyes are simple, not compound as are the eyes of insects. Despite having eight eyes the spider does not place much reliance on the sense of sight; touch is much more important. If a tuning fork is brought into contact with a web the spider rushes out exactly as it does for a fly and does not return to its waiting position in the center of the web until after it has touched the tuning fork.

At the Upstate Medical Center of the State University of New York at Syracuse two major lines of research involving spiders are underway. Dr. Witt is working on the effects of drugs on the web pattern of spiders and the author is working on the regulation of protein synthesis in the silk glands of the spider. The web of a spider is a record of a complex operation carried out by the spider. Such an operation is dependent on the interplay of physical and physiological conditions. The amount of available thread, weight of the spider and the length of its legs, and those parts of the brain that regulates movement and measurement are all involved. Dr. Witt has examined the effects of drugs, of missing legs and of lesions in the central nervous system on the web pattern. By spraying the web with paint and photographing it, it is possible to obtain a permanent record, Measurement of the size and regularity of the pattern are made and recently comparisons have been aided by the use of a computer.

My own work has been largely confined to the regulation of production of silk in the ampullate gland. The rate of making new protein has been measured by determining the amount of radioactive amino acids taken up. The silk glands can be removed from the spider and they continue to make silk under artificial conditions. Thus it is possible to carry out experiments that would not he possible otherwise. Work so far has shown that the rate of production of silk can be regulated both by the amount of silk present in the gland and by the central nervous system. Since the mechanism of protein synthesis is similar throughout the animal kingdom the information obtained about this simple organ may have wider applications.

Proteins are one of the most important classes of naturally occurring compounds. They range from structural molecules such as collegan and silk fibroin to hemoglobin which is responsible for oxygen transport in the hody and insulin which controls the blood sugar levels, Most metabolic pathways of the body are controlled by protein molecules called enzymes. Proteins are formed by the assembly, in a precise order and number. of amino acids. There are twenty different amino acids, or basic building blocks, and since proteins often consist of hundreds of amino acids joined together the number of different proteins possible is enormous. How the cell tackles this immense problem of making hundreds of different proteins, each of an exact sequence of amino acids, is a problem that has received a lot of attention lately. It has been found that the information to carry out this task is coded into the genetic material and a copy of this code forms a template on which the actual protein is made.

In short, we have found that the spider is a valuable research animal as well as being a fascinating creature in its own right.

Whither A Drop Of Water?

by Paul C. Lemon, Professor and Chairman, Department of Biological Sciences, State University of New York at Albany

I N Glacier National Park there is a mountain called Triple-Divide Peak. The name comes from the supposition that a drop of water, if it hits there at a precise point, divides into droplets, one going to the Pacific Ocean, one to the Atlantic watershed (through the Mississippi River), and yet another third for the Arctic Ocean. We can't prove all this, nor our present example, but let us try to follow a drop which might plank down, say, in the Adirondacks (and remembering that it comes from the sky, and goes back there, in time).

What scientists call a condensation nucleus forms the center about which a drop of water forms. It can only do so when (1) a suitable surface is presented. and (2) if there is an excess of gaseous water vapor present in the atmosphere. These extremely minute nuclei are provided in nature by several possible sources such as microscopic clay, dust, smoke or bits of crystalline salt blowing from the oceans. Thus, the atmosphere consists of a grand mixture of working materials including microscopic solids plus a complex gas mixture. Water vapor is one of the gaseous components and is invisible. Fog. mist or clouds are made of small droplets of liquid water and may not be termed vapor, if we speak discreetly.

A Sample Raindrop: How It Falls

Further, when small droplets of water form they will not fall to earth until they get larger (from 1/1000th to 1/10th inch in diameter). As they grow by adding condensed water vapor they fall at a clearly calculable rate. The mathematician computes the speed of a raindrop to be about 30 miles per hour under usual conditions. During its fall a sample raindrop might: (1) Evaporate and disappear, or get so small it stops, (2) Grow larger, if it collides with mist or condenses more water, and it will ordinarily speed up. (3) Freeze to sleet or hail; if the air is very cold snow crystals often form.

Incidentally, we can correct one common misconception about the shape of a typical raindrop, falling at terminal velocity.

The Shapes of Water

They are not tear-shaped: but rather are kidney-shaped: The old tear drop form was once a model for stream-lined A Biologist Traces Out The Full Cycle Of Water And Tells What It Means To Man, Plant And Animal



Raindrop hits surface of water

automobiles. Remember? In addition to this note on raindrop shapes, perhaps it is of interest to explain the shapes of snowflakes or hail. These are amazing illustrations of scientific problems yet mainly unsolved. Snowcrystals, for example, are "normally" built on a plan of six-sided symmetry. Just imagine a pattern, then reproduce it, kaleidoscopewise, six times; then you have a snow crystal. Scramble a bunch of them together and you will have a snowflake. They interlock so well that it is easy to visualize forming a loose aggregation into a snowflake. Now for hailstones. Picture a frozen raindrop about one-eighth inch in diameter; let it be falling. Suddenly it comes into a violent updraft. The aerodynamics are such that it is blown back *upwards*. As the vertical wind lessens, it begins to fall again. Let us say it falls through more mist and grows a layer of new ice on the surface. It falls, being larger, but at the same speed, and in time finds a new updraft. If the speed of descent is in the ratio 1:1 with the updraft, it will stop and then start upwards again! Replay this record up to possibly four or five times and you could get hailstones

From the digital collections of the New York State Library.



one to three inches in diameter and weighing nearly a pound. Dodge it, if you take my advice.

The previous comments refer to only three "hydrometeors." The translation is: Falling objects composed of water. There are actually at least a dozen forms of precipitation and professional meteorologists may recognize a few more. The diagram shows what could be formed by a single. if ideal, winter warm front. Most storms travel too fast or have a frontal plane too irregular to give us all these forms.

Rain on the Forest

Eventually, let us now assume that a "drop" of water, in whatever form, has fallen in a forest. It strikes the leaves and branches, which can cover as much as 80 to 90 per cent of a wooded area. Test this, if you like, by looking upward at the blue sky some fine mid-summer day. The surface area of tree leaves, twigs and branches is enormous and most of this. at least the upper surface, must be quite wet before much rain can reach the ground. You recall that people or animals run under a tree early in a storm, but not later, As drops strike foliage they break into smaller droplets which can evaporate, or continue to fall. When this water layer is adequate it

begins to run and will drip, or keep running down the branches and trunk. While idly looking out my window recently. I saw a little drip hollow in the yard under our revered apple tree. Seeking an explanation. I saw the water flowing along the under sides of twigs. leading to branches, to limbs, to a bump caused by my pruning. The bump made a jumping off place for a stream of drops. Near the trunk itself still another puddle of water formed. Of course, we have a completely different problem when the leaves are fully displayed and intercept even more water. Wet leaves provide an enormous surface from which evaporation occurs as vapor re-enters the atmosphere instead of coming to the ground at all.

In an extended rain, water runs to the ground, passing over vegetation or any other objects extending upwards. And part of the rain falls directly on the land between the various objects. In agricultural fields or other bare ground, it strikes the soil surface, often bouncing back up again. Broken drops make smaller droplets. As before, this process is another point at which evaporation will allow vapor to re-enter the atmosphere. In the course of my work I have taken relative humidity readings thousands of times but one seldom reads as high as 95 per cent or 100 per cent, even in a light rain or drizzle. Whenever the value is less than 100 per cent the air can take more moisture from a free water surface. Strictly speaking, evaporation even occurs at 100 per cent relative humidity but condensation is at an equal rate.

Detritus is A-O.K.

Where there is natural vegetation or crop residue, there is much organic matter on the surface. Soil scientists (agronomists and pedologists) refer to "Aoo and Ao" layers of detritus. These terms are A-okay with me and can easily be defined. $A_{\sigma\sigma}$ is undecayed leaf or stem fragments lying visibly on the surface and A₀ is just a bit lower down, decomposed beyond recognition, though mainly organic material. Under this there is normally mineral soil, silt, fine sand and other bits of non-organic stuff. The litter and humus of the upper levels is a good blotter which can catch and hold much water, with little splashing. If there is only a light or brief rain moisture is soon returned to the atmosphere. It may cool the air and at least conserve water content in plants and the soil. The "blotter" of surface litter is an excellent protective mantle which keeps the soil safe from erosion. A substantial



rain storm wets objects above the ground, A_{oo} and A_0 and, at long last, permits water to percolate into the soil and sub-soil. Movement downward is principally gravitational flow through worm burrows, channels left by decayed toots, and other large pores and spaces.

How Store Water?

There has been a good deal of discussion of what is the best way to store water for later use. Are cool forests, pastures, ponds or large reservoirs best for "catchment," as the British term it? Seepage, another term for simple "leakage." might be a worry. Evaporation, however, is our greatest problem. It may



APPROXIMATELY THREE QUARTERS OF THE EARTH'S SURFACE IS WATER

sound fantastic that a lake surface does not lose nearly as much water vapor as a hirch-beech-maple forest. A lake surface is. in a sense, the minimum area of exposure. Contrarily, a forest with its myriads of leaves presents an enormous area for water loss (transpiration).

Yet it is often proven that soils may be best conserved by allowing free development of natural communities. The orderly processes of ecological succession lead to a type of land cover that arrests soil movement and gives a welldamped or uniform flow of water from springs, streams or wells. Excessive flash runoff or stream siltation commonly results from too-intensive cropping or poor agricultural practices. The water vield from abused land is too erratic and too beclouded by suspended soil particles to be of greatest service to man. A great many trained ecologists and experienced land managers have a strong faith in the rightness of naturally developed communities or vegetation types. We tend to believe that the master hand of climate leads to an effective collection of suitable plants and animals, all knitted together in a great water-accumulating and water-conserving ecosystem. In short, the natural way is the safe way of guaranteeing good water catchment with release spread over all months of the year.

The Engineering Approach

On the other hand, there is a school of thought which stresses the engineering approach to water catchment. These worthy people feel that the ideal would be to collect rain in a vast watershed as rapidly as possible. To them a good surface would not be a multi-layered blotter (like natural soil and sub-soil) but a paved slope like a roof, with its eave troughs and cistern. True, we ought to avoid washing the land but we ought to promptly collect water and lead it to a tank (reservoir). Once safely impounded in large volume and with minimum surface exposure, it can be let out through a gate and spillway as needed.

In this kind of a scheme the rapid consumption of water by trees and other vegetation is largely avoided. Only surface evaporation is a serious loss and we now have cleverly devised films, one

(Continued on page 26)



(Continued from page 23)

molecule thick, that virtually halt evaporation. Examples of these chemical films are hexadecanol, octadecanol or cetyl and stearyl alcohols. These are fairly cheap and effective except in areas where strong winds produce rough waves and surface drift. Of course, there must be appropriate awareness of: (1) When the rains come. (2) Magnitude of individual storms in the area above the dam. (3) Distribution of rain and snow (and frequency of "January thaw"). (4) Capacity of reservoir (in ratio to outflow desired). (5) Timing of the water needs at the spillway.

Such a system usually requires either a large earth-moving job or considerable concrete construction in the dam and its appurtenances. Labor and machinery being as they are, this costs money. Multiple services such as irrigation or city water, power generation, navigation and recreation can often bear the expense and return a net profit. Our most famous example in the world is the Tennessee Valley Authority, It conserves water, produces wood and products from agricultural irrigation, develops nitrate fertilizers, creates great supplies of electricity for industrial and domestic use and is a desirable recreational area. It has an excellent chance of repaying every dollar invested, and probably has done so already. Even the nature-lover must accept the engineer's success where this approach has proved wise.

Back to Nature-or to Books

Our policies must be such that we select appropriate techniques for each specific situation. Let us not hastily adopt a strict "back to nature" plan nor merrily consign our futures to the textbook decisions of a bunch of bright-eyed engineers. If we are learning some lessons in the latter 20th Century, one should be that the world and its people are indeed complex. Specialists do not know all of the answers. In fact, hardly anybody does! Fundamentally, we are divided into specialists and generalists and we have to contend with two frightening extremes. The specialist sees too little to really understand, and the generalist knows not quite enough to properly evaluate a highly complex problem in resource management. Historically, both patterns of thought have been known to err. in particular circumstances. But do not you and I? We need both approaches, and must take a reasonable gamble with either one though occasionally we enjoy a measure of election or some chance to make limited experiments.

It is surely clear that the conservative course of action is to employ a natural or ecologically more predictable pattern of land management. It happens that this is also the more economical decision, in most instances. Water is effectively caught, stored and gradually released in areas which support at least an approximation of the original vegetational cover. Though sometimes a little hard to completely prove. natural biotic communities appear to make maximum use of radiant energy received and also tend toward a soil which is fully developed and water-conserving in its performance.



Actual raindrop shapes: not tear shaped

Once water is in the soil its movements and characteristics are interesting to follow. In humid climates where annual evaporation rate is less than the annual rainfall, water movement occurs essentially by run-off or leaching downward and out through springs. Such action is much like a percolator in that the soil tends to be washed by water infiltrating downward and dissolving many of the natural salts. Soils of this sort are not among our most fertile because the washing process, over long periods of time, removes some of the desirable elements of fertility, New York has this sort of condition in its mountainous areas and particularly where there is coniferous or mixed forest. We do not think of these areas as primarily agricultural.

