Massachusetts Wildlife

MAY-JUNE, 1979

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IN THIS ISSUE

THE COVER: In its advance stages of decay the cattail harbors a variety of insects that are food for the spring invasion of the red-wing blackbird, while its new growth provides food for the forager of edible wild plants. See story this issue. Photo by Bill Byrne.

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TOPS FOR SATISFACTION

It has been written that "a fisherman is good in proportion to the satisfaction he gets from the sport." To some this means stalking the elusive native brook trout with a fly rod, to others it's seeking out the salmonids; rainbows, browns and lake trout. Although there is no denying these perennial favorites their place in the sun, to thousands of Massachusetts fishermen and women there is nothing like the strike of a black bass to experience the ultimate in piscatorial satisfaction.

The stocking of bass in the Commonwealth began in the year 1850 when one Samuel Tisdale introduced 27 smallmouths into select Cape Cod ponds in Wareham, Plymouth and Bourne. They were shipped from Saratoga, New York, and marked the beginning of one of the most successful species introductions in the state. As a matter of fact, the venture was so successful that many anglers today still insist that the largemouth and smallmouth bass are indigenous to Massachusetts.

By 1912, after a succession of stockings throughout the state, a hatchery for the propagation of smallmouth bass was built in Palmer, Massachusetts.

Although the Palmer Hatchery was primarily concerned with the cultivation of smallmouths, it also raised largemouths in natural ponds located on the Palmer site. These attempts proved to be unsuccessful, however, and the idea abandoned. Live stocking of fish taken from other natural breeding grounds proved to be more successful and it wasn't long before the species became established as two of the most exciting warm-water sport fish in the East. It is generally agreed that Lake Ontario and the Ohio River drainage systems were the origin of the largemouth and smallmouth bass which have since become the focus of a recreational industry valued in the millions!

Today the bass are established throughout the country with the southern states boasting "lunker-size" bass in the 20-pound range . . . the result of a 12-month growing season compared to a six or seven-month growing season in the Northeast. Still, Massachusetts and the other New England states produce some "bragging-size" fish of their own, like the 15-pound 8-ounce largemouth pulled through the ice and the 13-pound largemouth taken from an obscrue pond in Carver, Massachusetts. (See *Massachusetts Wildlife,* September-October, 1976).

In the smallmouth class the state record stands at seven pounds and what the smallmouth lacks in weight it more than compensates for in its fantastic aerobatic efforts to shake the hook. Anyone who has ever tried to tame a smallmouth, or crank a largemouth through a bed of spatterdock, will attest to the obvious . . . the bass fishery in Massachusetts is one of the best angling challenges left . . . and July and August the best months to respond to that challenge.

—Matthew B. Connolly, Jr., Director

by
Jack Clancy

Without the language of science we could well lead you to the poison patch . . . albeit unintentionally.

It's a fact . . .

By the first of May when the leaves have exploded into view, mammoth magnolia blossoms blanket lawns and the white flowers of a myriad species of cherry trees and bushes brighten our winter-drab roadsides . . .

. . . and people freak out.

There is something about those first warm, windless days of spring that moves the restless fisherman; the birder who challenges the wooded trails still sopping from the last traces of surface frost; the salamander buff who stoops to overturn the most insignificant leaf in the hopes of discovering his first amphibian of the season; the novice—and not so novice—herpetologist scouring the land and water alike for whatever reptiles might be about . . . and then there is the wild food forager . . . a creature whom some believe to be the weirdest of the weird.

Back to the magnolia. Unfortunately this attractive and decorative harbinger has an all too brief blossoming season. The life of the wild Black Cherry (*Prunus serotina*) on the other hand, has only begun when its finger-like umbels of white flowers brighten our understory forests and cleared borders of the highways.

Unfortunate also is the fact that we have a wide variety of wild cherry species with few of them sweet enough for tree-to-mouth eating. They also contain little or no pectin, demanding a commercial additive if you choose the jelly and jam route. But, at least they are there for the picking if one is so inclined . . . and the very least that can be said of them is that by their very presence they are a spring tonic for the foragers . . . a promise of things to come.

But there is more to collecting wild edible plants than picking a ripe cherry, chewing on a stalk of meadow hay, or savoring the wintergreen flavor of the Checkerberry. A great deal of what one hears and reads about wild plants is true, a great deal is false, a little of it is true and false. Much of the fun behind wild plant foraging is sorting out fact from fiction.

Anyone who has ever used those indispensable field guides has been faced with the aggravation of scientific names. Those of us who write about nature appear to have an affinity for making our written work sound as stuffy and pompous as possible by constantly referring to scientific names. Well, it's more necessary than you'd think. Common names, whether they are associated with plants or animals are extremely unreliable in pinpointing the exact species described. Take the case of the Cowslip for example. Here in America we know it as Marsh-Marigold and by the scientific name *Caltha palustris*. In England the Cowslip is a member of the primrose family, an entirely different species, with the scientific name *Primula veris.* It doesn't take much imagination to see what a disaster we could create by using only the common names of our plants.

The problem of proper identification is more important with some species than with others. Take the Day-lily for example. The Day-lily we refer to is known botanically as *Hemerocallis fulva* but is often confused with Turk's-cap Lily *(Lilium superbum)* and Tiger Lily *(Lilium tigrinum)*, which are true lilies, something our edible lily is not.

All things considered a beginner-forager would be wise to take these differences into consideration and use the scientific names if only to ensure the plants' proper identification. Who cares whether it was taken from the Latin, Greek or French, or who the taxonomist was that is credited with the classification. The important thing is to know what you're looking at before it goes into your mouth!

So, readers, forgive what appears to be a didactic approach but is in reality not only a pain in the neck but a necessity as well. Without the language of science we could well be leading you to the poison patch, albeit unknowingly. The facts are that in America the polecat is a colloquial term for the skunk *(Mephitis)* while in Europe it is a fitch *(Plutorius)*, and although they are both weasels they look as much like one another as a knife and a fork.

In collecting wild plants for food there is yet another pitfall besides the confusing common nomenclature. Take this statement, for example: the wild black cherries are highly toxic plants! Literally every part of these plants are poisonous except the ripe fruit! This is a bit of a shocker to the neophyte collector until you consider that the leaves of the common rhubarb *(Rheum rhaponticum)* are also noxious as are the leaves of our common garden tomato and potato. Considered in this light the cherry suddenly doesn't come off half bad.

