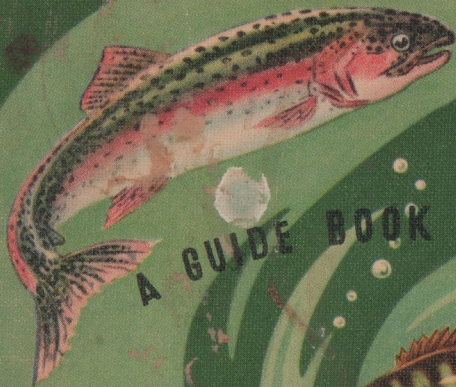


Fresh Water

FISH

A GUIDE BOOK ILLUSTRATED IN COLOR



Fresh Water Fish

by

JOE GODFREY, Jr.

WITH ILLUSTRATIONS IN COLOR BY GORDON ERTZ

One of a series of two Fish Guides



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Happy Birthday
Baby & Bruce
from
Aunt Catherine
& Uncle Frank
1952

PREFACE

THIS BOOK contains enough information regarding common and technical names, distributions and habits, to identify each of the fresh-water fishes. It is dedicated both to anglers and to those who are generally curious to know more about the inhabitants of our inland waters. It also provides helpful hints on bait and fly casting.

For many years our people have been eating the game and food fishes taken from the lakes, streams, and rivers of North America. But until now we have never had a handy, authoritative guide to them. Such a guide is now possible because lately we have had more time to study the habits, variations, and distributions of the various fishes, and because of improvements in the mechanical reproduction of water-color pictures. Notice the excellence of the colored illustrations in this book.

Some species of fresh-water fishes are widely distributed in North America. Many are exclusively of northern distribution. Others have close counterparts in northern Europe and Asia. We know that peculiarities of distribution depend on geological changes in the past and upon the ability of the fishes to adjust themselves to their environments. There are several hundred species of fishes inhabiting American inland waters, varying in size from minnows an inch long to sturgeon of several hundred pounds. Fishes vary in color, depending on their environments. A black bass may be greenish-brown in one lake and bronze-

backed in another. A study of the various species is an educational hobby and a fascinating pastime.

For many years the author has been gathering the information found in this book and in its companion guide, THE GREEN BOOK OF SALT-WATER FISH. As an enthusiastic angler he has fished from Florida to British Columbia and from Lower California to Quebec. A careful study of the fishes was made in the New York, Chicago, and San Francisco Aquariums, and at several museums. The author has caught with hook and line all but a few of the game fishes appearing in the book.

To the many persons who have assisted in the preparation of this book the author's thanks are extended. Alfred Weed, Curator of Fishes at the Field Museum in Chicago, offered many valuable suggestions. Clare Bryan, world's champion caster, should be credited with developing the methods of casting. Thanks are due also to the publishers of the Big Game Fish Map for the use of its color plates.

JOE GODFREY, JR.

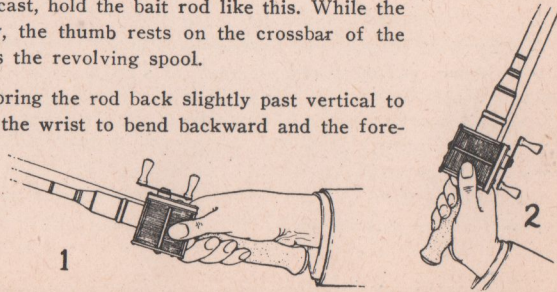
LET'S GO FISHING

TODAY game fishing is the fastest-growing sport in North America. Hundreds of thousands of people, old and young, are joining the brotherhood of anglers to test the pleasures of bait and fly casting. In this sport you can match your skill against the prowess of the mighty muskalonge, the fighting bass, and the gamy trout. Even the bluegill and the crappie will provide sport when taken on light tackle. Here are some hints on how to hold the rod and reel.

HOW TO CAST A BAIT

Figure 1: At the beginning of the cast, hold the bait rod like this. While the four fingers grip the handle firmly, the thumb rests on the crossbar of the reel. The tip of the thumb controls the revolving spool.

Figure 2: After the first position, bring the rod back slightly past vertical to complete the back stroke, allowing the wrist to bend backward and the forearm to be raised about 30 degrees from the horizontal. Using the wrist as a hinge, bring the rod forward quickly, releasing most of the thumb pressure on the spool.