In the Western, and particularly, Southwestern part of the United States we have a different movement of surplus soil water. There is sometimes surface erosion during sharp thundershowers but even if the soil receives most of the rainfall it may quickly move downwards carrying soluble materials. This water, actually a solution, may later move upwards through the soil during long periods between rains. This is called capillary rise and is comparable to the way a lamp wick takes up its fuel. As the solution approaches the soil surface it becomes more and more concentrated as water evaporates into dry air spaces



Water flowing over impermeable rock stratum

in the upper soil. Finally, the concentration is so great that it deposits solid materials in the soil layers and tends to make something like a sub-surface layer of cement. Such a layer, called hardpan, can be quite undesirable when it occurs in agricultural soils. Hardpan prevents free movement of soil moisture either up or down and limits root growth



freezes on Thruway near Indian Castle

to much too shallow a soil volume. Expensive mechanical methods are sometimes necessary to break up hardpan, if intensive farming is to be practiced on the land.

The upper conformation of the water table is another interesting soil phenomenon. We are inclined to speak of water table as if it were horizontal, flat and regular. This comes from our being over-impressed with the old remark "water seeks its level." Actually, the water table is an undulating surface which follows, approximately, the contours of the land. In order to understand the high points of the water table one must master the whole problem of detailed soil structure. Especially, the particle size, and relation of different particle sizes to each other, determines the configuration of an irregular "water table." Another way to state this is to say that if the pores and minute channels through the soil are very small in diameter then water movement will be retarded and soil water patterns cannot achieve the level plane we might otherwise expect. Close study of the centerfold painting will show a number of these examples in diagrammatic form. One of the most interesting cases is what is called a perched water table and the photograph shows this vividly as its outflow has frozen in winter time. Another example is illustrated in the large painting. Springs and seeps along small streams are illustrations of points at which the water table actually reaches the surface of the ground and there discharges water. Springs and brooks feed into a larger stream and thereby keep its flow fairly steady. Notice also what happens to the water table at the site of a pump. as shown in the lower right hand corner of the painting. An inverted cone is the result of regular removal of water by means of frequent pumping.

What Percolates-and Where

Percolation of drops of water through the soil are principally downward and, in fact, flow of water below the water table is either downward or at least at an angle which is partly directed downward. Gravity is the compelling force which causes flow of water in these particular ways. But scientists refer to another type of movement of soil moisture as capillary action. This differs sharply from that which has just been described in that capillary movement of water may be downwards, upwards or in lateral fashion depending upon the details of the situation.

Capillary movement is "wetting" and is caused by a free excess of water at a point adjoining a water deficient region, the two regions connected by wicklike fine structure of the soil. Creation of a dry region can be by evaporation into the atmosphere, or into soil spaces or it may result from the action of plant roots. In either, the deficiency and the connecting wick cause movement of soil moisture. It is not as rapid as gravitational movements and, therefore, the volume of water which could move by capillarity is limited. In irrigation practices water is distributed through the soil by both methods—gravitation or capillarity. While capillary action has great importance in connection with the



Some shapes of water

growth of crops or natural vegetation, it has very little to do with flow of water from springs, streams or wells. In other words, our domestic water comes almost entirely from gravitational water.

Thirsty Plants

The amount of water used by vegetation is extremely important depending upon how the land is used. Plants, such as corn or cotton, developed in the humid. semi-tropical areas, are very expensive of water and have recently been called phreatophytes. An example is rice which must grow in soil completely saturated with water. Thus, there is rapid evaporation from both the soil and transpiration through foliage of the plants. In native vegetation, a rich deciduous or broadleafed forest is an example of a high moisture-demanding type of vegetation. While soil evaporation may be reasonable, the loss through tens of thousands of leaves is extremely high. Either a deciduous forest or a welldeveloped deciduous-coniferous mixture puts more moisture back into the atmosphere than a free water surface such as a pond or lake.

On the other hand, a pasture, more especially a native grassland, is quite economical of water, Losses from transpiration and soil surface drying are lumped together under the term evapotranspiration. Maps of the comparative evapotranspiration rates in different parts of the United States have been attempted but data are not abundant. However, we are presenting a generalized map which gives a number of wavy lines labelled with percentages. These lines indicate the approximate ratio between precipitation and the potential

evaporation rate in various parts of the United States. In the State of New York the percentage ratings vary from about 100 per cent to a little over 150 per cent. Values of exactly 100 per cent suggest that rainfall rate is matched by an equal evaporation rate during the growing season. That is, along the 100 per cent line we normally expect to have as much rain during the frost-free period of the year as the theoretical evaporation rate in the same area. In the Plattsburgh section, along the State's northern border. we have an average annual precipitation of 11/2 times the potential evaporation rate. Areas of drier air. below 100 per cent, are to be found in the extreme southwestern portion of the State. A person familiar with different kinds of oaks could predict what has just been said. since this is the area where we find bur oaks, a species common to dry climates, Ecologically we could make the following broad statements: (1) Values markedly below 100 per cent are best assigned to grazing or agricultural uses. (2) Ninety per cent and above will permit development of commercial forest stands provided soil and topography are reasonably favorable.

Global Water Circulation

Let us stay with this line of thought a little longer: perhaps it will lead us back to the grand cycle of global water circulation. In eastern and northwestern New York we get 11/2 times as much precipitation as is returned into the air as evapotranspiration (water vapor). So. in a sense we are getting 50 per cent rainfall over our share of the average. The great deserts of the earth get very little, and return it all to the atmosphere. This probably could include the polar ice caps and much of the tundra, steppe and prairie regions. I think we New Yorkers are inclined to assume that our tains come from the west, or Canada. This is typically true, but actually there is also a recycling of water flowing out the Hudson River or all bodies of water.

Water relations of the seas are a sperial problem, staggering in magnitude. Putting it in terms of "cubic miles" of water, we can make some interesting computations. The oceans are estimated to evaporate 80,000 cubic miles of water per year, even though salt water evaporates more slowly than fresh. Our land surfaces (and fresh-water lakes) evaporate 15.000 cubic miles of water. This must balance with rain and snowfall. Adding these figures makes a total of about 95,000 cubic miles of water entering the atmospheric circulation each year. It all falls back, roughly 1/4 or 24,000 cubic miles, in precipitation on the continents. Were all of this to drop

on New York (heaven forfend) it would flood us to a depth of half a mile. (This might approximate the amount of water, as ice, resting upon our State during the glaciation 10.000 years ago.) Now if we continue figuring, each resident in the State would have a share of 4,500 acre feet or 196.020,000 cubic feet.

But enough of this mathematical twaddle. The citizens of our great State make up barely 9 per cent of that of the United States or about one-half of one per cent of the world's population. So we shall be sharing widely! In fact, the average annual precipitation for all land areas of the earth averages nearly 30 inches. This is about where we start since the lowest average rainfall in New York is said to be 28 inches in the extreme northeast corner and at one spot on the shore of Lake Ontario. On the other extreme is Hoffmeister, in Hamilton County, which has an average of 53.4 inches for its record of over 35 years.

How Much do We Need?

We need plenty of water, too, An oil refinery uses 18 gallons of water to produce a gallon of oil and over 12 gallons of water per gallon of gasoline. And for beer? Ten gallons of water are used to make a gallon of beer. About 250 gallons of water are needed to make a "gallon" (sic) of paper, that is, about 10 pounds of it. In 1955, the U.S. Public Health Service found the usual home water requirement of our citizens to be about 140 gallons per day. In small communities, it is 60 gallons and in cities of over 10,000 persons the usual consumption is about 180 gallons per day. One author subdivided use of water in a typical city, on a per capita basis, as follows:

Residential uses	50	gallons
Industrial processes	50	.9.9
Public purposes	10	27
Commercial uses	10	**
Miscellaneous losses	10	23.
	_	

Total 130

On a real austerity program we could make out (says Prof. M. A. Pond, Yale University) according to this regimen, per person:

Drinking and cooking.	1	gallon
Laundry	6	gallons
Toilet flushing	8	
Personal washing, in a		
basin only	5	72
Bathing, tub bath or 5		
minutes in the shower		
bath	25	10
Total	45	

But even this isn't severe! It was found that, in low-income sections of Illinois, residential use was barely 10 gallons per person per day. Higher income areas used more than ten times as much. And normal needs are certain to greatly increase with the passage of years. Total needs of the United States in 1950 were about 185 billion gallons and may easily reach 350 billion gallons in 1975, just a little short of doubling in 25 years! Are we all wet? Well, hardly so, unless we husband our watersheds carefully and look to very economical water storage and distribution.

To Summarize and Project

We have now followed the full cycle of water all of the way around one revolution. That is, the story began with growth of water droplets in the atmosphere and traced them through their descent to objects on the ground. Manyevents may happen between deposition on a tiny condensation nucleus until a hydrometeor forms, be it a tiny droplet in a cloud, an ordinary falling raindrop, or any one of six or eight types of ice and snow formations.

Many interruptions may occur which prevent water from actually entering the soil. During the last part of the journey water may run down a tree, the side of the building or plants that grow upon the land. As water finally strikes the earth it can bounce back, partially evaporate or enter a blotting paper effect of surface soil litter. Percolating through the small passageways in the soil a drop of water finally reaches the irregular surface of the water table. Not strictly a plain surface, the water table may be undulating or even feed out to the surface of the land in instances of perched water table, spring or seep. Water continues in a stream and flows towards a river or lake. Water storage in the soil can be very effective under natural cover or in reservoirs where this plan may better meet man's needs.

In the future it would appear that detailed control through diversion tunnels and reservoirs will be required for all of our larger cities. This kind of detailed planning seems essential for distribution of water through time and space, according to human requirements. Although some cities (especially industrial areas) seem to need over 200 gallons per capita, people in other areas get along with about 50 gallons per day. But it is certainly evident that in the future we shall have to care for watershed lands according to the best scientific principles known. And in using water we must learn to conserve so that it will not limit our economy or undaly restrict the normal pleasures of the domestic scene. Special means must be developed for assuring both clean air and clean water for the future.

From the digital collections of the New York State Library.



A New Twist In Wood

Here Are The Details Of A Major Advance In The Fashioning Of Wood For Art And Utility

by Conrad Schuerch, Forest Chemistry Department, Rod Cochran, Forest Extension Department, State University College of Forestry at Syracuse University

W OOD, that tough servant of man since the dawn of history, is getting its arm twisted these days to perform new jobs and to become even more useful. Scientists at the State University College of Forestry in Syracuse, have discovered an inexpensive, easy way to plasticize wood, so that it may be bent or formed into almost any imaginable shape. The discovery unlocks a new approach to wood working and wood products engineering and design. It holds the promise of allowing designers to concentrate more on the aesthetics of wood, and has already brought a new dimension to wood sculpture.

By treating wood veneer with liquid ammonia it was found that it becomes "leathery" and can be molded and shaped in your hands. As the ammonia evaporates out of the wood, in about 15 minutes, the wood stiffens and holds its new shape. The process is quite similar to the chemical reaction that gives hair a permanent.

As is often the case, this discovery was simple once someone pointed the way. That person was Dr. Conrad Schuerch, chairman of the Forest Chemistry De-

From the digital collections of the New York State Library.





Piece of ash veneer being removed from liquid ammonia with tongs. Fumes are removed via a vacuum cleaner hose

After three or four minutes bending is started by Professor George Earle, art teacher at the N. Y. College for Forestry

partment, who theorized that liquid ammonia should plasticize wood. After studying the results of some basic research conducted several years ago, and talking about it with another chemist. it appeared that liquid ammonia was the likely chemical. In the liquid state, it must be kept at about minus 30 degrees C., and as it vaporizes, the familiar evesmarting fumes are formed. But by working with a flask constructed like a thermos and using a laboratory hood with an exhaust fan, the experiment began. Birch tongue depressors were used. Being only is inch thick the ammonia penetrated them rapidly, and they were plasticized in 20 minutes.

The theory was proved!

But these results were too exciting to lay aside. What could be done with bigger pieces of veneer? What about practical application of the discovery? A larger tank was built to hold the ammonia and a special deep freeze brought into the lab, to hold the tank. Hardwood veneer was cut in the wood products engineering lab. in pieces about 30 inches long, four inches wide and oneeighth inch thick. Ash, birch, elm, cherry, hickory and oak were used in a new series of experiments.

By now Prof. George Earle, who teaches art to landscape architecture students at the College, became interested in the strange wooden shapes coming out of the chemists' labs. A new kind of wood sculpture resulted. In the hands of an artist, the strips of veneer became flowing forms and sculpture worthy of a place on anyone's coffee table or book case.

The professors feel that wider practical application of the discovery is not far off. Visitors at the College are amazed at the pile of bent and twisted veneer Dr. Schuerch keeps in his office, and nearly everyone comes up with a different idea of how the process may be used. Your imagination is easily stirred, when you think that now wood can be treated as a plastic yet retain all the beauty and other desirable characteristics that make it our favorite building material. Plasticized wood may be machined, glued, sanded and finished the same as if it had not been treated,

Plasticization with liquid ammonia is possible because the ammonia acts as a solvent on the two major materials in wood—the phenolic lignin binder (which holds the cellulose fibers together) and the polysaccharide system in the cell walls of the cellulose fibers. These have quite different solubility requirements, hut fortunately, liquid ammonia is a reasonably good swelling agent for both materials.