Elderberry *(Sambucus canadensis)*, regarded by some to be the prince of wild wines is another plant that is highly toxic with the exception of the ripe fruit. This fact, however, is not passed down to us by those same folks who expound the social and medicinal qualities of elderberry wine—which must say something about the significance of knowing too much.

The author feels that Marsh-Marigold isn't worth the effort.

Photo by Jack Swedberg

Today's book and magazine markets offer a proliferation of journals in one form or another all testifying to the benefits of going back to nature for our vitamins, calories and roughage; and aside from the fact that many of these journals list plants also included in texts dealing with poison plants found in the home garden, they also propose methods of preparation that are contrary to good nutritional practices.

The late Euell Gibbons, for example, proposes the Marsh-Marigold or Cowslip *(Caltha palustris)* as a desirable, edible plant. He admits that eating it untreated might poison you and advises boiling it in two or three changes of water to make it palatable. Nutritionists, on the other hand, tell us that by boiling our vegetables we are destroying most of the good in them. Why this double standard?

In the case of nettles *(Urtica dioica)* the forager is advised to collect this resource armed with a pair of leather gloves and a sharp knife! With all the thousands of edible plants available it hardly seems worthwhile to concern ourselves with those that require special treatment either in the collecting or the preparation.

Dealing with wild plants as an alternate food source is very much like trying to get your friends to eat game for the first time, their first question being "what does it taste like?" The obvious answer should be "like venison" or "like squirrel," or whatever it is that we are eating. Unfortunately we feel that we must equate it with a familiar taste, i.e., "it tastes like pork, or beef, or whatever."

Whether one is foraging for wild plants or game foods it becomes dramatically obvious that a sense of adventure must go with it from the collecting to the eating. There is no one less respected in the world of the hunting or fishing sports than the person who collects his or her prize and then lets it rot in the garbage bucket or buries it in the garden. This same attitude applies to the plant forager. If you don't like it the first time around, either find some one who does or leave it alone the second time around.

There was a time many years ago that grey squirrel never found a welcome place at my table. I had collected some grey squirrel while hunting in the Harold Parker Forest, North Reading and had cooked it in a fashion recommended by a friend (the recipe has long since been forgotten) and it was terrible! For over twenty years I avoided shooting the grey squirrel because of that experience. Then came the day when my oldest son was away at college and he invited his mother and me to an apartment he shared with two other boys for a game dinner. Included was grey squirrel in one of the most delicious one-pot meals I have ever eaten. After twenty years the grey squirrel was back in my recipe file.

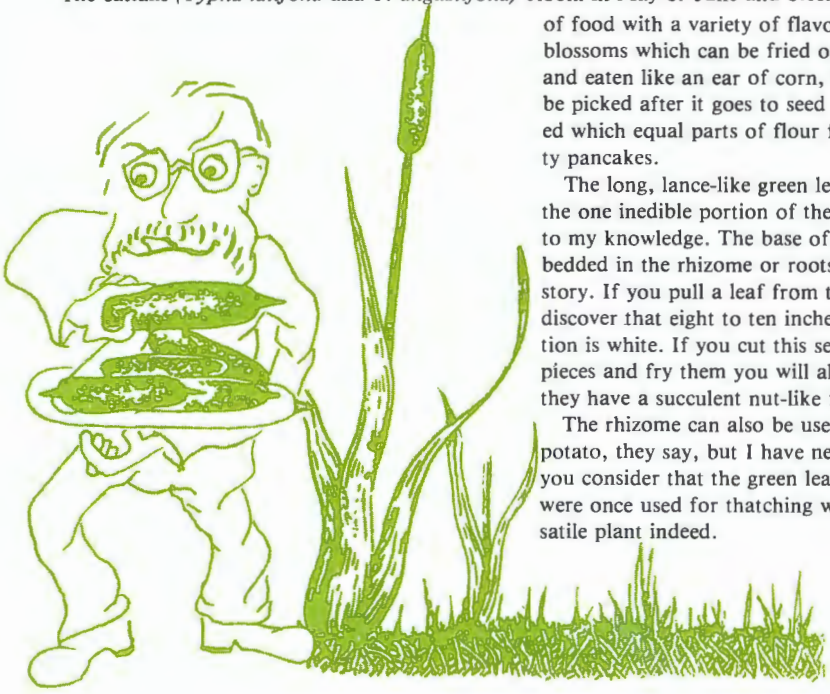
Sketches by Connie Donahue

Given enough time the forager, like the fisherman and the hunter, will discover favorites among the wild plants and will invariable seek them out as seasonal treats.

The Common Blue Violets *(Viola papilionacea)* are generally the first to catch my eye and tend to stir my wanderlust in a way that a cool fall day makes me think of fields of cut corn and clouds of vapor pouring from the nostrils of an eager Irish setter. It's no secret that our native violets are very high in vitamins A and C, although I can't say that it is because of this nutritional value that I collect them. Knowing they are beneficial doesn't hurt but my thoughts are directed more at what the splash of color will do to a salad. In this respect I am probably a snob and more interested in the aesthetics of the salad bowl than the contents.

It isn't long after the violet blooms that the stalks of the Day-Lily *(Hemerocallis fulva)* show and its blossoms too are added to the salad bowl. I also collect the early buds of the Day-Lily before they bloom and fry them in butter. I have only recently learned that they can also be dried, frozen and used in soups and stews. This is new to me but not for long.

The cattails *(Typha latifolia* and *T. angustifolia)* bloom in May or June and offer a wide selection of food with a variety of flavors. Starting with the blossoms which can be fried or boiled when ripe and eaten like an ear of corn, this same part may be picked after it goes to seed and the pollen mixed which equal parts of flour for colorful and tasty pancakes.



The long, lance-like green leaves of the plant are the one inedible portion of the cattail . . . at least to my knowledge. The base of the leaf that is imbedded in the rhizome or rootstalk is a different story. If you pull a leaf from the rhizome you will discover that eight to ten inches of the lower section is white. If you cut this section into small pieces and fry them you will also discover that they have a succulent nut-like flavor.

The rhizome can also be used as a substitute for potato, they say, but I have never tried it. When you consider that the green leaves of the cattail were once used for thatching we have a very versatile plant indeed.