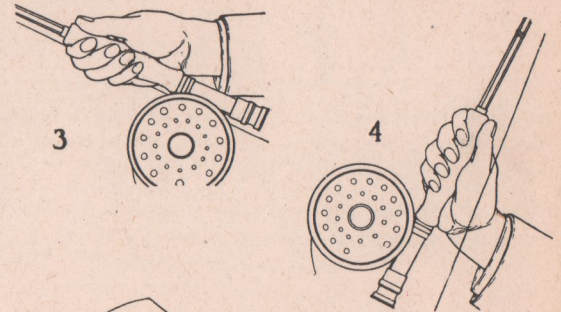


HOW TO CAST A FLY

Figure 3: Hold the rod like this at the beginning of the cast. See the following pages for the method of holding line stripped from the reel.

Figure 4: Here is the fly rod at the finish of the backward stroke. Note that the forearm is raised and the wrist is bent upward.

Figure 5: The line having been thrown forward on the water, the rod is raised to start the backward cast. Holding the rod as illustrated, apply power from the wrist to lift the line from the water.



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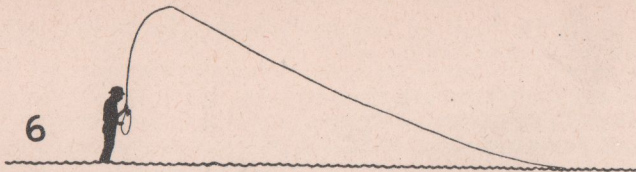


Figure 6: When the lower half of the bent rod is practically vertical, there is a slight pause in the applied power to allow the spring of the rod to whip the line backward past the caster and to straighten up behind him over the water.

Figure 7: The final pull of the line, when it is straightening out behind the caster, causes the rod to reverse the bend shown in Figure 6.

7



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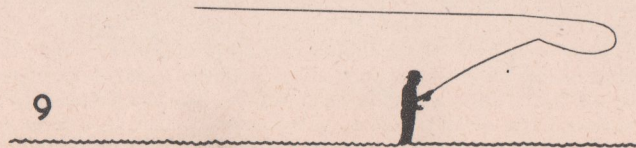
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Figure 8: To start the forward cast, apply power from the wrist to the butt of the rod, and start the forearm in its downward motion.

Figure 9: The work of both the rod and the caster having been finished, the rod straightens out and the line continues to go forward to complete the perfect cast. The line held in the left hand, having been stripped from the reel before the cast, is released at the finish for the forward stroke and is carried out by the weight of the flying line. This gives more distance.

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[9]

Atlantic Salmon (*Salmo salar*)

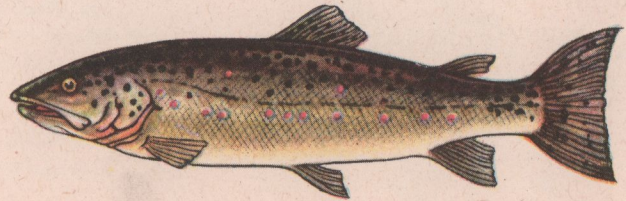
MANY FISHERMEN consider the Atlantic salmon the king of all game fishes taken in fresh waters. The yearly arrival of the silver horde is the signal for the migration of anglers to the sea-running streams of Maine, New Brunswick, Quebec, Nova Scotia, and Newfoundland. In fact, this salmon ascends all the best suited rivers of northern Europe and northern North America. In former years the salmon was common as far south as New Jersey, but such rivers as the Hudson and Connecticut have become too impure to suit its taste and it is now rarely seen below Cape Cod. It is commonly known as the Kennebec salmon. It comes up the streams from the sea, a beautiful silver-colored fish, steel-blue on the back with scattered spots of red and orange on its white and silver sides.

The Pacific salmon never feeds in fresh water, and always dies after spawning. The Atlantic salmon does feed in both fresh and salt water, and it does not die except from old age. The fact of occasional feeding while in fresh water makes the eastern salmon a more important game fish, as it will more readily take to the highly colored flies. Fly fishing for Atlantic salmon is the only legal method allowed to sportsmen. Commercial fishermen employ nets near the mouths of the rivers. The Atlantic commercial catch is far less important than that of the Pacific. The eastern fish does not grow quite so large, the average weight being around 15 pounds. But much heavier catches are made, fishes weighing from 40 to 60 pounds being sometimes taken in the Restigouche and other famous New Brunswick streams.