Lignin in wood is a branched and crosslinked polymer with macromolecules of relatively spherical shape. On plasticization the molecular structure can be distorted but the chains do not dissolve or completely separate. The polymer system in lignin softens, but it does not become a liquid. It may be likened to softening vulcanized rubber with benzene. When wood is treated with liquid ammonia and compressed, the softening and distortion can be observed under a microscope.

The powerful binder, lignin, can be softened and stretched or compressed during the ammonia treatment, and as the ammonia evaporates, it hardens again in the new shape, retaining its grip on cellulose fibers.

A number of other possible solvents were investigated, including water the time-honored wood softener, Both experimental and theoretical evidence point to the superiority of liquid ammonia as a lignin plasticizer.

Solvent-polymer relationships in the cellulose system are more complex than in lignin. Instead of having an amorphous structure as does lignin, cellulose has both crystalline and amorphous regions which react differently to solvents and the proportions and structure of which can change on chemical treatment. It has been known for many years that liquid ammonia would cause the amorphous regions of cellulose to swell, and would also enter the crystal lattice to form an ammonia cellulose crystal structure. This ability to solvate not only the amorphous regions of the cellulose but also to enlarge and relax the crystal lattice is one of the keys to successful wood plasticization. There is nothing particularly unique in this behavior, however. It is rather typical of a fairly powerful cellulose swelling agent. A poor solvent like water enters only the amorphous regions. One that reacts strongly with cellulose enters both the amorphous regions and the crystal lattice, and one that both reacts strongly and also has a

"Design and Aesthetics in Wood" Symposium

A Design and Aesthetics in Wood Symposium will be held at the State University College of Forestry at Syracuse University. Date of the Symposium has not been decided, but it is proposed for April, 1967. The symposium is being supported by a \$25,000 grant from the New York State Science and Technology Foundation.

Purpose of the symposium is to discuss the question of co-ordinating æsthetics of design with modern advances in wood science and the engineering and technology of wood products. The subject is timely because of the competitive advances from several European countries in recent years. The symposium will be organized to illustrate to wood industry executives, scientists, engineers and architects the nature of the undeveloped potential in this country, for combining æsthetics with functional utility in wood products. Methods are available today to overcome any present technical inability to translate æsthetic values into production.

Economic growth in the wood industries depends to a very large degree upon the amounts of human creativity that are channeled into these industries. The Scandanavian countries with their pre-eminence in furniture design, have provided the world with a lesson in this respect.

The three to five-day symposium will present noted designers, artists, engineers, and architects from various parts of the United States and some from foreign countries. Concurrently with the symposium, Syracuse University's Lowe Art Center will present a Design in Wood Exhibition that will display wood as an art medium. The College of Forestry will hold an exhibition of creativelydesigned pieces manufactured by American wood products industries. The proceedings of the symposium will be published in book form, as will a picture book of the Design in Wood Exhibition.

Inquiries should be directed to Dr. Eric A. Anderson, Chairman, Wood Products Engineering Department, College of Forestry, Syracuse, N. Y. 13210.

large molecular volume is able to enter the crystallites, separate individual chains from one another and actually dissolve cellulose. Liquid ammonia reacts strongly by an acid-base reaction with cellulose hydroxyl groups, but is too small in size to dissolve the cellulose.

Once the cellulose in the cell walls of fibers is swollen (softened) several things occur. The ammonia enters between the molecular chains, separating the adjacent polar groups; weakens the crosslinks; and acts as a molecular lubricant. One chain molecule can then move past another as the wood is bent or compressed. As the ammonia evaporates the hydrogen bonds are re-established between the molecular chains in their new positions. Thus, very little stress is required for bending and little strain is left in the wood at the end of the forming process.

As far as both the lignin and molecular chains are concerned the new form is the "natural" form of the wood. This is why there is almost no "spring back" in the wood. When steam is used to soften wood, the lignin is not softened and there is no movement between molecular chains in the cellulose. The resulting stress weakens the wood, and it tends to spring back to its former shape. Plasticization of the cell wall apparently occurs in all species of wood. The small differences in chemical constitution between species do not significantly alter the solvent-polymer interaction. However, it is possible to bend some species more readily than others. Softwoods tend to suffer compression failure more readily than hardwoods—that is, the cellulose fiber walls are thin and tend to collapse when bent. The result is creases on the inside of bends.

Best success has been obtained when using straight-grained ash, beech, birch, butternut, cherry, maple, and oak. (See photographs for elaborate shapes made with these species.)

The tendency for cells of softwoods to collapse when plasticized and put under pressure can be utilized to surfaceharden these species. White pine veneer, for instance, has been plasticized and compressed cold to vield a resistant material with no obvious change in external appearance, but with a greatly enhanced resistance to scratching and marring, Compression with heat brings about more complete collapse of the fibers, resulting in a stiff, smooth parchment-like material which is translucent. It seems possible that species that are too soft for common use may be improved by plasticization and compression and/or tension.

Possible Uses

The process is still at an early stage in development. Investigation of the moisture-regain characteristics and mechanical properties of treated woods has been made and is about to be published. Generally the wood is somewhat tougher and softer after treatment and drving than before treatment. Although fundamental engineering data will be needed for some applications, many promising uses for the process exist where design and aesthetic appeal far outweigh any other criteria of value. Many items can be formed very simply from plasticized wood with relatively simple equipment and a modest capital outlay. The kinds of object that might be considered are household knicknacks such as candle holders; novelties; bracelets. fluted dishes. neckerchief slides. simple toys: decorative items and art forms: lamp bases, mobiles, wood sculpture: and architectural accessories such as room dividers and screens.

Manufacture of many of these items is within the capabilities of quite small wood products industries or lumber vards. It is believed that commercial equipment will be available within a year. The scope of this kind of application seems roughly comparable to that of quality injection molding operations in the plastics industry, and it would be well for the wood industries to analyze the number and size of such operations rather than to compare the possibilities of this process with the previous applications of conventional steam bending. The successful marketing of such items will depend primarily on artistic, pleasing design and material cost will be trivial. There should be adequate difference between material cost and sales value in many cases to permit considerable experimentation and inefficiency in the early processing methods.

The application of this process to use in furniture, in corrugated core stock for construction, for skis or other items where mechanical properties are of special significance should perhaps wait until both engineering data and some manufacturing experience with simpler items has been obtained.

It is too soon to tell where this new twist in wood will take designers and the wood products industries. But wood is traditional in our society, people like it for many reasons—economy, beauty, warmth, and durability. Now that wood can be treated as a plastic, we will probably see more of it in our homes, offices, and stores. In this miracle age when we probe outer space for the moon, wood will play an even greater role in our lives.



Managing 1,000,000 Acres

How The Department Is Handling State Forests Outside The Preserve To Meet Public Demands

Hillside near Cobleskill before reforestation in 1940. Note the erosion

Same hillside 17 years later, well covered with maturing stand of pine



by Harry V. Decker, Jr., Senior Forester, Bureau of State Forests, N. Y. S. Conservation Department

HAT's going on in your State Forests outside the Forest Preserve?

You ought to be interested because there is close to a million of them—nearly one-third of all wooded lands owned by the State, not including parks. What are they costing, what are you getting, what are the prospects, what is the guiding philosophy in their management?

The questions are pressing because while the demands for quality timber. wildlife, watershed protection and public outdoor recreation increases, the supply of open land decreases.

True. New York State is handsomely endowed with forest cover yet only a small portion is in public ownership. Nearly 50 per cent of the State's land area (almost 14.5 million acres) is forested: of this amount. slightly more than 3.5 million acres is in State ownership under the jurisdiction of the Conservation Department. This includes over 2.5 million acres of Forest Preserve land in the Adirondack and Catskill parks; nearly 600.000 acres of reforestation land, and 118.000 acres of multiple-use land; over 50,000 acres of game refuge and game management areas and the balance in other categories of public ownership. These figures do not include over 900 miles of public fishing rights on major trout streams nor 220,500 acres in the various State Parks. We are indeed very richly endowed with forested lands, both publicly- and privately-owned, in New York State.

Of all the publicly-owned lands, those called Reforestation Areas, or State Forests, are probably the most widely distributed and yet, perhaps the least well known. These areas, situated across the Southern Tier Counties and in the Adirondacks and Catskills fringe, outside the Adirondack and Catskill parks boundaries, are in 400 separate units ranging from a little over 500 acres to several thousand acres in size and are devoted to the production and sale of timber and other forest products. watershed protection. wildlife and public recreation. In sharp contrast to the Forest Preserve, these are lands on which multiple-use land management is practiced -co-ordinating compatible land uses to get as many benefits in the public interest as possible without harm to the land or its natural resources.

Start of Reforestation Program

The State reforestation program had its beginning in 1929 with the passage of the State Reforestation Law adding Section 60-a of the Conservation Law (recodified as Title 7, Section 3-0703). In order to provide for a continuing program, the Legislatures of 1930 and 1931 passed the so-called "Hewitt Amendment" to the State Constitution which was approved by the voters in the regular election of 1931. This amendment became Section 16 of Article VII. preserving the integrity of the Forest Preserve and permitting the acquisition of landsoutside of the Adirondack and Catskill parks boundaries for reforestation purposes.

Further impetus to the program was provided through the Federal Civilian Conservation Corps—the CCC of the 1930's and 40's. This nationwide organization supplied some of the manpower needed to reforest open acres and construct roads and truck trails into more inaccessible areas.

During the 30 odd years since the heginning of the reforestation program. there has been a notable change in the management and use of these lands. The emphasis has shifted from that of planting open fields with young forest trees. maintenance and protection, to expanded sales, intensified silviculture, extension of facilities and increased public use. This shift in emphasis is common not only to New York State but to other states across the nation, especially where publicly-owned lands are involved. It also represents a natural and logical succession of events, at least here in New York, because at the time of acquisition, and for some time thereafter, about half of the lands were open fields, depleted through repeated poor farming practices and in critical need of protection from erosion and further deterioration through reforestation. The balance of the acreage consists of partly cut-over, high-graded and abused farm wood lots with little to offer even in the way of good growing stock much less forest products, and a serious challenge to the practicing forester.

Now, after 35 years of reforestation, the open lands are nearly all reclothed in forest cover, and as a result of intensive silviculture, protection and the use of other sound land management practices, those abused farm wood lots exhibit stands of quality timber in various stages of development. In fact, a substantial portion of what was once idle and abandoned farm lands now support stands of timber rapidly approaching merchantable size and beginning to invite the interest and attention of the pulpwood and sawtimber market.

Managing Reforestation Areas

The management of the State Reforestation Areas for multiple-use purposes has been, and will undoubtedly continue to be, an immense job, and constitutes the primary responsibility of the Bureau of State Forests. in the Division of Lands and Forests of the Conservation Department. Not only is it a very demanding enterprise, but multiple-use land management costs money, "How much does it cost?" and "Is there a return being realized for each dollar spent on the State Forest Program?" are the kinds of questions being asked of our field personnel and Albany staff every day by people who are genuinely interested, not only in where their tax dollar is being spent, but also in all conservation programs, whatever they might be.

Until very recently, the answers to these questions, and others like them, have been largely conjecture. A few cost figures perhaps, but more often than not, some rather vague references to "intangible" values were offered; not much in the way of concrete costs and returns. Actually, when the effort was made to analyze the costs involved with multipleuse land management, it became increasingly evident that they would not be easily found, and that a rather intensive survey would be required if satisfactory estimates of costs and returns were to be made. The analysis ultimately included a complete re-evaluation of the entire State Forest program and the setting of goals for the future as well as the establishment of the cost and return relationships originally sought.

What Are Productive Forests?

These relationships and goals can now be presented, but before doing so, let us first examine and define the broad limits within which they were derived.

To begin with, although the State now owns over 700.000 acres of State Forests upon which multiple-use land management may be practiced, it hardly seems equitable to assume that all of this land is productive forest. The term "productive" forest land means land that is currently capable of producing a harvest of quality forest products, or will do so within a reasonable length of time. No more than you would assume an entire farm to be productive cropland. certain forested acres are just not capable of being classed as "productive" under the above definition. As a matter of fact, according to the forest inventory of these lands, now nearing completion, only 55 per cent, or roughly one-half of this total acreage is considered productive, at least from the standpoint of its capacity to grow continued crops of quality forest products. The balance of the acreage, although quite productive for public recreation, wildlife. and watershed protection, lies in one of three broad categories: (1) Nonforest-lands in roads. streams, marshes, ponds, various rightsof-way and miscellaneous clearings; (2) stands of trees classed as Site III-the poorest of our forest sites in terms of their ability to sustain the growth of wood; and (3) a somewhat more arbitrary category presently considered "unproductive"-stands of trees whose mean diameter is less than 6 inches.

This same 55 per cent of State Forests lands, by the way, currently receives the bulk of the annual forest work and sustains the forest products sales program.

A Look at Costs

Now then, let us examine just a few of the costs involved in this relatively large scale land management program. For example, during the 1964 fiscal year, from April 1, 1964 to March 31,

1965, \$192,000 was spent on general forest management; the maintenance and administrative activities associated with land management. An additional \$169,-000 was expended for various road and building construction projects; the replacement and repair of access facilities and structures. These projects are considered to benefit publicly-owned lands as a whole and therefore the costs are pro-rated over the entire 700,000 acres of State Forests. During the same period, however, almost \$270,000 was spent for silvicultural operations-thinning, pruning, weeding, releasing-in both plantations and natural forest stands, and this work was essentially confined to the socalled productive forest acreage. In total then, it cost \$630,000 to manage and administer these State lands for multipleuse purposes for one year; a little more than \$1.25 per acre per year. This obviously does not reflect the costs for the replacement of obsolete equipment, the purchase of new equipment, or the many other expenses associated with State Forest programs. This is what it cost just to maintain and improve the land area involved. These cost figures will tend to be somewhat higher for 1965.