The plantains, dandelions and mustard plants all have their disciples and it would be ridiculous for us to try to cover here what it took Euell Gibbons over three volumes to accomplish. Aside from the fact that we are not that knowledgeable, we prefer to deal with plants that have given us pleasure with the least amount of effort.

The groundnut or Indian potato *(Apios tuberosa)* became a new member of my larder when I first discovered it along the banks of a piddling stream that was once a part of the Blue Hills River during those halcyon days when the river was a factor in the lives of the Massachusetts Indian living in and about the Blue Hills of Milton and Neponset. It is not an easy plant to find since it is a prostrate vine, and often obscured by taller grasses. The blossom is a very subtle shade of brown to purple and has a pleasant, heady fragrance.

Once you find the runners of the groundnut, pursue its course by running it gently through your fingers until you come to a spot where it disappears underground. If you dig there, just below the surface you should find a string of groundnuts. I don't believe I have ever found one that was more than an inch and a half across, and because of their size I chose to cook them with their jackets on and found them a tasty change from our native potato.

SEASHORE SUCCULENCE

Perhaps one of the most underrated areas for edible plants is the seashore. It offers a tremendous variety of wild plant foods from Sea Lettuce *(Ulva lactuca)* to Beach Pea and the Beach Plum, both of which are found beyond the dunes.

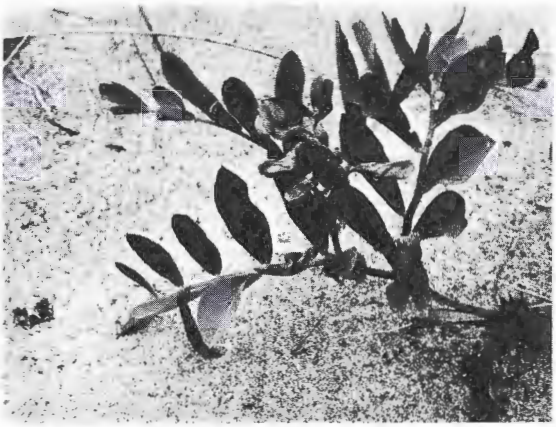


Photo by Bill Byrne

The Beach Pea is as obvious as the home grown variety.

Beach pea *(Lathyrus japonicus)* is probably one of the most unmistakable plants we have. The pea pods are as obvious as the garden variety and the leaves and blossoms are familiar to all home gardeners. When it comes to taste, the Beach Pea will never win any prizes but it is palatable and nutritious and may well appeal to those who favor a bland vegetable.

Marsh-Rosemary or Sea-Lavender *(Limonium* carolinianum) is one of the most highly prized of marsh plants for dry flower arrangements, but few people realize that within a step or two of the Marsh-Rosemary lie two plants that pickle beautifully. One of them is even better eaten raw or as an embellishment to a sandwich.

Generally speaking samphire, sometimes called Glasswort *(Salicornia* europaea) may be found between the Sea-Lavender and the mean-low tide line. Between the Sea-Lavender and the wrack line or upper beach you will find the sea rocket *(Cakile edentula)*. Although this pickles as well as the marsh samphire the fleshy leaves of the Sea-rocket can best be appreciated when plucked and tasted on the spot. It has the unmistakable but mild taste of horseradish.

Further inland from the beach you will find the Wax-Myrtle or Bayberry *(Myrica pensylvanica)*, a plant that is better known as the source of berries with the gray, waxy coat that are used for making the popular bayberry candles, and are also favored by, and responsible for the name of the Myrtle Warbler. But the plant has more to offer than berries. I collect the leaves in August when it is convenient and then hang them to dry—outside or in the cool cellar, it doesn't seem to matter. I have occasionally speeded up the drying process by putting them in a low oven. Once dried the leaves are rubbed through a fine mesh screening and the resulting powder placed in condiment jars and stored for future use in seasoning stews and chowders. It is a much more delicate seasoning than the South American bay with which we are all familiar and, unlike the commercial bay leaf our seaside variety doesn't "take over" a stew or chowder. I have also placed fresh bay leaves on the underside and topside of a bluefish before pan frying it smothered in mayonnaise. Delicious.

The ubiquitous Bearberry *(Arctostaphylos uva-ursi)* is a prostrate evergreen mass that covers much of Cape Cod and is found throughout Massachusetts. It produces one of the most insipid mealy fruits that you can imagine and although it is eaten by some collectors it is best left to the bears whence it got its name. The leaves are rumored to possess medicinal properties, a fact that holds little interest for this writer. Euell Gibbons, however, suggests that an infusion made from the leaves of the Bearberry and a liberal amount of gin will cure a number of personal plumbing problems. I suggest that even if this is not so, the gin would probably make one very satisfied to have a malfunctioning urinary tract.

The Bearberry plant and fruit is often mistaken by the novice for the Checkerberry; however a bite into the fruit or the leaf will quickly settle the matter. Checkerberry *(Gaultheria procumbens)* has a rich wintergreen flavor that is unmistakable. I have made an acceptable wine from its leaves and have also glazed the red berries as an after-dinner treat. There is little doubt that the Bearberry and the Checkerberry are worlds apart in taste.

Photo by Bill Byrne

Checkerberry has the rich refreshing flavor of wintergreen.

Closing out the summer would be incomplete without beach plumming in September. Beach Plums *(Prunus* maritima) are a popular source of jelly sold from roadside stands from one end of the Cape to the other. The jelly may be on the pink side or a deep purple, depending on what stage the plums were picked.