Like its western cousin, the Atlantic salmon is anadromous; that is, it lives habitually in

the sea, ascending rivers only for spawning. Urged on by the necessity for depositing eggs in cold, clear waters, it fights its way up rapids and over unbelievably high falls hundreds of miles inland. It does not, however, make such long journeys as the Pacific salmon, which ascends the Yukon more than 2,000 miles. The eggs are left in the fall on the sandy bottoms of shallow headwaters and hatch the following spring. The young salmon or "parr," marked with reddish spots, lives here for about two years. Then, having lost its gay coloring, it goes down to the sea and grows to maturity. Its first spawning journey occurs about its fourth year.

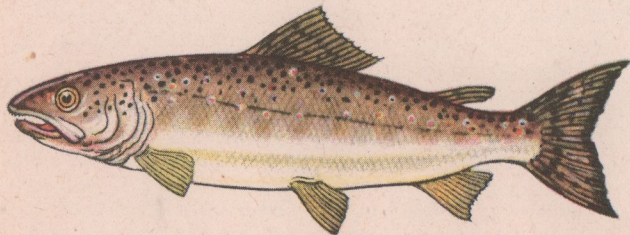
Each female carries about 6,000 eggs at spawning time. Sportsmen agree that until you have caught your first Atlantic salmon, fresh run from the sea, you have not felt the fastest fish the inland waters have to offer.



Landlocked Salmon (*Salmo salar sebago*)

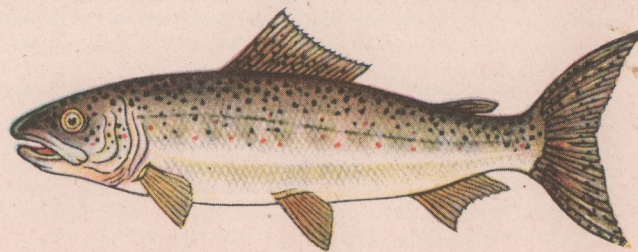
NATURALISTS generally agree that the landlocked salmon is a true Atlantic salmon which, having become landlocked, adapts itself to life in fresh water. Yet in Lake St. John in Quebec, one of its principal stamping grounds, the landlocked salmon has free access to the sea through the Saguenay and St. Lawrence rivers, but does not go to sea. In appearance this fish differs from the sea-run salmon no more than would be expected from its different way of life. It is smaller, and has coarser scales and somewhat different coloration. It is found in the lakes of New England and Canada. In Maine, where it is locally known as the Sebago salmon, it is native to four river basins. In Sebago Lake, its principal home, it ascends tributaries to spawn in the fall,

and later returns to the lake, its substitute for the ocean. Here it reaches a maximum weight of 25 pounds, but the average is considerably smaller. It will take a fly readily.



Ouananiche (*Salmo ouananiche*)

THE OUANANICHE, pronounced "wan-na-neesh," is another landlocked relative of the Atlantic salmon. It is smaller than the landlocked salmon and the Atlantic salmon, the average weight being 2 to 3 pounds. It has a more northerly distribution than the Sebago salmon. Big ones weigh up to 10 pounds. Its favorite haunt is Lake St. John in northern Quebec, and here anglers have great sport fly-fishing for ouananiche. Those who have caught it think it has no equal as a game fish. It is also found in the streams of Labrador. Although it is a close relative of the Atlantic salmon, "landlocked salmon" would be a misnomer, because in most of the waters in which the ouananiche is found there is direct access to the sea, yet it does not visit salt water. The best time to fish for ouananiche is late in May, June, and July. Like other members of the salmo family, it responds best to the fly and the spinner.



Pacific Salmon (Genus *oncorhynchus*)

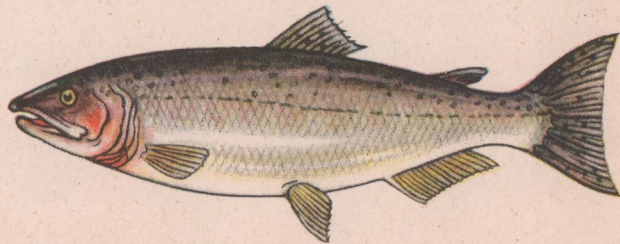
THE PACIFIC SALMON are unquestionably the most valuable fish in the world. These great salmon annually hurl themselves in countless hordes up the streams of the north Pacific coast. Out of the sea and up the rivers they go, running rapids, leaping waterfalls, overcoming all obstacles, driven by the urge to reproduce their kind. After incredibly long and fearful journeys, battered by rocks, buffeted by torrents, emaciated by abstinence from food, they at last reach the crystal-clear headwaters where they deposit and fertilize their eggs. Then, having fulfilled their destiny, they drift tail first helplessly downstream, to die before again reaching salt water. The eggs, so dramatically placed, hatch in about 60 days. With the high water of spring, the young salmon, quite different in appearance from the adult fish, begins its long journey down to the sea, thrives mightily, and grows to maturity in the new element. When the creative urge seizes it, it, too, makes the long journey back up its native stream, spawns, and dies.