What About Returns?

So much for the costs; now what about returns on this rather substantial investment?

During the same 1964 fiscal year, a little over \$100,000 was received from the sale of forest products such as sawtimber, pulpwood, posts, poles, fuelwood, and, to a limited extent. Christmas trees. These sales range in size from a few dollars to several thousand dollars (those representing a value of over \$500 are sold to the highest bidder following public advertisement of sales).

Using the same acreage base as that used to determine cost per acre, we find that our "productive" forest acreage is returning slightly more than 30 cents per acre, cash in hand, plus a number of those so-called "intangible" values. The balance of the State Forest acreage, the "unproductive" portion, also contributes its share of intangibles as well.

The Intangible Values

The intangible values are those to which we cannot readily assign a monetary measure. For example, how much is a hunter-day, or a family picnic-day worth? Certainly the hunter and the picnicker must place a great deal of "value" on the day he spends on State Forests or he wouldn't be there in the first place, but it is difficult to arrive at an applicable dollar measure because it is dependent upon a number of variables. Is

(Continued on page 38)



Fly dope

Nessmuk (George Washington Sears), outdoorsman, hunter, angler, canoeist, poet, philosopher, writer on woodcraft, concocted a black fly dope thusly: 3 ounces of pine tar. 2 ounces of castor oil and an ounce of pennyroyal (mint). It works!--R. B. M.

Classes for curious

When summer walks in, school children run out, but two North Syracuse Central High School Science teachers have lured the kids back to school for a field biology course with a memo to "curious and ambitious boys and girls." which reads:

"Each blade of grass, each ant, each woody tree is a reflection of two billion years of struggle. These reflections living things are on a field of battle every second of their lives. A landscape including ponds, streams, hills and woods is teeming with living things each one especially equipped to stand its ground, to live, reproduce, and send a better equipped generation scurrying into the frav!"

The results of this lively description were soon evident. The first week found these teachers with a school bus load of enthusiastic field biology students parked on Oneida Lake's south shore with lake ecology as the subject of the day. Working in and around the shore, specimens were examined with microscopes and hand lenses and notes were carefully recorded under a sunny sky no stuffy classrooms here! Other trips included such fascinating spots as Euclid Bog. Tully Research Forest. Montezuma National Wildlife Refuge and Sandy Pond.

Only two enthusiastic teachers like William Anderson and Charles Wheatley and a progressive school board are a must.—J. GREEN

Wild rice

Wild rice, the cost of which is astronomical—but worth it to the gourmand grows best in fresh water of sheltered bays, bayous or marshes with soft bottoms, the water 6 inches to 3 feet in depth.—R.B.M.

Conservation careers

High school students are showing increased interest in conservation careers. Some students expect to terminate their schooling after high school, others will go on to universities and colleges,

A decade ago, training was limited to a few subjects and a few schools but today there is not only great and expanding interest in nearly every phase of natural resource management and outdoor recreation planning, but training facilities have expanded, too.

Your Conservation Department can provide you with quite a few publications and sources for others that will be an excellent guide as to the types of jobs and positions available, the training required and what one can expect in the way of salaries and working conditions. If your interests are in this all important field write to the Division of Conservation Education of the N.Y.S. Conservation Department at the State Campus in Albany for information on careers in conservation—E. A. W.

Sour dough

A sour dough is the name applied to a Canadian or Alaskan prospector, socalled from the habit of carrying sour dough, a fermented dough used as a leaven in making bread. And sour dough is made by stirring 2 cups of flour, 2 tablespoons of sugar, 1 tablespoon of salt in enough water to make a creamy consistency, then stir in a tablespoon of vinegar. Put the "mess" behind the stove or near a fire for a couple of days to sour.—R.B.M.



How to beat squirrels and jays

Here is a way to keep squirrels and blue jays from hogging everything in a bird feeder.

To do the squirrel thing, buy a 3-ft, square sheet of aluminum at a hardware store, and cut it into four 18-inch circles. Punch a hole in the middle of each and hang them between trees or other anchorages for a bird feeder supporting wire. The circles act as rat guards such as are used on ship cables, and the squirrels can't get by.

To do the jay thing, get a scrap of wire mesh of maybe one-inch hole size and make a tube that will allow the chickadee feeder (in our case a little plastic "can" with removable top for refilling) to hang clear with maybe 1½ inches of clearance all around. Hang the feeder inside the mesh tube by whatever device you can invent. Jays cannot reach the seed. Only the smart chickadees can, but one seems to tell another. Suspend the plastic feeder from the same support wire noted above. Then run a light bit of wire from side to side in the mesh tube, across the top of the feeder. This locates the mesh tube properly.

How do Congressmen feel about getting letters?

Circle one. (five points)

- a. They are too busy to read mail.
- b. They want to know what people from home are thinking.
- c. They do not care what your opinions are.

(The answer is "b". They always welcome sincere letters from constituents.)

It is your duty, as a sportsman and citizen, to take an active interest in the bills introduced each year which affect the future of outdoor recreation in America. How much do you know about making your opinions count? Here is a guick test.

2. Name the Congressman from your district.

(ten points)

(For answer, contact your town or county clerk)

3. Name the two U.S. Senators from your state. (ten points each)

(You can find out from your town or county clerk)

4. The preferred form of address when writing your Congressmen is: (ten points)

- a. "The Right Honorable....."
- b. "Dear Senator....." or "Dear Representative
- c. "Dear Mr....."
- (Most Congressmen aren't too concerned with formalities. "b" is perfectly acceptable.)

5. If I am interested in a bill introduced in the House, I should write to: (ten points)

- a. The Representative who introduced the bill.
- b. The chairman of the committee which will hear the bill.
- c. The Representative from my district. (Write "c" first, then "a" and "b" if the situation warrants.)

6. When I write a letter expressing an opinion, I should: (five points)

- a. Quote what the "experts" are saying.
- b. Express my own reasons and beliefs.
- c. Send a petition with a lot of names.
- (You are his constituent. The answer is "b".)

7. When I write a Congressman, I should: (five points)

- a. Tell him how important I am.
- b, Theaten him with my vote.
- c. State the name of any organization I represent and my title. (The answer is "c".)

8. When I write a Congressman, I should:

- (ten points)
- a. Tell him what the Constitution means.
- b. Be polite, sincere and brief.
- c. Set him straight once and for all. (Congressmen are familiar with what the Constitution means. "b" is the answer.)

9. When I write a Congressman, I should:

- a. Tell him I am a Democrat.
- b. Tell him I am a Republican.
- c. It is not necessary to state party affiliation. ("c". Leave parties out of it.)

10. Circle one.

(five points)

(five points)

- a. Congressmen are hardened to criticism.
- b. Congressmen have the same feelings as anyone.
- c. Congressmen ignore good or bad comments.
- ("b". Although too many people overlook this.)

11. About how many bills are introduced in Congress each session? (ten points)

a. 3,000 b. 5,000 c. 15,000 ("c". No Congressman can read that many bills. That's why you should call his attention to bills that are important to you.)

12. I should express my opinion on a bill:

(ten poins)

- a. Just before committee hearings.
- b. When the bill somes up for vote in Congress.
- c. When the bill goes to the President for signing. (The committee recommendation usually decides the outcome of a bill. "a")

13. When a bill has been signed into law, I should: (five points)

- a. Write and thank my Congressman for any help he gave.
- b. Forget about the bill.
- c. Complain to my Congressman.
 - ("a". Win, lose or draw, he'll remember your gratitude on "another day.")

How to score yourself: Below 50—Better brush up • 50-60—Fair • 60-70—Good • 70-80—Excellent • 80-90—Superior • 90 or above—Have you ever thought of running for President?

Contributed by SHOOTING SPORTS ASSOCIATION, INC.

STATE OF NEW YORK, CONSERVATION DEPARTMENT



The Back of the Book

Signs of the times

Seen beside a country road, a paper sign with childish printing: Caution, groundhog crossing. Along an eastern highway, one man's answer to litterbugging and highway beautification: Throw away something beautiful.

Whistling swans on duck stamp

Whistling swans, flying low over a northern lake, carried off top honors for the seventeenth Duck Stamp contest.

The drawing of the swans will grace the 1966-67 stamp. There was a record number of entries of 181 designs submitted by 105 artists from 34 states. The winning artist. Stanley Stearns. of Stevensville, Md., became a three-time winner. His blue geese won for 1955-56 and his nene for 1964-65.

Wetlands down the drain

Growing world food commitments can accelerate clearing of bottomland hardwood forests and drainage of wetlands. A 10 per cent increase in rice and an additional million acres of soybeans are needed this year with Arkansas. Louisiana and Mississippi as major producers of these crops.

More than 270.000 acres in Arkansas and 130,000 in Mississippi had been cleared and planted largely to soybeans during 1963 and 1964. This had been due in part to improving market conditions as well as to farm tax structures. drainage subsidies and flood prevention programs developed by the Army Corps of Engineers and the U.S. Soil Conservation Service.

The timber industry and sportsmen are apprehensive that the new planting incentives may cause further clearing of bottomland hardwoods. The industry, of course, is concerned about its future source of raw materials, while sportsmen know the forests to be good habitat for deer, turkeys and other wildlife. An interesting sidelight on this is that few delta soils will produce crops much beyond their third year because of soil compaction. They might better be left in timber that does not require everincreasing flood protection expenditures.

Gall book reprinted

Students of plant galls—their numbers are increasing as fast as some of their quarry—will welcome the news that E. P. Felt's definitive work. "Plant Galls and Galls Makers." is again available, Long out of print, it has been reprinted by the Hafner Publishing Company of New York City. One can obtain a copy from the publisher at 31 East 10th Street, New York, New York, 10003, for \$10.75.

This is the only book dealing with the plant galls of the United States. The detailed, rather technical text is not the easiest thing to handle but there are very many useful line drawings, paintings and photographs to aid in tracking galls down. Its coverage, while astounding, is not complete, so the curious naturalist is advised to consult his own state entomologist or state natural history survey for publications dealing with his own area. It won't take long to exhaust the literature on the subject, for there is still much more to write about plant galls than has ever been written. Want to help correct this intolerable situation? Write for the CONSERVATION-IST reprint. "Some Plant Galls of New York." It will get one started in this fascinating field of biological investigation .- PROF. R. B. FISCHER, Cornell University.

Directory available

The 1966 Conservation Directory, a listing of 900 or more organizations and thousands of persons concerned with natural resources, is available from the National Wildlife Federation, 1412 16th Street, N.W., Washington, D.C., 20036, at \$1 a copy, Listings include official agencies in the U.S. and Canada, international and interstate organizations, national and regional non-government organizations and state agencies and citizen groups.

International skeet

The world's largest skeet shoot, the National Skeet Shooting World Championships, will be held July 30 through August 6 at the Rochester-Brooks Gun Club in Rush, near Rochester. This event has been held annually since 1935 except for a break during the war years and attracts some 700 of the top skeet shooters from all over the world. The National Skeet Shooting Association, 2608 Inwood Rd. Dallas. Texas, 75235, has more information.

Oyster production

A hundred years ago, oyster consumption was many times greater per capita than today. Four times as many ovsters were landed in 1900 as were landed in 1962. Sewage, industrial wastes and chemical pollutants have been important factors in reduced harvests. But there also have been extensive losses through natural occurrences such as floods and storms and from the ovsters' natural enemies, the drill and the starfish, However, these losses can be reversed by application of a farming method known as aquaculture, which is widely used in Japan. Europe and on the west coast of the United States.

THE CONSERVATIONIST, JUNE-JULY, 1966 From the digital collections of the New York State Library.

Party Permit Application Period Changed to August

An important change in the procedure for applying for party permits is being adopted this year. This change will require the submission of party permit applications in *August*, 1966. Application forms will be printed on double punch-card stock and will be available from regular license issuing agents by *August* 1. All applications must be mailed not later than *August* 27 to be eligible.

The change will provide several advantages. It will permit earlier notification of successful applicants and will eliminate any need for resubmission by allowing the use of second and third choices of areas.

The selection of successful applications for each area will be done through a computer. The date of mailing will have no bearing on the selection. All applications mailed on or before *August* 27 will receive equal chances of receiving a permit. No big game license or fees need to be submitted initially. Successful parties will be notified by about September 15 and they will have a period of about two weeks to submit their licenses and fees.

Second cruising guide

The second cruising chart kit, "The Grand Canal," produced by the Department's Division of Motor Boats, is expected to be ready soon for distribution.

Similar in plan to the first chart kit, "The Northwest Passage." for the Hudson River. Champlain Canal and Lake Champlain, the "Grand Canal" will list all the information needed by a skipper cruising from Albany to Buffalo along the Erie Canal. If a boatman wants to travel north to Lake Ontario through the Oswego Canal or if he wants to float leisurely down to the Finger Lakes using the Cayuga-Seneca canals. he'll have that information at hand, too.

"The Grand Canal" represents the first complete chart kit of the Erie Canal that has been offered to the boating public with charts of all the above-mentioned canals and a guide book to facilities found along the routes.