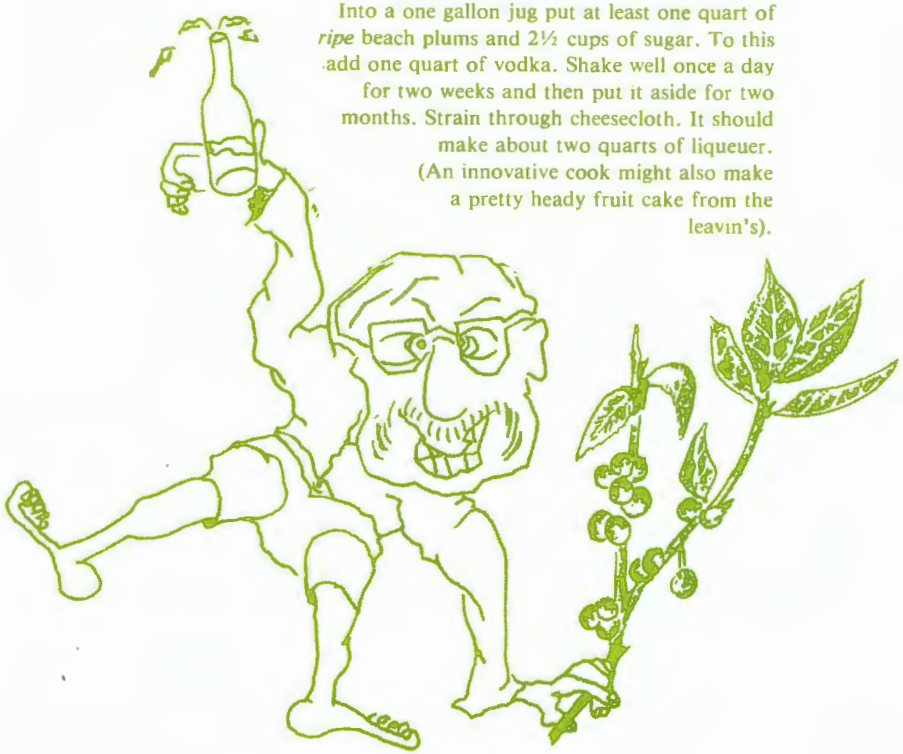
Picking Beach Plums is a competitive exercise. From the middle of August until picking time in September every roadside bush receives our critical appraisal. There is little danger of being "skunked" however. Most Beach Plum pickers are a lazy lot and gather the fruits that front on the roads and trails. Few will tackle the rose, briar and Poison Ivy tangles that are frequently found in Beach Plum territory . . . but those that do will harvest the cream of the crop with only the birds for competition.

But there is more.

Aside from the one or two dozen jars of jelly we put up every year we also make sure that we have enough plums to make at least two quarts of the finest after-dinner liqueur that money can't buy. Up until now it's been the secret of the distaff member of our household and here's how she does it:

BEACH PLUM LIQUEUER

Into a one gallon jug put at least one quart of *ripe* beach plums and 2½ cups of sugar. To this add one quart of vodka. Shake well once a day for two weeks and then put it aside for two months. Strain through cheesecloth. It should make about two quarts of liqueuer. (An innovative cook might also make a pretty heady fruit cake from the leavin's).



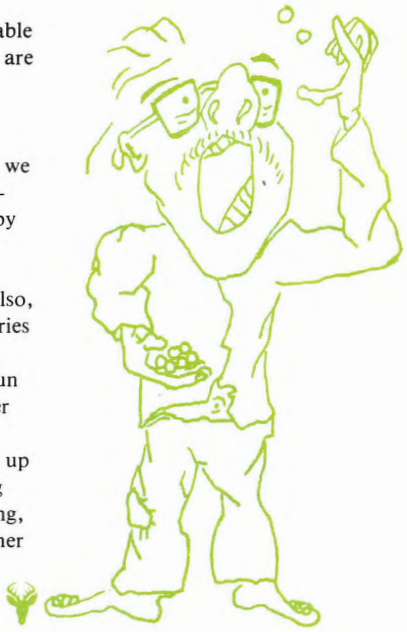
We haven't begun to touch on the edible plants available in Massachusetts and neither was that our intent. There are a variety of texts available to the would-be forager that spell out all the details needed to recognize a plant and prepare it for the table.

It makes little difference where you are collecting. As we have seen, the uplands, inlands and seashore have a fantastic inventory of natural foods all awaiting discovery by the forager. There are no special skills needed but one should exercise common sense and attention to detail in sorting out the edible from the inedible or poisonous. Also, remember that no one ever got sick on a handful of berries but many have become hospital cases by overdoing it.

Above all, remember that you are out there to have fun and not to prove to the world that you can survive under extraordinary conditions of deprivation.

A Swiss physician and alchemist, Paracelsus, summed up what could be the perfect quote in referring to collecting wild plants for food: "Poison," he said, "is in everything, and no thing is without poison. The dosage makes it either a poison or a remedy."

Good pickin'.



BEGIN REPLACES BURNS

Nancy Begin, Topsfield, has been appointed to the Massachusetts Fisheries and Wildlife Board representing the northeastern part of the Commonwealth. She replaces Martin Burns of Newburyport who retired in December of 1978 after serving on the board for 15 years.

Mrs. Begin is the mother of three and wife of retired airline pilot Donald Begin. She is a well-known wildlife artist and is actively involved in agricultural affairs in Topsfield and Essex County. She has served as president of the Essex County Agricultural Society, president of the Topsfield Agricultural Fair. She serves on the Board of Directors of the Topsfield Farmer's Market and the Topsfield Garden Club. She is a dedicated bird hunter and angler and an active member of the Essex County Chapter of Ducks Unlimited. Mrs. Begin becomes the first woman to become a member of the Wildlife Board in its 31-year history.

THE BROOK LAMPREY IN MASSACHUSETTS

by
David B. Halliwell
Assistant Aquatic Biologist, MDFW

Although rarely observed, a small and secretive representative of the State's fish fauna has managed to "hold its own."

During a biological survey of selected tributaries to the Blackstone River in Worcester County, a number of strange fish were collected using electro-shocking equipment—a technique which temporarily stuns fish. A single adult and larvae, (ammocoete), were retained as voucher specimens in the Museum of Comparative Zoology, Harvard University.

Having a primitive skeleton of cartilage, however, lacking jaws, ribs, shoulders, pelvic girdle and paired fins but possessing seven pairs of external gill openings, members of the lamprey family (Petromyzontidae) are not true fishes as such. Only two species occur in New England freshwaters, the brook lamprey *(Lampetra lamottei)* which spends its whole life in streams, and the better known sea lamprey *(Petromyzon marinus)* which is anadromous in habitat, frequenting coastal river systems in the spring to spawn.

Formerly, the occurrence of this species in Massachusetts waters was based on the observance of a single ammocoete sometime in the early 1950's. However, no specimen was collected, the discovery was never documented and the actual occurrence of the species was relegated to speculation. Although its distribution and habits are poorly known, the status of the brook lamprey in Massachusetts appears extremely limited—especially in view of the fact that both occurrences, though separated by 25 years, have been from the same locality.