The five species of Pacific salmon that run up the rivers from central California to southern Alaska are: (1) *Chinook, king, tyee, or quinnat salmon*. The average weight of these is about 20 pounds, but they are known to reach 100 pounds. (2) *Sockeye, blueback, or red salmon*. This averages from 5 to 8 pounds. (3) *Silver or coho salmon*. It averages from 5 to 8 pounds. (4) *Dog or calico salmon*. This one averages from 7 to 10 pounds. (5) *Hump-back or pink salmon*. This salmon averages from 3 to 5 pounds.

These five species differ in color and structure but all have, in general, the same spawning

habits. The Chinook and sockeye run upstream in the spring, but they do not spawn until fall. The other Pacific salmon run up the streams in the fall. The Chinook runs farthest. In the Yukon it reaches points more than 2,000 miles from the mouth of the river. The sockeye runs only in streams which pass through lakes, and ascends as far as 1,800 miles. The other three species spawn much nearer the sea.

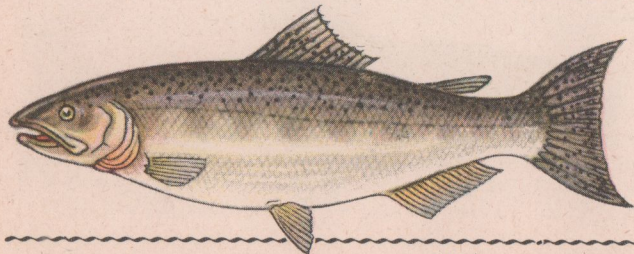
The Pacific salmon attain their growth in the sea before entering fresh water. On first entering a river or stream, they always swim against the current, with few interruptions. Their rate of travel is from two to four miles per day, but of course those that enter the Columbia in the spring and ascend to the mountain rivers of Idaho must go faster. The economic value of any species depends on its being a "spring-run salmon." The Pacific salmon practically cease feeding when they leave salt water, but they live on the fat stored in the body and flesh. The flesh loses flavor and color as the fish swims upstream.



Chinook Salmon (*Oncorhynchus tshawytscha*)

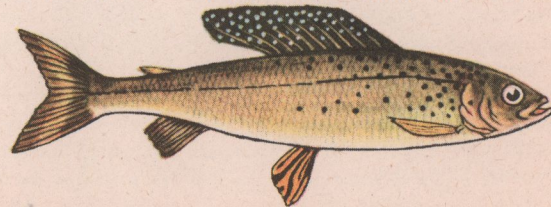
THIS IS the largest and most important Pacific salmon. It averages 20 pounds; many weigh close to 100. On both Pacific coasts it ascends large rivers in spring and summer—the Columbia River in February and March. Those entering first go farthest, many to spawn in the Salmon River in the Sawtooth Mountains, Idaho, more than 1,000 miles from the sea. They enter streams in prime condition, and hence, being large, have high commercial value. The Chinook is found from California to Alaska and northern China, and is the best salmon for the angler. Entering a river from the sea, both Chinook and coho will take the fly, but trolling is more popular. Anglers from all countries with light tackle fish in July and August at the mouth of the Campbell River, Vancouver Island, to take this brave fighter. Rod-

and-reel anglers at the Tyee Club have taken salmon weighing more than 60 pounds. This fish is called *Chinook salmon* in Oregon, *tyee salmon* in British Columbia, and *king salmon* in Washington.