A special feature of the State's cruising kits is that the charts have the marinas and other points of marine interest actually located on them and keyed so that more definite information may be obtained from the companion guide books. Included in the "Grand Canal" guide book is not only the facility information but also background stories and colorful photographs about the historic old Erie Canal, the men who dug the original "Clinton's Ditch" and manned the mule-towed barges that traveled along it.

Another novel touch is the inclusion of pictures of the actual route on the margins of the charts. With this a skipper using that page has a picture readily available for instant reference as well as the chart information.

Like the "Northwest Passage." which is still available, the entire kit will come in a water-resistant vinyl envelope and will sell for \$5 a copy from Division of Motor Boats, Conservation Department, State Campus, Albany, 12226.

Senior conservation educator

The Conservation Department's Division of Conservation Education is seeking a list of eligibiles for the position of Senior Conservation Educator. First appointment to be made from the list will serve as Director of the Division's new Conservation Education Center at Sherburne in Chenango County. Entering salary is \$8,365, with annual increments to a top \$10,125.

Entrance qualifications for the civil service examination are as follows: Bachelor's degree with specification in wildlife or fisheries biology, or in forestry; and either two years of professional experience in conservation education, or in wildlife or fisheries biology, or in forestry; or two years of teaching subject matter closely related to conservation of natural resources.

Appropriate professional experience in conservation education may be substituted on a year for year basis for up to four years of college. New York State residence required.

Applications accepted up until August 29, 1966.

For further information write: New York State Department of Civil Service, Recruitment Unit 231, State Campus, 1220 Washington Avenue, Albany.

Population challenge

Population problems are the theme of the second Conservation Yearbook by the U.S., Dept. of Interior,

The new, 83-page. illustrated publication discusses the population impact on America's environment in terms of renewable resources, non-renewable resources, outdoor recreation and the people, themselves,

Copies are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., 20402, at \$1.25 each. Copies of last year's yearbook, "The Quest for Quality" are still available for \$1 each.

Golden passport for \$7

The new \$7 Federal Recreation Permit —the "Golden Passport" of the Federal government's operation, Golden Eagle, is now available. It is a wallet-size card, so designated because of its gold color and to the large number of Federal recreation areas—7,000—it entitles the purchaser and everyone in his car entrance.

Money from the sale of the "Golden Passport," together with other fees and revenues, goes into the Land and Water Conservation Fund and appropriations from the Fund assist states and their local governments in meeting urgent outdoor recreation needs and in the acquisition of Federal areas authorized by Congress.



Besides admitting a carload of people to Federal recreation areas, the "Golden Passport" will admit the purchaser himself, regardless of how he travels. to all Federal recreation areas that charge entrance fees. This means that the owner of the permit can use it on a commercial bus going into an area or when walking into an area or building. The 1966 permit is valid an unlimited number of times. It does not cover special user charges, such as fees for guides.

The annual permit is sold at national parks and monuments, national forest areas, wildlife refuges. Corps of Engineers recreation areas, and other Federal recreation areas that charge entrance fees. It also will be on sale in many cities at offices of the American Automobile Association, the Forest Service. National Park Service, Tennessee Valley Authority, Bureau of Sport Fisheries and Wildlife, and the Bureau of Outdoor Recreation,

Fishing the Surf on Long Island

(Continued from page 3)

(both before and after the bathing season) when surf fishing for striped bass is at its best. There is a need now for more public access and surf fishing areas between Moriches Inlet and Shinnecock Inlet where much of the beach frontage is privately-owned and the few large "public" beaches are restricted to local town and village residents throughout the summer. Acquisition of access rights and surf fishing areas by State or local agencies is a possibility to be explored.

If the reader wishes a more detailed scientific report on Long Island's surf fishing. I suggest he read "The Sport Fishery in the Surf on the South Shore of Long Island from Jones Inlet to Shinnecock Inlet." written by this author and published in the January. 1965 issue of *The New York Fish and Game Journal.*

Taking Stock of Your Rural Property

(Continued from page 7)

of the slope for such uses as a playing field. The slopes, soil texture and drainage would suggest it as poorly suited for a pond site. Most conifier trees or wildlife shrubs which are climatically adapted to eastern New York would probably be suitable, although information on tree and shrub pests may rule out some selections. This soil presents only slight limitations to disposal of effluent from septic tanks. It should be suitable for such uses as bridle trails. archery range, and camping sites. In this way soil properties favor some uses and discourage others, and a knowledge of them may help you to allocate different kinds of activity or property development to different areas.

Conversely, if you have in mind some particular form of land use, for example planting Douglas fir for Christmas trees in Steuben County, (New York), the county soil map would indicate suitable locations where one might buy property. One would have to have some knowledge of course, about the soil requirements of that species in order to select appropriate combinations of soil properties. Other factors, such as presence of brush, size of suitable area, ease of removing products, etc., might finally narrow your choice to one or a few areas. (Aerial photographs are helpful in this process.)

Moreover, if you are obtaining land management advice from a consultant or a public agency, the existence of a soils map of your property will greatly expedite their work. If you are going to work from the ground up, it would be prudent to look from the ground down. Soils are hasic to land use planning.

Managing 1,000,000 Acres

(Continued from page 33)

the hunter looking for deer or partridge? Does he stay in a motel or live at home? For his value received, did he spend the price of a new rifle, or use an old shotgun?

What is the value of providing food and cover for wildlife? Here again, there certainly is a value, but how do you measure it in terms of dollars and cents? For purposes of acquisition, prime deer habitat may be worth \$5 per acre, but good partridge cover may not equal such a price.

How much value can we ascribe to an acre of State Forests from the standpoint of watershed protection? It is an established fact that "woods and water" are fully compatible under the multiple-use concept of forest land management, and total water yield may be increased as much as 30 per cent under proper land management practices. This means more water available to farms, homes and industry. The forested watershed is the chief barrier to floods and devastation of the soil through erosion, and the purest of waters flow from the forested slopes. How many *dollars* is that worth?

What is the value of providing a day's income to a pulpwood or timber cutter operating on public lands? Again, the value is dependent upon a number of variables but primarily on the dollar value of the products.

These are but a few of the so-called intangible values derived from State Forests in a list of such benefits which increases in length each year. All of these values, and others not mentioned, contribute to the total benefits or values derived from State Forests, they are worth how much—\$2 per acre?—\$5 perhaps even more?

Add to these intangibles the very real receipts from oil and gas leases, another multiple-use, amounting to \$11,000 in 1964, plus miscellaneous receipts of over \$2,000 during the same period, and our return is raised to something over \$3 per acre at the very least, although much of it cannot be considered as cash in hand.

Larger Returns Forecast

Now then, what can be said of the future? Here we must attempt to project current trends, but some predictions will undoubtedly prove to be certainties.

For one thing, a substantial increase in the sale of forest products from State Forests can be expected. The first half of the 1965 fiscal year certainly bears out this prediction. During that period, receipts from the sale of forest products alone amounted to nearly \$50,000 and gas and oil leases returned \$6,600. In addition to these actual receipts \$44,000 worth of timber contracts were being negotiated at this writing. If marketing conditions continue to remain steady. income from State Forests should exceed \$150,000 for the 1965-66 fiscal year-a return of about 50 cents per acre. The gap between cost and actual cash in hand return per acre grows smaller.

important point previously One touched upon, and to be kept in mind, is that nearly 30 per cent of the forest cover on State Reforestation Areas is comprised of stands of timber in which the average stem diameter is less than 6 inches. This is obviously not a statewide average for all lands, public and private, but pertains only to State Forests which have been under management for almost 35 years. In many sections of the State, timber stands in this category may represent as much as 80 per cent of all forested acres. Although these stands are currently classed as "unproductive" from the standpoint of harvesting forest products, they do represent a future timber resource of impressive potential. Not only does the gap between cost and return grow smaller, but the percentage of productive forest land continues to increase annually.

More Access Needed

A further prediction indicates intensified efforts directed at the extension and over-all maintenance of State Forest access facilities, so essential to effective sales and work programs, forest protection, and increased public use. Adequate forest access is as important as streets and sidewalks in the city. Actually, it makes little difference to the wood-using industry that State Forests contain enough raw material to sustain their operations for some time if it is not economically practical to get the material out of the woods. The cost to the industry to fell and cut up a tree into useable lengths remains fairly constant, depending of course, upon the type and size of timber and topography. But the cost of transporting that wood from the forest to the mill varies directly, first upon the ease with which the transportation equipment can be placed at or near the logging site and secondly, with the over-all distance between woods and mill.

And, speaking of increased public use, during the past decade public use of State Forests has become a major factor in planning the multiple-use management for these lands. Hunters, bikers, and fishermen alone are making tremendous use of public lands as more and more private holdings become surrounded by posting signs. This, coupled with the fact that there are annually more and more hunters, bikers and fishermen seeking forested areas for their recreational a pursuits, definitely makes adequate access to State Forests a critical need, even if no other reasons are considered.

Increased emphasis on silvicultural operations in both plantations and natural forest stands can also be expected. Stands of forest trees, like any other agricultural crop, must receive proper care in the form of thinning, weeding and pruning if quality timber products are to be harvested. Without proper and timely cultural work, you can look forward to little more than site deterioration, reductions in growth rates and timber quality, stand stagnation and possibly mortality.

Reforestation Tapering

Accompanying the increase in silviculture work will be further reductions in the amount of reforestation accomplished annually. Only a small percentage of open plantable land remains to be reforested on State Forests, and an even smaller amount remains of lands suitable for replanting following an initial planting failure.

Indeed, the future of our State Forests looks very promising. Seven hundred thousand acres of publicly-owned forested lands managed for multiple-use purposes are offering you the opportunity to enjoy the natural beauty of the out of doors, giving protection to valuable watersheds, providing a source of raw material to the wood-using industries of the State, furnishing both food and cover for wildlife and providing a source of income to the State of New York. This is truly multiple-use.

Skunk rabies

Rabies in skunks has risen to its highest incidence in New York State and research plans are under way to study population potential and possible techniques for controlling this species.

The species breakdown of cases for 1965 through September shows fox. 35; skunk, 53; cow. 16; bat, 9; cat. 3; dog, 2; and horse, fisher, and woodchuck, 1 each.



Chimney swift nest

It is generally accepted by ornithologists that the usual nesting site for the chimney swift was a large hollow tree before the settlers cleaned the land and raised chimneys. There are probably only a handful of living bird watchers. both professional and amateur, who have ever seen such a nest. During the last four summers, however, a hollow tree nest site was one of the regular stops on the Sargent Pond overnight field trip taken by 1.200 boys who attended the Conservation Department's Raquette Lake Boys' Conservation Camp. The nest is located about half way up the hollow trunk of an ancient white pine. The empty shell of this old monarch is about three feet in diameter and extends skyward for 50 feet without a trace of old branches, still topping the surrounding trees.

During the first three years of observation, photographic evidence indicated the same site and possibly the same nest were used. Last summer there was no sign of a nest at the original site. but the new nest was only about 18 inches away.—PAUL KELSEY

Eagles

The bald eagle, national emblem of the United States, is becoming increasingly rare and studies indicate that indiscriminate shooting is still a factor in the decline. Inexperienced hunters are sometimes frustated at their inability to find game and prone to take shots at hawks or other living targets. Some of these "hawks" turn out to be eagles.

Both bald and golden eagles are completely protected by Federal law. The bald eagle, so-called because of the white feathers on its head, has been protected since 1940 and the golden eagle was given protection in 1962. The larger hawks themselves are all protected. Almost every hawk a hunter sees is beneficial.

There is no excuse for indiscriminate shooting of eagles and the law will be rigidly enforced by Federal and State authorities. Surely these magnificent birds warrant all the protection people can give them, Blue if by sea

Red if by land, and blue if by sea will be operational procedure for all enforcement agencies conducting navigation patrols on New York State waters.

All marine divisions of law enforcement agencies throughout the State will operate enforcement vessels with revolving blue lights as standard equipment. Most enforcement craft have been using flashing red lights similar to those in use on police and emergency vehicles on the highways.

A recent study by the U.S. Coast Guard shows that some confusion in night navigation has resulted due to the conflict between red navigation lights and the flashing red lights being used on enforcement vessels. Based on light color studies and visability tests, a revolving, blue signal light was recommended. When used on the water, a revolving, blue light will denote an enforcement vessel and use of this type signal by other craft is prohibited.



County conservation education

A new organization in St. Lawrence County is designed to provide its residents with more conservation education.

Known as the St. Lawrence County Conservation Education Committee, the voluntarily-organized group is composed of State and local conservation co-op. agents and a member of the St. Lawrence University faculty.

Members of the committee include (from left in picture) Dick Adams. State Conservation Department: Floyd Fisher, manager, county conservation depart-

New trout rule

Regulations for this year's trout season provide that all trout caught in *certain streams* may not be kept but must be returned to the water. This will apply to the Beaver Kill in Delaware County from the Delaware-Sullivan counties line down-stream two miles and to Genegantslet Creek in Chenango County. Town of Smithsville, from the first Route 220 bridge north of Smithsville Flats upstream approximately one mile to the mouth of Five Streams.

The Amawalk River from Reservoir to Muscoot Reservoir, Westchester County, has had catch-and-release regulations, but it is planned to allow the keeping of one "trophy" trout per day during the coming season. A 14-inch size limit will apply on this stream.

Also special regulations are expected to be put into effect this year on the West Branch of the Croton River from West Branch Reservoir to Croton Falls Reservoir, Putnam County. In this section of stream, fishing will be restricted to the use of artificial lures and a person may take in one day not more than three trout not less than 12 inches long.