Actually, the brook lamprey, which reaches a total length of only six to eight inches, may be considered a diminutive relative to the sea lamprey which averages two to two and a half feet in length upon reaching maturity. Unlike its larger cousin—well known as a parasite of gamefish, whose livelihood depends on a mouthful of teeth arranged in concentric rows (described as a 'rasping disc')—the brook lamprey is a non-parasitic (free-living) species which is distinguished by its feeble teeth arranged in clusters. In Canada, where brook lampreys are more common, they are sold as bait for such sport fishes as walleye, smallmouth bass, muskellunge and striped bass. Which is not surprising, as these strange "fish" bear close resemblence to large "garden hackle" and are no doubt food for trout in the small, clear and cool streams which they inhabit.

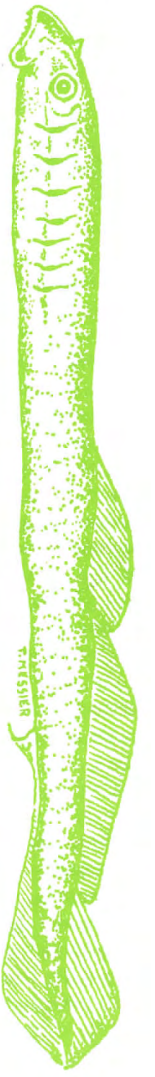
The American brook lamprey has a five- to six-year life span. The first four to five years are spent in larval form as ammocoetes, which live in the bottom mud (detritus) feeding on microscopic plants and animals. They are blind, toothless, and have a fleshy hood over their mouth. Transformation to the adult stage (actual metamorphosis) takes place in the fall, at which time adults emerge from the bottom, remaining in the stream all winter. Adults do not feed as their digestive systems are nonfunctional.

Spawning occurs in the spring when water temperatures approach 62°F. Nests are constructed in gravel by adults with group spawning common. There is extensive carrying of gravel in the mouths, hence the derivation of their name *Lampetra*, which means "sucker of stone". Eggs hatch in a few days and following yolk absorption, the larvae burrow into the sand and silt. Following spawning, the adults die.

The distributional/population status of the American brook lamprey is currently unknown. It has not been recorded from Rhode Island and is known to occur in only a few places in the coastal watersheds of New Hampshire, while Connecticut has included it in its listing of "rare and endangered fishes" (1976), as the lamprey has been found only in the Connecticut River watershed.

Young lampreys are vulnerable to pollutants and siltation. Variation in stream level could also be a significant mortality factor.

Future study to determine distributional range and identification and protection of "critical" habitat may be required to ensure that the American brook lamprey continues to persist as an integral (though relatively unknown) member of the Commonwealth's diverse native fish fauna.



Sketch by Tim Messier

SPORT FISHING AT THE POWER PLANTS

by
Robert P. Lawton
Senior Marine Fisheries Biologist, MDMF

The Massachusetts Division of Marine Fisheries has conducted ecological studies at three Massachusetts Power Plants.

As a result of the ever-increasing demand for electric power, fossil fuel and nuclear electric generating plants have been constructed at an increasing rate throughout the United States. Within the past decade, proliferation of nuclear power plants has understandably generated public concern over potential effects of radiation and waste heat on our environment. This growth in generating capacity has placed additional demand on our nation's water resources to provide an increased magnitude of cooling water.

By the end of 1973, the United States had 42 operable nuclear reactors producing electricity on a commercial scale. In New England, nuclear generating units already produce more than 20% of the region's total output. Nuclear plants require approximately 50% more cooling water than do fossil-fueled plants of equal generating capacity. Adverse effects of thermal discharges have been extensively studied and widely publicized. However, potentially beneficial effects often go unreported. Artificially heated water has been used for swimming, irrigation, aquaculture, and improved sport fishing.

The Massachusetts Division of Marine Fisheries has conducted ecological studies at three Massachusetts power plants: Cape Cod Canal, Salem Harbor, and Pilgrim Nuclear Power Station, to assess potential effects of plant operation on the marine environment. Investigations began in 1966 at the Cape Cod Canal site and presently are continuing at all three plants.

The Division M.F. is particularly committed to fulfill its responsibility to protect marine species that are of sport and commercial importance. In addition to evaluating long-term, subtle effects of power generation on the marine ecosystem, there has been a concerted effort to identify and report those aspects of power plant operation that are obviously beneficial or detrimental to marine life. Knowledge accumulated to date has contributed to the data base necessary to predict and assess impact of possible future expansion and to guide design planning.

Investigations at Pilgrim Power Station have included groundfish and pelagic fish stock assessments; lobster growth, movement, abundance, and larval dispersion studies; collection of Irish Moss harvest statistics; temperature monitoring; dissolved gas analyses; and a sport fishing survey. Of particular interest to anglers is the latter study which will be discussed in this article.

The survey conducted by the Massachusetts Division of Marine Fisheries did not include the catches of boat fishermen off shore.

Pilgrim Nuclear Power Station is located at Rocky Point, Plymouth on the western shore of Cape Cod Bay just south of historic Plymouth Harbor. This site, occupying 517 acres, is approximately 38 miles southeast of Boston. Commercial operation of this nuclear-fired 670 megawatt station began in December 1972. Cooling water is pumped in from Cape Cod Bay by way of an approach channel intake, passes through the plant, and is returned to the bay laden with heat via a discharge canal. The intake and discharge areas, collectively called the Shorefront Area, were opened to the public in April 1973.

The Shorefront Area was designed and constructed by the power station to provide marine sport fishing access to Rocky Point and has greatly enhanced shore fishing in that area. Accessibility, seasonal abundance of sport fish, scenic view, and ample parking have made the site popular in a locale where previously there was essentially no shore fishing.

Pilgrim Shorefront provides fishing access from April through November from two discharge canal jetties and an intake breakwater. Fishing opportunities of this type are uncommon in this coastal area. Pilgrim Station has provided parking for approximately 100 automobiles and has built and maintained a comfort station and shelter near the discharge channel.

The Massachusetts Division of Marine Fisheries conducted a creel census from 1973-1975 to determine the extent and assess the status of the newly established sport fishery at this warm-water discharge. An interview-count survey was employed to obtain information on fishing pressure. This study surveyed only shore-based anglers, and no data were collected on the boat fishery located offshore of the plant. Interview days were chosen by random selection of four half-day segments each week, one randomly chosen morning and afternoon segment each weekend, and all day on holidays. The Shorefront Area opened each day at 6:00 A.M. and closed at 7:30 P.M. Information collected from each interview included number of anglers, hours fished, and species and number of fish caught. Monthly and seasonal totals were obtained by expanding respective sample data.

During the three census years, an estimated 21,120 anglers visited Pilgrim Shorefront, angling a total of 41,405 hours. An estimated 9,332 fish, representing 16 species, were caught. Four species dominated total catch: cunner (37.1%), bluefish (31.8%), pollock (13.0%), and striped bass (7.7%).

Cunner (commonly called sea perch or choggy), a relative of the tautog, outranked all other fish in number caught (3,463) and is

an important recreational fish appealing especially to youngsters. This species is abundant in the offsite waters of Pilgrim Station and is easily caught. Catches were recorded from May-October predominantly from the intake breakwater. Still-fishing with bits of seaworm or clam was by far the most popular and successful fishing method. Because of the small body size and mouth of cunner, small hooks were used.

Although generally not regarded as a game fish, cunner afford light-tackle amusement to thousands of vacationists along our coast. Not well known is that larger specimens are very good pan fish and are as delectable as the tautog.

Bluefish ranked second in total catch (2,970). This species together with the striped bass appealed to most anglers and were actively sought. Eighty-five percent of those interviewed in September 1973 were seeking one or both of these fishes. When striped bass catches declined subsequent to 1973, most of the fishing pressure expended from the discharge jetties was directed at bluefish. The majority of bluefish were taken by casting artificial lures (e.g., poppers, swimming plugs, and spoons) into the discharge current as it emptied into Cape Cod Bay. Adult fish, ranging in weight from 2½ lbs. to 15 lbs., were caught from July to October, with peak fishing in September. Young-of-the-year fish called "snappers" were caught during August and September.

Bluefish are warm-water fish and migrate inshore at water temperatures of 54-59°F. They are attracted to lotic habitats, e.g., tidal and current rips. The warm-water discharge at Pilgrim is an artificial warm-water current which concentrates baitfishes especially during late summer and early autumn. This abundance of forage fish attracts the predacious bluefish to feed in the discharge area making them accessible to shore fishermen. Poor bluefishing in 1975 at Pilgrim Shorefront was attributed to the prolonged plant outage in September and October. Apparently without the thermal effluent, bluefish did not concentrate in adjacent waters.

Pollock was the third most abundant species caught (1,214). Concentration of forage fishes and small crustaceans in the thermal discharge and protective habitat afforded by jetty construction have attracted pollock. However, this species was underutilized in the sportfishery. Most were caught incidentally from April-October by anglers fishing for other species. Fishing techniques included bottom fishing with worms or clams and casting artificials (e.g., spoons and jigs). A directed sportfishery would undoubtedly have increased pollock catch.

Overall, striped bass ranked fourth in total catch but ranked first in total 1973 catch. Due to the erratic fluctuation of year-class strength of this species, the annual catch varied considerably. Availability of striped bass in a particular locale is determined by their behavioral preference for surf-swept beaches, rock substrate, and the mouths of rivers and estuaries.

Historically, few bass have been caught along the rocky stretch from Cape Cod Canal to the entrance to Plymouth Harbor, although this would appear to be very good bass water. Many bass are caught in Plymouth Harbor, Warren Cove, and along Duxbury Beach. Pilgrim Shorefront now provides access to shore bass fishing at Rocky Point. Further, the thermal discharge is a

Most species caught were bottom dwelling fish.

Photo By Bill Byrne

The majority of bass were caught on artificial lures by fishermen casting from the discharge jetties.

point source of forage fishes that attract and concentrate bass. The majority of bass were caught on artificial lures by fishermen casting from the discharge jetties.

Other sport fish caught at Pilgrim Shorefront included: winter flounder, Atlantic cod, tautog, Atlantic mackerel, American eel, Atlantic tomcod, and scup. Most of these species are bottom-dwelling fish which were caught from the intake breakwater on natural bait.

Seasonal fluctuations in angling pressure at Pilgrim Shorefront were attributed to fishermen's knowledge of sport fish migrations in nearby waters as well as the period of favorable weather conditions and traditional summer vacations. Highest angling pressure occurred in July and August and lowest in November when many fish had emigrated from near-shore waters as a response to declining water temperatures.

The largest group of anglers were casual fishermen who fished irregularly for a variety of small fishes from the intake breakwater. A small group of avid fishermen regularly sought bluefish, striped bass, and mackerel when seasonally available. The latter group fished primarily from the seaward end of the discharge jetties.

While the average three-year catch rate of 0.22 fish per angler hour at Pilgrim Shorefront is relatively low in comparison with other studies conducted in Massachusetts, the catch rate was not unexpected and is believed typical of an open coastal location. Scarcity of mackerel from 1973-1975 and striped bass from 1974-1975 apparently influenced overall catch rates negatively. Sport fish catch composition was typical of a north-temperate open coastal region, and there were no southern or warm-water fish in the harvest.

Long term study programs, to date, conducted by the Massachusetts Division of Marine Fisheries at Pilgrim Nuclear Power Station indicate that plant operation has had minimal adverse impact on marine ecology in the Cape Cod Bay ecosystem. Recognizing the many demands on the area, the Boston Edison power company as an integral part of their planned recreational development has created a sport fishery at the shorefront site by providing public access to fishing not previously available. While the general public is justifiably concerned about potential hazards to the environment posed by nuclear power plants, few people are aware that the power industry is increasingly cooperating with state and federal agencies to prevent or mitigate environmental problems. At the Pilgrim site, Boston Edison Company has wisely utilized the heated waste water discharge to the benefit of salt water fishermen.

Guarding Dogs of Europe

By Jack Clancy

Photos by Jack Swedberg

Guarding dogs from Europe, nitrogen-fixing plants from New England's upland slopes and a new breed of hair sheep may prove to be one answer to the lagging agricultural economy of Massachusetts.

Dr. Coppinger and a hair sheep lamb.

It will probably come as a shock to the soft-at-heart, but man's best friend is a highly complex critter with character traits that belie its docile and affectionate behavior in the home. This is especially true of those countless breeds of herding dogs who just as quickly harass their charges as tend them.