Delaware River recreation

A set of ten outdoor recreation maps, covering the Delaware River, describes in detail the characteristics of the river for the entire non-tidal main stem, from Hancock (N. Y.) in the western Catskill Mountains to Trenton (N. J.) on the ment; Carlton L. Doane, county co-op. extension agent; Dr. John I. Green, chairman. St. Lawrence University biology department: Don E. Huddelston, county co-op. extension agent: Norman R. Hulbert, U.S. Soil Conservation Service; and Charles O. Nevin, state forester.

The committee, through the combined services and specialties of its members, will develop a series of conservation projects and provide an information center for schools, organizations and individuals in the county.

upstream edge of the tidal estuary that runs into the sea.

The maps show parks, forests and game lands, river launching locations and recreation areas, good fishing, boating and swimming spots, rapids, riffles and pools, channel and water depths and stream flow characteristics.

The Delaware is ranked among the great rivers of the nation. From Colonial times, when it helped open the nation's interior to pioneers and trappers-the first outdoorsmen-to the present, the beauty and splendor of this noble river has been a source of inspiration and enchantment to those who live along its shores and have journeyed along its route. Not only is the Delaware River known for its aesthetic qualities, it also contributes tremendously to the prosperity of the nation by providing the water requirements for millions of people in the mid-Atlantic region, While the Delaware has been cited as the "hardest working" river on the con-tinent. it still flows through many wilderness-like areas that are outstanding places to spend leisure hours.

This excellent set of material is a must for anyone expecting to use the varied recreational facilities of the Delaware. It is produced by the Delaware River Basin Commission and can be secured at \$1 on order to the D. R. B. Commission, Box 360, Trenton, N. J., 08603.

Value of walnut

A land owner in Forestry District 4

had a large black walnut tree about 4 feet diameter (breast high) in his yard with a good butt log, estimated to contain 1,100 board feet. A buyer offered \$350 for the tree. When the owner hesitated, he raised his offer to \$550. The owner was suspicious and called in a Conservation Department forester. The forester advised the owner to sell the tree for cash at the last price offer before the buyer changed his mind.

Dean Shirley retiring at Syracuse

Hardy L. Shirley, dean. State University College of Forestry at Syracuse University, will retire on September 1, 1966 after 21 years on the faculty, including 14 years as dean.



Dean Shirley came to the College of Forestry in 1945, as assistant dean and taught an introductory course in forestry, offering a new approach to student orientation in this field. The textbook, "Forestry and Its Career Opportunities." used widely in forestry schools throughout the nation, was an outgrowth of this experience. He also taught a graduate course in forest history and policy and was instrumental in reorganizing the research and graduate offices at the college.

Appointed the fifth Dean of the College in 1952. Hardy Shirley continued to place emphasis on research, graduate education and world forestry. College facilities began to grow, with the completion of Baker Laboratory and a new wing at the Ranger School at Wanakena. Ground was broken recently for new biological science and library buildings and a new pulp and paper research building is in the planning stages. Two new departments were established, Forest Chemistry, and Wood Products Engineering; and the Cellulose Research Institute, Polymer Research Institute, World Forestry Institute and the State University Water Resources Center were organized under Dean Shirley's leadership.

Dean Shirley began his career as an instructor of mathematics at the University of Nevada in 1922 and in 1926 he taught dendrology and forest mensuration at the Yale School of Forestry summer camp; then spent two years as assistant in biochemistry at the Boyce Thompson Institute for Plant Research. In 1929 he began a distinguished career with the U. S. Forest Service at the Lake States' Experiment Station. He was later appointed director of the Allegheny Forest Experiment Station during and after the time this station was combined with the Northeastern Forest Experiment Station. He was the first American Forester upon whom an honorary doctoral degree was conferred by the University of Helsinki (Finland). He served as editor-in-chief of "The Journal of Forestry" for three years. He was a member of the Sixth Botanical Congress in Amsterdam in 1935, and served on a special mission to the Caribbean region to study the needs for tropical forestry research in 1937. leading to the organization of the Tropical Forest Experiment Station in Puerto Rico.

Migratory Bird Treaty stamp

There is a new 5 cent postage stamp commemorating the 50th anniversary of the Migratory Bird Treaty Act. It was issued for the 31st North American Wildlife and Natural Resources Conference. The design depicts two birds in white outline, one flying north, the other south, at the Canadian border.

The Migratory Bird Treaty, a major document in conservation history, became effective in 1916. This treaty afforded international protection to named migratory and non-game birds common to both Canada and the United States. Each nation became responsible for enacting its own laws to implement the treaty provisions.

There are nine families of migratory game birds and 33 families of insectivorous and other non-game bird species under its protection. Indians and Eskimos, however, were absolved from some closed seasons on designated migratory non-game birds.

The effectiveness of this treaty led to the development of a similar agreement with Mexico, concluded in 1936.



Fishing soda

A box of baking soda can be a valuable asset in a tackle box.

Used dry, it's a scratchless scourer, so when rubbed on lures that have dulled or rusted, it restores their original shine.

Bait bucket and creel will give up their fishy odor to a swabbing with a baking soda solution and hands will come clean and odorless, too. by wetting and rubbing with dry soda.

If you've been fishing with bared back and the sun has left its mark, dunk your handkerchief in water, sprinkle on dry baking soda and drape it over the sore area. It will take the sting out of the burn and spare one blisters.

A palmful of dry soda with enough water to make a paste and applied over bug bites will reduce the itch and sting.

And, if one has a queasy feeling-baking soda and water will set the stomach right.

New Audubon sanctuary

The National Audubon Society has accepted a gift of 100 acres of wild land in the Town of Islip. Long Island, from Mrs. Charles B. Scully of Islip. This tract of forest and marsh has a wide variety of plants and wild animals that will be protected in an Audubon sanctuary.

The view of the property is of the Great South Bay with Fire Island in the distance. Much of the area is in salt marsh, which is valued as habitat for a variety of birds and as nursery for many kinds of aquatic life. Most of the higher ground is forested. A clear stream with moss-covered banks flows through the property to the bay.

The property is expected to be opened for limited and regulated public use for educational purposes after it is developed. Mrs. Scully will have life use of the property and she has generously agreed to be responsible for all maintenance costs during her occupancy.

This is an exceptional gift, when one realizes that this property has now been saved from the rising flood of real estate development.

Conservation clubs cited

Twenty-eight conservation clubs have been cited for outstanding service to conservation. Announcement of the award was made at the National Wildlife Federation's 30th annual meeting.

The awards program is designed to recognize the value and importance of an alert, active and aggressive local conservation organization in citizen support for sound management of renewable natural resources. The awards are in the form of a tile plaque with inscribed brass plate and will be formally presented by Federation representatives at state affiliate and local club meetings later in the year. The 28 winning clubs were selected from nominations submitted by officers of state affiliates of the National Wildlife Federation in 49 states. New York State was represented by a winner, the Sportsmen's Clubs of Northern Westchester.

Fisheries change

Locating the abundant but low level fish stocks of the Great Lakes and finding methods of harvesting them is a priority assignment for the Federal Exploratory Fishing and Gear Research Base at Ann Arbor, Michigan.

Several commercial fishing vessels have already converted their gear from gill netting to trawls heretofore used only in marine waters based on findings of the Base's research vessels.

Smelt and bloater chubs have been found in great numbers and tons of these fish have been taken in relatively short hauls. This type of fishery tends to be quite extensive, especially in Lake Erie and could be the source of fish products over a greater part of the fishing year.

This should be good news to commercial fishermen who have suffered from the deteriorations in populations of such larger fisheries as the trout and pike.

Photo correction

The fourth cover color photograph in the December-January, 1965-1966, issue, showing deer on the Allegany Game Management Area, was incorrectly attributed to Lawrence Nelson. The photographer was Fred Evans of the Department's Olean District Office.

Big Rampart Dam

It would appear to be cheapter to build a nuclear plant on the Pacific Coast than to transmit Rampart power south, a prominent study team has advised the Natural Resources Council of America. The N.R.C. wanted an independent appraisal of the probable impact of the huge project on Alaska's wildlife and fish resources as well as a review of and recommendations on the future electric power needs of the new state.

Rampart Dam, on Alaska's Yukon River, not including power transmission facilities, would cost \$1.5 billion or more, depending on various estimates. The reservoir would flood about 8 million acres and take 30 years to fill. It would be 80 miles at its widest point and 280 miles long, would flood 400 river miles of the main Yukon and 12,600 miles of tributaries. The reservoir would have a surface area of about 10,500 square miles, nearly 600 times larger than Lake Erie.

In a 1964 report on the proposed project, the U.S. Fish and Wildlife Service said: "Nowhere in the history of water development in North America have the fish and wildlife losses anticipated to result from a single project been so overwhelming."

Pistols and crime

It may be argued that any legislation that would reduce the number of pistols in circulation would substantially reduce the number of aggravated assaults. This rests on two mistaken premises. First, it assumes that restrictive legislation will prevent criminals from obtaining guns. The fact is that experience has shown that legislation, such as the New York Sullivan Law, does not reduce the number of pistols in the hands of criminals. Second. it assumes that guns are used in most aggravated assaults, whereas the fact is that they are used in only a small percentage of such assaults .- POLICE SUPT., Washington, D. C.

Sooty egrets

Large numbers of cattle egrets in central Florida, and normally quite white, have been turning progressively darker, even to near black. Fortunately, this is not the result of a mutation of this particular population but a direct result of the intensive firing of the citrus groves during the January cold spell.

As a result of firing the groves with old tires, railroad cross ties and crude oil to prevent freeze damage to the citrus crop. a large amount of greasy soot covered most of the citrus area. This has rubbed off on the egrets, carrying them through shades of gray to black. It will probably last until the plumage change, too.

Record commercial catch

Fishery products harvested by U.S. commercial fishermen in 1965 reached a record high of about \$440 million. This is \$51 million and 13 per cent more than in 1964.

The American consumer recognizes that fish is a relatively low-cost, highprotein food with little waste. The 1965 record reflects the continuing demand for fishery products. Improvements in processing, packaging, freezing and transportation all played a part in creating the record year.

The shrimp fishery led the new records with the value of the United States shrimp catch in 1965 estimated at \$82.6 million.



Spare-legged frog

A frog with two good hind legs can be hard to catch.

Jack White caught up with one carrying a spare!

This frog came from Lost Pond, some two miles from the Putnam Pond Campsite, 6 miles west of Ticonderoga.

Marsh blasting booklet

State and Federal wildlife agencies report more and more queries from landowners and others interested in creating potholes for ducks and wildlife by blasting in shallow marshes and saturated soils, according to the Wildlife Management Institute. The pros and cons of this technique, plus an illustrated stepby-step explanation, are shown in a booklet, "Marsh Blasting with Ammonium Nitrate," available from the U.S. Forest Service, 710 N. Sixth Street, Milwaukee, Wisconsin, 52303.

Litter crowds fish

Some 50 million people in the U.S. will go fishing this coming spring, summer and fall. If each of these anglers were a litterbug and left a pound of rubbish in his streams, lakes and salt water or along the shores, it would add up to a potential of 50 million pounds of rubbish in a single season.

Most anglers are not litterbugs but there are enough careless fishermen with their lunch wrappings, empty cans and bottles, old bait cans, etc. to spoil the nation's waters for man and fish alike.

Carry home whatever trash you cannot safely burn.

Dubious distinction

Long Island's south shore has the dubious distinction of having one of the densest growths of certain marine plants ever found in the ocean, according to a Cornell University oceanographer. The growth is due to the large amount of nutrients entering the water in the form of pollutants.

A study is being made of the plants in the estuaries—places where streams or rivers empty into the ocean—to see what happens to them when they receive these massive charges of nutrients. Fertilization of bodies of water has always taken place naturally from the washing of nutrients from the soil around the water. But as man's activities increase, so does the amount of fertilization.

Plants at the bottom have a slow rate of photosynthesis and they manufacture little of their own food but algae appear to be able to absorb the organic material entering the water, furnishing nourishment, which the researchers believe may account in part for the dense growth.

The study is planned to learn how much pollution can take place and still keep plant growth within bounds. Although action is now being taken to stop pollution, it will be a long time before an appreciable difference will be seen in the State's waters.



LETTERS to the editor

Old man of the mountains

Sir: In THE CONSERVATIONIST. June-July, 1965, on page 6, that old man with the humped back and long nose, is me, on State land, just off Perkins' Clearing. I was 86. I was camping just back in the woods about 7 rods, all alone, as my buddy died the year before. I am in hopes of being up there this fall abunting. I will be 90 then.

Fred Mackey, Middlesex

· Congratulations, and good luck .- Editor

Cunning litterbug

Dear Sir: Enclosed is a handful of litter which I picked up and represents only a fraction of the total amount in the area consisting of soft drink cans, lunch bags, etc. The area in question is a small parking area for fishermen provided by the Conservation Department and located on the Oriskany Creek near Dugway Road. The reason I am taking the pains of sending you this litter is because, hopefully, when spotting the envelope I thought I might obtain a name and address which our local Game Protector could use in tracking down this particular culprit. Please observe that this character scratched out his name and address and then threw the scraps on the ground! I thought this was going pretty far in the way of deliberate and cunning litterbugging. I sure wish we had better laws with more teeth in them to curb this sort of thing.