Sheepherders throughout the world have known this for millenia of course but the true nature of the loyal herd dog has never been revealed on the theatre screen or the television tube—there is much too much romance in the sight of a working sheep dog rounding up his errant flock to burst the bubble.

While it is true that herding dogs like Border Collies or Queensland Blue Heelers are dedicated to their job of herding, and are loyal to the shepherd when the object of that loyalty and dedication, the shepherd, is removed and the dogs left alone with the flock, well, it's then that the sheep may become the prey of their erstwhile guardians.

Closer to home, the thousands of mongrel and pure-bred canines that roam our state show an equal disregard for the hoofed breeds by running and slaughtering our white-tailed deer, domestic sheep and even cows. It's not a matter of "bad blood," just instinct. The question of how to protect our white-tailed deer has been answered in part by the leash law, when it's enforced, but for the sheep farmer the problem is more complex.

A shepherd, any shepherd, cannot physically stay with his flock ad infinitum. Even if he or she could there is still the question of predation by other canids like packs of bousehold pets, wolves or coyotes. Even if so inclined the average herding dog is relatively small in size and light in weight. It is also no fool and recognizes very quickly when it is outclassed by larger canids either in size or numbers. It may not turn tail and run but it sure isn't about to wade into a war it cannot win . . . only people do that.

How then can a farmer protect his flock without calling on the government for the use of the poison 1080, traps or bounties?

Doctor Raymond Coppinger, an animal behaviorist and professor at Hampshire College, Amherst, Massachusetts believes he may have the answer in some of the breeds of foreign guarding dogs he has imported from various countries of Europe.

After traveling more than 20,000 miles throughout Europe and the United States the Coppingers, Ray and Lorna (an accepted authority on sled dogs in her own right and author of *The World of Sled Dogs)* shipped 16 dogs representing three breeds from Italy, Yugoslavia and Turkey to Hampshire Colleg's new farm in 1977. Since then other breeds have been added to the experimental kennel including the aggressive Russian Ovcharka, Scotch Border Collies and a Queensland Blue Heeler from Australia.

Why all this concern over sheep dogs?

According to Ray Coppinger lamb is more popular in New England than in most of the rest of the country. The Easter demand alone is very high because of the large concentration of ethnic groups from the Mediterranean area for whom roast lamb has a special significance. Since the northeast cannot supply the demand there is a considerable financial outflow from New England.

"There's a food shortage in the world," Coppinger explains, "There's a food shortage in Massachusetts . . . in the sense that we have to buy our food from someplace else. I would really like to see," he goes on, "Massachusetts, all New England, become more food-sufficient. I'd like to see the dollar-flow OUT of New England stop."

"At Hampshire College," he says, "we are interested in agriculture. We say, okay, if agriculture is to come our way let's think about what the land can bear. And the first thing we thought of was the upland slopes of New England. The wooded area. And we started with questions like: Can you graze sheep in a forest? or, Can we pasture sheep on native plants?"

We soon discovered in our conversation with Coppinger that the sheep program at Hampshire College is far more complex than the single question of dogs. Further questioning revealed that the program has three parts.

John Torrey, a Harvard botanist, is studying the forage aspects of raising sheep on the New England slopes. Specifically, he is interested in determining the value of such nitrogen-fixing plants as alder and Sweet Fern. In both cases the plants are nutritious, edible and palatable to sheep. One of the questions to be answered is how many acres of otherwise non-productive land would it take to support a given number of sheep.

Paul Slater, an Assistant Professor of Agriculture, is Farm Manager and Director of the Sheep Breeding Program. It is his job to develop a strain of sheep that will take well to our New England environment, feed readily on native forage plants and be capable of "twinning."

The ability to produce twins is not considered a desirable characteristic in the west where rainfall is minimal and vegetation relatively sparse. However, here in New England, with ample forage available because of our high rainfall rate, twinning would be an asset. "For that reason," Slater says, "we have been working with Dorsets and Finns and will be acquiring Wiltshire rams some time this summer . . . the idea being to hasten the twinning process." According to Paul Slater you can increase the twinning process, so that it is moderately inheritable, by careful selection. "Finns," he says, "are very prolific. It's about the only thing they have to recommend them," he added.

Slater also explained that the emphasis on raising sheep in New England is on meat production, not wool. Wool, he says, is a by-product; one of the issues they are faced with is that wool is mostly protein, takes a great deal of food to grow and may not be worth it. Hence the interest in other breeds of "hair" sheep like the Barbados and Wiltshire strains. The chances are that if Paul Slater is successful in his efforts to develop a new strain of New England sheep it will be of the "hair" variety, be an active breeder of twins and forage well on plants like alder and Sweet Fern.

Ray Coppinger, in the meantime, is interested in finding a way to protect those sheep without the intervention of the government. Right now he doubts that, even with everything going right for you, you could make a living sheep ranching in New

The Italian Maremma has one of the gentler dispositions of the guarding dogs and is remeniscent of the white Laborador—a breed which Coppinger believes, might lend itself favorably to guarding dog conditioning.

England. "Part of the problem," he says, "is the lack of market facilities, the other is the predator problem."

Coppinger cited one case in South Hadley where a farmer one night lost 25 to 40 sheep to dogs that destroyed the sheep right in the barn!

In another case a Cummington farmer lost 35 sheep out of a flock of 130. To him it was a financial disaster.

Is the problem dogs or coyotes?

It depends on where you live. Statistics however, indicate that dogs are responsible by far for most losses in Massachusetts and Vermont. Still, there is evidence—good, sound, irrefutable evidence—that the coyote is increasing in numbers in Massachusetts and therefore poses a potential threat to the sheep farming industry.

Jack Swedberg, Senior Wildlife Photographer for the Massachusetts Division of Fisheries and Wildlife and a lifetime observer of Quabbin wildlife says that coyotes are becoming increasingly common in that area but are not yet a threat to other wildlife.

There is, however, the singular case of a farmer in western Massachusetts who lost a considerable amount of sweet corn to a pack of five coyotes who were so visible he had them all named!

The problem, as Coppinger sees it, is to find, or develop, a breed of guarding dog that will protect the sheep from free-roaming dogs and coyotes.

Although the guarding dog program is relatively new, about thirty dogs have been leased out from the Hampshire College farm to sheep farmers throughout New England and in the states of Louisiana, Arkansas, Missouri, Iowa and Wisconsin. The dogs are the Yugoslavian Shar Planinetz, the Italian Maremma and a cross between an Australian Blue Heeler and Shar Planinetz.