Walter W. Oman, Clinton

Helping hand

Dear Sirs: I would like to make a comment on a letter to the Editor in the Dec.-Jan., 1965-66 CONSERVATIONIST, that of Mrs. Hannah C. Salvatore of Rhinebeck. She wondered that a yellow warbler fed its breakfast to a waiting pigeon hawk. In July of 1965 our family was camping in the Allegany Mountains. We threw bread out in front of the cabin. We witnessed a small gray chickadee feed a young bird, not of its own species. It was twice as large as the chickadee, brown with a speckeled brown and white breast. The chickadee crammed the crumbs down the throat of the other bird. The bird was old enough to fly. We thought this strange, Do birds adopt young of another species or do birds practice slavery?

David Bingert, Buffalo

• Not slavery, but sometimes a helping hand, or in this case, beak,—Editor

Fox squirrels

Gentlemen: On October 10. 1965. while hunting approximately 5 miles south of Geneseo. my son and I each shot an unusual squirrel. Upon going back through our old CONSER-VATIONIST issues, we found in the February-March, 1957 edition what we were looking for. It was an article on New York squirrels by W. J. Hamilton, Jr. of Cornell University.

The squirrels fitted perfectly the description of fox squirrels. We killed the two and saw two more so there are some left. We have hunted this same woods for at least ten years, and shot many squirrels but this is the first of these we have seen.

Daniel Dostman, Ralph Dostman, Spencerport

• We were very much interested in your report about finding lox squirrels. They are listed as occurring in southern New York, but this is the first report I have heard about them in some time.—Editor

Their contribution

Gentlemen: Lately I have read much about blue birds in my CONSERVATIONIST and thought you would like to know about our contribution to that population. We recently constructed one bird house for each of our 185 students. This terminal project of our unit on animals should increase their numbers considerably.

F. E. Griffin, Grover L. Priess Elem, School, Eden

Out-of-stater's views

Dear Sir: Hunters and fishermen can be divided into two categories-nice people and so-and-so's. The nice people ask to hunt or fish your land, don't litter up the place, don't cut fences. The others act like so-and-so's. They roar around the countryside, shooting at anything that moves, be it cow or cat, They dump their beer cans and booze hottles where they are emptied, to come to light at this time of year as the snow melts. Their name and tribe is legion, and their litter is to be seen on any roadside. They cut fences or break them down by crawling clumsily over them; they chop themselves a Christmas tree from plantings on private property; they ignore posting notices and yell loudly when arrested for trespass. They are 99 per cent of the reason why we must have Conservation Officers patroling the woods, lakes and streams to enforce fair conservation laws.

In the area where I live, on the eastern shoreline of Lake Winnebago, Wisc. I would estimate that about 90 per cent of the forested lands are posted. Not that anyone objects to hunting—it's those other type hunters that are objected to. There is plenty of game for everyone; too many deer, in fact. We are just fed up with picking up empty heer cans and bottles, fixing fences, and the like. It seems to me that violators of the game laws could be further punished by withholding hunting privileges for a season, especially for violations that involved gun safety, littering, or just violations of common good manners.

Frederick C. Hervey, Chilton, Wis.

Pollution

Gentlemen: I read the letter from M. W. Lockport, on "Waste and Pollution," in the February-March issue of THE CONSERVA-TIONIST (Pg. 44, col. 3.) If this waste is so valuable why don't people store it in the right places? In any case, it shouldn't be dumped into our lakes and streams!

Mark Lindsay, Johnstown

• We will learn, in time—or smother in it. —Editor







Duck story

Dear Editor: Last summer my daughter had a house built on a tidewater bay adjoining our Hudson River "island" home. She called me early one morning to get my camera and come quickly. Seven very newly-hatched wild baby ducks had walked up from the muddy shoreline, and confused I suppose, crawled under her large black retriever, sunning herself by the new garage. The dog. stunned, never moved and I snapped the shot in the poor light. My husband put them (the ducklings) in a paper carton and we all looked everywhere for the mother duck-but no sign then or later on. We have killed several very large turtles in this area and maybe they or a dog disturbed the nest.

We brought them home and put a soft.

Trickling

Gentlemen: In your August-September, 1965 issue, on page 34 you describe a new treekilling hatchet which was recently invented.

We have a very great problem here in getting rid of scrub oak which keeps on coming up even out of supposedly dead stumps. We thought that perhaps this hatchet would be the answer to our problem.

We would appreciate your advising where we can obtain more information on this product, whether it is for sale on the market now, the price, etc. Harry M. Webster, Prescott, Ariz.

• The hatchet described is only one of a number of striking or stabbing tools used for the injection of tree-killing substances into woody weeds. No matter how it is done or what material is used, the operation will only kill that part of the tree above the point of injection-it will not kill the roots and, therefore, will not completely abate sprouting.

If you want to kill the tree, root and branch, you can best do it with plant hormones applied by trickling, a technique

wooly rag on a hot water bottle in the box and they crowded on top of the heat right away. Later, my husband fed them mashed hard-boiled egg yolks and as they grew stronger, baby chick food and shredded lettuce.

They matured very fast and when they had feathered out and were splashing in a large pan of water, he took them over to a muddy tide flat and left them swimming around in the shallow water.

A few days later, the carpenter called my daughter to show her two young ducks asleep in one of the bedroom closets in the uncompleted house, and that same day, three more showed up in the vard. Two never came back; likely victims of some accident. This time, my husband put the five in our enclosed vegetable garden and dug a large hole to sink a big tub for them to swim in. We kept them there until they were able to fly, but for a long time, they refused to leave us! The garden gate was kept open and they waddled each early morning up our drive and climbed the steep, cement steps to my kitchen door, quacking until I fed them. All day, these wild, black ducks, followed my husband around, five in a line, behind his heels!

Toward fall, other wild ducks swam around our island and one day ours were gone.

Ruth Reynolds Glunt, Saugerties

sometimes loosely referred to as "basal spray." A 2 per cent solution of 245T in kerosene is liberally flowed onto the base of the stem, so that it runs down onto the root collar, where roots and stem meet. This treatment is slow-acting but very effective on most of the trees that grow in New York. I have never tried it on scrub oak, but it will kill such resistant species as red oak and black cherry.

Try trickling and see what happens!-David B. Cook, Senior Forester

Population curb

Editor: "The Peregrine Disappears" by Paul Kelsey, in the August-September issue of THE CONSERVATIONIST is a gem. It made me both nostalgic and sad.

I have treasured memories of the early 20's while a student at Cornell. I. too, risked my life to hold my camera out over the edge of the Taughannock Gorge precipice to get a picture of two half-grown duck hawks on a ledge below. What a thrilling experience that was!

It is a tragedy that this outstanding and fascinating creature is on the road to extinction. And the evidence is almost indisputable that we, in our zeal to control insects with DDT, have done the damage. Since this chemical has had such a powerful effect in reducing the fertility of duck hawks, eagles and ospreys, it is unfortunate that it can't be used to slow down the frightening explosion of humanity.

Malcolm E. Smith, Falls Church, Va. (Cornell Ag. '23)

Jungle prowling tip

Dear Sir: As a zoologist and jungle prowler with over 50 years of experience with tropical wildlife, a "must" in my medical kit is a dozen or more kits of antivenom by Wyeth Laboratories for North and South American snakebite.

The directions for treatment by Wyeth Laboratories, Inc., Marietta, Pa., have been recommended.

You will note that particular emphasis is placed on the use of tourniquet, incision and suction as being more harmful and abandoned in clinical use.

Harry A. Beatty, N.Y.C.

Comment on mink

Sirs: I would like to comment on the December-January issue on the article. "How to Trap Mink." It was a good article with one possible correction. I don't believe wild male mink stay with the female to help raise the young. With ranch mink, the male has to catch the female by the back of the neck, forcibly, to disarm her for breeding. Without this "fight" the female doesn't release her eggs. After breeding, the female tries to escape. If she doesn't the male drives her away; i.e., tries to kill her.

Have also observed a female mink driving a male off her island on Black Lake first week of July.

> Walter Terpening, Richfield Springs (Wal-Ris Mink Ranch)

Frustrated

Dear Sir: It is probably an act of futility. However, I did want you to know why I will not renew my subscription to what is in many ways an excellent publication. THE CONSERVATIONIST

The article in the December-January, 1965-66 issue, "How to Trap Mink," has little to do with conservation, and much to do with brutality.

Having had a cat whose leg was torn off by a trap, and having released animals from traps, I know them to be an instrument of torture not suitable to a civilized person, and most certainly not acceptable to a person having regard for nature, or love of —if you pardon the expression—God's handiwork.

Lincoln Figart, Jordan

• Trapping, humanely done, is the only effective way to harvest the wild fur crop, and furs will undoubtedly continue to be harvested until mink (and other fur) coats go out of style.—Editor

The Appolachian Trail

To the Editor: I have just read the article entitled, "The Appalachian Trail in New York and New Jersey" in the February-March CONSERVATIONIST and would like to point out to your readers that there is presently a bill before Congress which in effect would preserve and protect the entire Appalachian Trail for future generations of hikers.

The Appalachian Trail Bill (S622) is cosponsored by two conservation-minded Senators; namely, Senators Gaylord Nelson of Wisconsin and Harrison Williams of New Jersey, who feel that the trail has been rerouted too often by the pressures of expanding suburbia. The bill would provide for Federal purchase of the trail and sufficient land adjoining it where it does not now pass through state and Federal lands for the purpose of maintaining and administering it and to preserve its wilderness character. Readers are urged to write to their

Readers are urged to write to their Senators and Congressmen in support of S622, Without protection the trails continuity could be broken and it would no longer be "The Longest Footpath in the World."

Eugene E. Graf, Dover, N.J.

berruter-beootgT

Dear Editor: The story about the lost hound in your December-January issue, page 36, brought to my mind a similar situation that happened to one of my dad's hounds. He got his dog back in a few hours because the hound had his name and address tattooed in his ear. He had lost his tag and collar. My dad bought a machine to do the work on all his dogs' ears—from the Dermo Marker Co., 11 Wedgewood Lane, East Northport, L. I. I am passing this information along so other sportsmen won't run into trouble losing their good hound dogs. S. S. Johnson, Brooklyn



Geese and swans

Dear Sirs: The enclosed picture shows a flock of Canada geese, about 70 in number which have spent several years between Rockland Lake, Congers Reservoir, and Congers Lake. There is one snow goose, left foreground. They are quite tame and come very close to feed on cracked and

whole corn. When water is open, there's quite a fuss between them and about 60 swans for chunks of bread.

Both groups are pairing off, soon there will be many more.

> T. J. Minwegen. Congers



Jigging carp

Dear Sir: I am enclosing a picture of myselt and the result of one of my ice-fishing trips this winter. Almost unbelievable that it could happen during the winter season, but you're correct if you think it's a carp. I took him through the ice on Titicus Reservoir while jigging with a Swedish Pimple. The fish weighed in at 12 lbs. and although he wasn't quite what I had in mind, I took him home anyway and had a lot of fun showing him to my friends who, up until now, thought that "it couldn't be done."

Mason C. Ward, Purdy Station

Would spare the bear

Dear Sirs: On page 10 of the October-November, 1965 issue of THE CONSERVATIONIST is an article by George H. Lesser, "an old hunter." Mr. Lesser writes about his enjoyment of yellow leaves, crisp air, mcn "shouting" like "boys."

Mr. Lesser has killed 35 deer. This would be conservation due to the animals' population growth. But Mr. Lesser has gone further in "the art." He has shot three bear.

How many hear has he seen in New York State? How many bear are there in New York? Are there enough "big fat hear" to permit Mr. Lesser the luxury of a hero sandwich of bruin meat?

Free living bear are parts of the New York heritage and residents of the State for thousands of years. They deserve the right to survive in freedom, if only because they represent that unique living genotype which, once destroyed, never occurs again, if only because they long ago struggled and won their right to exist in the world.

To stand back with no apparent naturalist knowledge, understanding or feeling for the animal, to aim at a rather large living target for the sole thrill of stopping a heart beat and stuffing a head ("thrown in for good measure"?) is a criminal act if there is the slightest possibility that the species is endangered in our area.

Teri Heller, Scarsdale

• New York's bear population is on the increase too and is not in danger of overharvest.—Editor

Million to one

Dear Editor: Last fall, during deer season, I had an unusual thing happen to me while on the way home from work one night about 12:30 o'clock. I saw something shining in the road but never gave it a thought that it was a deer slug, and to my surprise it was. I had found out after I ran over it. When the back left wheel hit it. I jumped and was very frightened to hear the noise of it sounded like someone had shot right under my car. I have ice corks on the back snow tires and all I can figure out that one of the spike ice grips had hit the center of the shell that was left laying in the center of the road by some carcless hunter by emptying his gun in the highway the day before. Look what could have happened to me or the car! I strongly recommend all hunters be more careful when emptying their guns while on the highway. The life you save may be your very own.

John H. Caton, Rushville



State

Rabbit infection

Dear Sir: I would greatly appreciate it if you would give me some information in regard to a disease that attacks rabbits white snowshoe. It is called *Multiceps serialis*. Is it contagious, how contracted, symptoms, etc.?

Bill Guerra. L'tica

• The disease of snowshoe rabbits, Multiceps serialis, to which you refer in your recent letter, is actually a parasite infection. I have seen several cases of snowshoes so infected and consider this to be of relatively common occurrence here in New York.

The adult form of this parasite, Taenia (Multiceps) serialis, is a tapeworm belonging to the order Cyclophyllidea. This order contains the vast majority of tapeworms of mammals and birds.

The adult tapeworm is found in the small intestines of the dog and fox. Eggs are shed periodically with the feces of these animals and are then picked up on vegetation by hares, rabbits, and related species. The embryos remain passively in the egg until eaten by the host in which they are to develop. The embryos that hatch out, make their way into the blood vessels in the walls of the alimentary canal of the intermediate host (in this case the snowshoes), and are carried by the blood to other parts of the body.

The larval stage of Taenia serialis is found in the connective tissue between the muscles of hares, rabbits, squirrels and coypus (untria) and is called Coenarus serialis. Cases of accidental parasitism of the muscles and brain of humans have been reported. The cycle is completed when dog or fox eats meat containing the encepted coenari and these larcae then develop into the adult form and live in the small intestine,-Milton Friend, Conservation Biologist

Had similar experience

Dear Editor: Apropos of your article in the March CONSERVATIONIST on the program of conservation education at the private school. Back in the 1930's, when I was Scoutmaster of Troop 102, Queens, we had a similar experience. The Queens Council of the Boy Scouts of America ran a week end camp out at Long Island called Camp Newcombe.

It was part of the responsibility of each Troop that came out to stay at Camp Newcombe to plant a few hundred pine tree seedlings and we did it religiously. I am not sure what the Council did with the trees when they grew up because thousands of trees were planted by our boys under this program.

Where there's a will there's a way and if you are aware of the conservation program and are interested in its perpetuation you will find a scheme for doing so.

Charles Belous, Port Washington

On canoe trips

Gentlemen: I would like to plan a trip for ten Senior Boy Scouts as a reward for their accomplishments in our Scout Troop.

In discussing this trip with our boys, they have indicated that they would like to

City

(Zin Code)

I enclose \$

THE CONSERVATIONIST, JUNE-JULY, 1956

make a canoe trip in the North Woods in order to display and put to use their Scouting skills. I wonder if you could be of assistance to me in planning the following type of trip: Our boys are eager to perform some type of conservation program for a State, community or worthwhile conservation project could be worked on by these boys while they are on this trip. Their original desire was to make a 50-mile canoe trip in order that they could qualify for the Boy Scout 50-mile award, I had hoped that we could find a suitable trip for them that would not only allow them to qualify for this 50-mile award over a period of five days but also would include an opportunity to spend one or two days on some conservation project.

The boys' ages range from 12 to 17. The majority are in the 16- to 17-year-old age group. We are reasonably certain that we could provide six canoes for the trip and the boys have earned sufficient money by themselves to pay for their food. With a few exceptions, all of the boys are fairly experienced campers. The adult supervision so far has been limited to myself as Assistant Scoutmaster and one other experienced camper.

I have been a subscriber to your magazine less than two years; however, I find of all my subscriptions, yours is the most interesting and far superior to that of my native state. The articles I have read, lead me to believe that very possibly you may be able to help me with the program we are planning for the boys.

> George W. Morville, Sr., Newton, N. J.

• The Editor of THE CONSERVATIONIST, has passed your letter to me and asked that I reply.

First of all, I agree with the Editor that it is difficult to combine a service project with a canoe trip, especially a 50-mile "sprint." Even if such opportunities existed, the boys would have their hands full portaging, preparing meals and just making headway on an outing of this type. A possible exception to this would be in some areas of Algonquin Provincial Park, Ontario, where careless canoe campers in the past have ruined some of the isolated campsites by allowing camp fires to escape. If your boys were to intentionally camp in one or two of these sites (an up-to-date spotting would have to be secured from Ontario Lands and Forests people serving the area) they could devote as much time as you would want to provide for improvement.

As for canoe trip areas, beyond all doubt the most popular in New York State is the Fulton Chain to Saranac Lake route, containing every challenge a canoe party could possibly want and in a setting of beautiful scenery. Should one not desire to trek the entire length, many road contact points make it possible to shorten your stay. A brochure, containing a spread map, is enclosed for your study. Incidentally, I serve on the committee of a Scotia, New York, Boy Scout Troop (my son is a member) that takes this trip every year. We, consequently, have considerable information on such as canoe rentals, provision stores, and related items that canoe parties find out only through experience.

Returning to Algonquin Park for a moment: This is an area becoming more popular each year with U.S. Scouting and youth groups. The nice thing about it is one may contract with local outfitters at what I consider a low price (\$5 a person per day) for canoes, provisions, tents, packs, and all essentials. The outfitter will then haul the canoes to any point within a reasonable distance and pick up at the end of the trip. All of this means much in the burden of planning, and, to say the least, reduces the "logistics" on this long auto trip. I took 24 members of a Senior Girl Scout Troop over a 75-mile route, containing about 20 portages, three years ago and I am going with a similar group in August of this year. Should you be interested in specifics on

Algonquin Park provisions, I recommend you drop a note to: Mr. William V. Swift, 402 Bonnie Brae, Rochester, New York.

Mr. Swift is co-owner of Algonquin Outfitters and has printed provision lists. Feel free to mention my name if you correspond with him. I recommend him most highly.

In closing, it is my thought that your boys should all be excellent swimmers, whether or not they have ever been in a cance. A large segment of them should be Senior Life Savers. Further, the portaging is arduous and the boys should all be large and strong enough so that each can do his share; otherwise, you can be in for trouble.

When you arrive at a final decision, I will be most happy to assist you in any way I can.—James W. Kelly, Senior Wildlife Biologist

Getting the message

Dear Sirs: Please send to me several applications and envelopes for THE CONSERVA-TIONIST. Part of the fee to join the Tonowandas Sportsmen Junior Group is used for a year's subscription to your fine magazine.

As counselor for the past fourteen years to the Junior Group, I would guess that about 700 to 900 boys have been sent THE CONSERVATIONIST.

Ken Sprenger, North Tonowanda

• An effective way to get conservation over to the youth --Editor

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Pack Trip Tips

(Continued from page 48)

ground with saddles and gear on it covered with a tarp, is a good storage method. You wouldn't like to climb into cold, wet clothes in the morning and a horse isn't too happy about the feel of a blanket and saddle left on the ground all night with sweat and dew collected.

Pack Animals

Pack animals constitute a special problem. Many are horses that are too temperamental for riding or have not been properly broke. Most of them can be handled if it is done carefully. Remember the danger of the hind feet.

Pack saddles are put on in much the same way as the riding saddle. In addition to the cinches, the pack saddle also has a breast collar around the front of the animal and britchen around the flanks. These are buckled, adjustable straps which prevent the load from sliding as the horse climbs. A good soft blanket or pad is essential under a pack saddle,

When loading a pack animal, put the load in canvas boxes or duffles, *balance* the load equally on each side of the animal. (Carry a spring scale that will go to a hundred pounds and make sure the side packs are equal in weight.) A pack horse should not be expected to carry over 200 pounds. Adjust the packs so they ride high on the horse's side ribs. This position will least interfere with the pack horse. After the load is on, and balanced, cover it all with a load tarp, then tie all in place. The best hitch for securing the pack is the famous diamond hitch. There are many versions of this, only one of which is shown here. This one is easy for one person to tie.

Remember, when you travel with animals you more than double your responsibilities. You have not only yourself and your own gear to care for but that of the horses' as well. Properly used and well treated, horses can and do add much enjoyment to a visit to the wilderness. But remember: Do treat them well. They have memories.

⁽While I have done a good bit of riding and worked on a western ranch, I am indebted for most of my knowledge of horses to my good friend, Joe Back, of DuBois, Wyoming. Joe is a master horseman and packer. If you would like to refer to his writings, I recommend "Horses, Hitches and Rocky Trails," published by Sage Books, Denver, Colorado.)

Pack Trip Tips

by H. Wayne Trimm

THERE is hardly anything that can spoil a vacation quicker than poor or undependable equipment. Usually the condition of the equipment reflects the use or misuse it has had. Although pots and pans, lanterns, tents and boats are all vulnerable to damage, they generally seem to lack memories. Some of you may disagree when you think of the tent that refuses to go up in the rain or the lantern that will light only in the daytime. Usually most equipment is not vindictive.

But now, with an increased use of horses for riding and pack trips in New York State, the story is different. Unlike the versatile and noisy trail scooter that eats only when moving and has no memory, the "hayburner" needs food and care—and does remember.

It would be impossible in the space alloted here to write a manual on riding and packing a horse, but a brief reminder of items to keep in mind may be of value. People on vacation often try to do things which differ from day-to-day routine, so we may suspect that riding is not a normal or usual part of their lives. Hence, this article will be very elementary and basic.

Of course, the smartest thing to do is to go on such a trip with a professional horseman and packer. But, if no guide and packer is available, here are a few do-it-yourself tips.

Equipment

The riding saddle should be comfortable and secure. For trail riding, I prefer a good quality western saddle with fairly high cantle and pommel. These help a rider stay aboard on steep slopes. The stirrup length should be approximately as long as the rider's arm from armpit to fingertip. Length is easily adjusted with a buckle. Make sure that all straps are pliable, not dried or cracked.

The saddle pad or blanket is designed to protect the horse against rubbing by the saddle. It should be soft, strong and of sufficient size to keep the saddle itself from rubbing the horse.

A halter is an arrangement of leather straps which fits around the neck, behind the ears and loosely around the nose of the horse. It is used for leading and tethering.

The bridle is the horse's "steering wheel." The bit, a curved metal bar. is placed in the horse's mouth and the head strap fastened behind the ears. Reins fastened to the bit constitute the rider's contact with the horse's brain. A pack trip horse often has a bridle put on over a halter.

A good pack saddle can be one of several types. The one I like best is the sawbuck, a simple saddle with crossed wood pieces strap-fastened to padded wooden pallets shaped to the contours of a horse.

Rope is a necessary item and there is seldom enough. Manilla hemp is best for it is strong and knots in this rope rarely bind up in cold or wet weather.

Attitude

Whether you feel it or not, act confident when working with a horse. Talk to it. Be firm but gentle. Remember that a horse has a memory and learns to recognize a person or other animal that mistreats it.

Do-It-Yourself Methods

In leading a horse, hold the halter rope or reins about six inches below the horse's chin. This allows the horse to move its head but gives it the feeling that someone is in control. When holding or leading a horse, stand or walk on the left side of the horse near the front shoulder. This will keep a person out of harm's way since the horse's hind feet are the dangerous ones. Speaking of danger areas: If at all possible, do not approach a horse from the rear. Even a gentle horse, if startled, may strike out with its hind feet.

Before saddling, the horse should be tied to a tree or hitching post by a halter rope. Tie it short enough so the animal can't move around too much. but not so tight that it may cause the horse to panic. Once the horse is tethered. stand on its left side and put the saddle blanket in place, being sure it is far enough forward to keep the saddle from rubbing. After the saddle is swung in place, put the left stirrup over the saddle. Reach under the horse for the dangling cinch ring, take two turns through it with the leather strap and tie the knot in it as shown in the sketch. Be sure the cinch is tight. Horses tend to suck in air and expand their chests while the cinch is tightened. When this air is exhaled, the saddle may be loose, so check the cinch again before mounting. After the saddle is on, adjust the stirrup length. The rider's leg should be slightly bent when he is seated.

Next the bridle is put over the head of the horse, the bit slipped into its mouth and the strap buckled around its ears. Reins are brought back to the saddle and the halter rope is untied.

A horse is mounted from the left, Stand near the horse, facing back. With the reins gathered in the let band, grasp the pommel or saddle hor. The the same hand. Twist the stirrup wit right hand, placing the ball of the foot in the stirrup. Grasp the cantle we the right hand and, with a hop off the right foot and a pull with the right arm, raise the body high enough to swing the right leg over the flanks of the horse and the cantle.

A horse is "steered" by pulling gently on the reins, A right turn is made by pulling a little on the right rein and looking right. As the horse feels the weight shift with the turn of the rider, and feels the uneven pressure of the bit, it also turns in that direction. Left turns are made in a similar manner. The horse is stopped by a sudden but firm backward pull on both reins simultaneously. A continued pressure backward will make the horse back up.

When riding, keep the weight forward with your back straight but relaxed. The rider's legs should carry part of his weight instead of it all pounding the kidney area of the horse. When climbing hills, the rider's weight should be forward even more; downhill it should be toward the back. The rider's weight should be on the balls of his feet.

When approaching streams or obstacles, be prepared for anything. Some horses prefer to jump rather than wade and this can lead to some unscheduled baths for the unprepared rider.

Reins are usually carried in the left hand across the palm so that a slight twist of the wrist can exert pressure on one side of the bit or the other.

A walking or a running horse is easy to ride, but a trotting horse can cause trouble. Try to move a little behind the horse in timing, so that you are still in the air as the hooves strike the ground, letting your weight down with the tension of your thighs in time for the next rise of the horse's body.

The ride is over and you want to dismount. Kick the right foot free of the stirrup and do the opposite of mounting, except that the left foot is swung free of the stirrup before the support of the arms on the saddle is relaxed.

To get conditioned to riding, plan to lead the horse ten minutes after every hour of riding. This will rest the horse and will help your legs adjust.

When the day's ride is over, unsaddle the horse and rub it down. Saddles, bridles and blankets should be put where the sweat will dry and where they will be protected from weather and porcupines. A downed log, four feet off the

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Wild Calla; Water Arum (Calla palustris)