There are perhaps a dozen breeds of livestock guarding dogs in Europe, but only half of these are being studied here in the United States. Of them all the Komondor of Hungary has probably received the most publicity because of studies being made in Colorado and Idaho under a federal grant. The Great Pyrenees of France and Spain, however, are probably best known since they have been in use in this country as a pet and show dog for some time.

The Shar Plainenetz from Yugoslavia (shown) is similar in appearance to the French Great Pyrenees.

It is the behavior of the guarding dog that makes them unique. They appear to have a hereditary aptitude to protect sheep but, unlike the herding dogs, may be left with the sheep overnight without the presence of the shepherd. Three or four of the dogs may guard close to a thousand sheep, moving with them as they travel from one grazing place to another. They are a slow and passive animal showing none of the nervous vitality of the typical herding dog. They are unruffled by strangers, generally positioning themselves between the stranger and the flock. They tend to be large animals—100 pounds and more—and do not make idle threats to an intruder but turn suddenly into a devastating fighting machine if the sheep are overtly threatened. Individual dogs not in use for guarding sheep are excellent as protectors of the home and family.

Some of the breeds pre-date Christ and may yet be the alternative to the poison 1080, trapping or bounties.

If you were to try to determine a single factor that sets the guarding dog apart from its herding cousin it would probably be that the guarding dogs appear to "imprint" on the sheep and become highly possessive of them. They are often raised in the same pens as the sheep and in isolated cases are even suckled on them. The imprint is so strong that in some cases a young dog—on reaching puberty—will try to breed with the sheep—a condition that disappears with age.

Research at Hampshire College is geared to find out why some of the maturing guarding dogs will mount ewes, tearing ears, pulling wool and inflicting wounds in the process. Other studies are directed toward those dogs who feed on sick and newborn lambs. It does not appear to be a destructive behavior and is not restricted to a particular breed but common among them all.

On the positive side the dogs show a dedication that is giving many farmers their first well-earned night's sleep in a long time. Last February during the sub-zero freeze a newborn lamb wandered out of its lambing pen to where the guarding dog—a ten-month-old Maremma—slept. The next morning the farmer found his lamb licked clean as a whistle and warm as toast, curled up with the dog.

Ray Coppinger believes that the success of the guarding dog program lies in the cooperators who are using the dogs on an experimental basis. "Most of the sheep industry," he says, "is waiting for the government to reinstate the use of the poison 1080 and it appears inevitable that the government will do just that." He also thinks that 1080 is not the answer in the highly populated New England area and that the government will never allow its use here.

At the National Wool Growers' Convention in January of this year Coppinger spoke to several western farmers who are having success with the Komondor and Great Pyrenees dogs. He is also in touch with the United States Sheep Experimental Station in Dubois, Idaho. Interest in the work being carried out at Hampshire College is also country-wide but the full impact of what is going on here will be felt first in the pocketbooks of New Englanders when and if raising lots of sheep on the upland slopes of New England becomes a reality. It's a tremendous effort to resurrect a once-important New England industry using untapped available resources, and although it may be some time before the words Ovcharka, Komondor, Shar Planinetz and Great Pyrenees become table conversation we would do well to remember them.

Man and the Balance

Fishing is the chance to wash one's soul with pure air . . . It is discipline in the equality of men — for all men are equal before fish.

Herbert Clark Hoover

STATES RIGHTS THREATENED

According to the International Association of Fish and Wildlife Agencies, a proposed wildlife treaty to be negotiated in Bonn, Germany this summer could be a threat to state and federal wildlife programs and their authority to manage resident wildlife. The treaty would grant member nations like Nepal, Peru, Ghana, or whoever, the power to propose rulings which would affect any animals that cross international borders, such as that between Canada and the United States. The treaty is so poorly worded that all caribou, regardless of whether they cross an international border or not, could then come under the authority of an international tribunal. It would be placing power in the hands of nations completely unfamiliar with local wildlife problems and could become a serious political pawn, since the United States would have no more voting power than any other member nation. The United States would never deny assistance to any third world nation's wildlife problems and their (U.S.) refusal to accept this treaty as it stands should not be misinterpreted as a denial of this support. On the other hand the treaty should NOT be accepted merely as an indication of good faith. The facts are that the treaty is so poorly written that it should not even be considered for adoption.

RABIES OUTFOXED

According to Conservation News, a live rabies vaccine, developed by Swiss scientists for wildlife, may soon counteract this deadly virus in red foxes. Unlike the traditional vaccine injections of killed rabies virus given to domestic animals and humans, the new live virus is effective when swallowed by the foxes. The foxes are baited with vaccine-laden chicken heads and should develop a slight case of rabies to promote the production of antibodies immunizing the animals. It is hoped that it will rid Europe of the disease.

ABOVE AND BEYOND

It's no secret that service organizations like the Kiwanis are a very important part of a community's structure and their organized efforts at community improvement are well recorded. However, the Charles E. Chapman family of Cheshire, Massachusetts performed an act of humanity that is worth recording outside the minutes of a club meeting. It happened on a Sunday that started out like any other Sunday until Chuck noticed a form foundering in the ice-choked waters of Cheshire Reservoir . . . it was a deer. Once Chuck made the initial decision that theirs would be an effort to save the deer rather than destroy it, he and wife Beth and daughters Jacqui and Cynthia swung into action. After launching a small boat they broke through the ice and reached the deer which by this time was in shock. The barking dogs which drove it into the water in the first place plus the icy cold water appeared to be too much for the young doe to take. After Herculean efforts by the Chapmans (which included a dunking for some of them also) the deer was finally brought to shore and put in the family barn where it shared quarters with a couple of family horses. As luck would have it, it survived the night and was released the following day. Our congratulations and thanks to Chuck, who is immediate Past President of the Kiwanis Club of Cheshire, wife Beth, daughter Jacqui, who is President of the Kiwanis Key Club at Mt. Greylock Regional H.S. and daughter Cynthia, an 8th-grader at Mt. Greylock Regional H.S.

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The Atlantic Cod shown here rated along with the winter flounder, Atlantic mackerel and scup in Bob Lawton's story about fishing off shore at the power plants. This issue, page 12. Photo by Bill Byrne.

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