Grayling (*Thymallus montanus*)

FEW KNOW the thrill of capturing this graceful, delicately colored aristocrat. It lives only in clear, icy streams of Montana, Michigan, northwestern Canada, and Alaska. In Montana it is common in streams flowing into the Missouri above Great Falls. In northern Michigan it was formerly plentiful but has been all but exterminated by careless logging operations. It spawns in April and May. Efforts to establish it elsewhere have had little success. In Michigan and Montana it is thought to have come from the Arctic in glacial streams during the ice age, and then gradually changed its form. It has a huge dorsal fin, which waves gracefully like a brilliant banner. The Arctic grayling has a larger dorsal than the Michigan and Montana species, the latter having the smallest. In breeding, courage, and habits, all resemble the trout. The largest specimens run to 20 inches and 2 pounds, but the average is 10 to 12 inches. The grayling lies in the depths of pools over sandy bottoms, whence it rises like an arrow to take the fly. Then it leaps repeatedly into the air. As a food fish it is superior to trout.

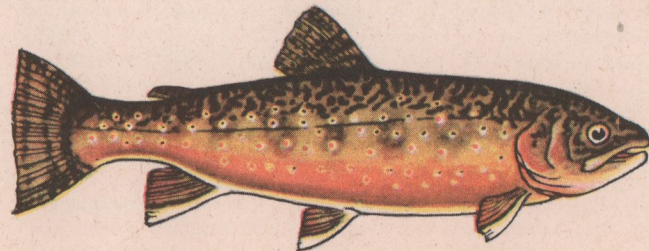


Brook Trout (*Salvelinus fontinalis*)

THE BROOK TROUT is probably the best known fresh-water game fish in all the world, and is the favorite quarry of more confirmed anglers than any other fish attracts. It is one of the most beautiful, active, and widely distributed of American trout, ranging from Labrador to Georgia and westward to the Pacific Coast in waters that are cold and not too sluggish. This speckled trout, not a true trout but a charr, spawns in the fall when the water is colder, working up into the smaller streams to deposit the eggs which hatch the following spring. It feeds on insects and smaller fishes, and strikes at artificial flies when they are dropped on the water by the sportsman.

The brook trout is often called by other names, such as *speckled trout*, *native trout*, *mountain trout*, *square-tailed trout*, *squaretail*, or *coaster*. The average weight is a pound or two, but big ones have been taken up to 14½ pounds. No other species has such a color variation: it ranges from a rich, dark olive-brown, with vivid fins and blue-ringed red spots, to the palest silvery olive. The back and dorsal fin are mottled. The maritime provinces of Canada, Quebec, Labrador, and Ontario have countless rivers and streams containing these speckled beauties. This fish comes down from the great rivers and lives in Lake Superior, growing up to 10 and 12 pounds. At St. Ignace Island, where it lives in Lake Superior, it is known as a "coaster." The Nipigon River in Ontario produced the world's largest—14½ pounds.

Contrary to general opinion, there are two species of brook trout. In Wisconsin and the lower peninsula of Michigan, eastward through Pennsylvania, New York, and New England, and south into the Virginias, the true *Salvelinus fontinalis* is caught. In the streams of the Gaspé Peninsula and Newfoundland, in eastern Labrador and in the streams flowing into Hudson Bay, is a different brook trout, *Salvelinus hudsonius*. The color pattern of this fish is almost the same, except that *fontinalis* has a dark stripe along the side of the belly at the lower edge of the red band, and *hudsonius* does not. In *hudsonius* the head is a little larger and more "bulldoggy." The body in *hudsonius* is rounder and not so "slab-sided."



Rainbow Trout (*Salmo irideus*)

THE TERM "rainbow" is popularly applied to the black-spotted trout that show a red or purple band along the side. There are eight or ten species of black-spotted trout. The western trout have three main divisions: the *rainbow*, the *steelhead*, and the *cut-throat*. The rainbow has a smaller mouth than the cut-throat, its scales are larger, it has black spots from head to tail, and there is a broad band of red along the side. The spawning season is in the spring.

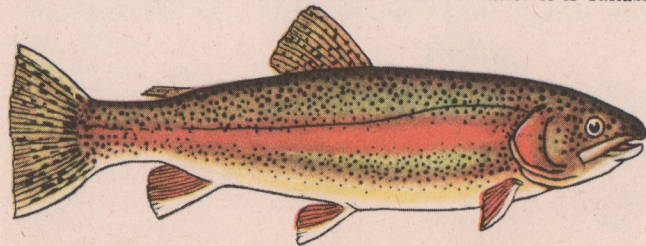
There has been much controversy as to whether the rainbow and the steelhead are the same species. The steelhead is held by some to be a rainbow that has descended to the sea, changed somewhat in appearance because of the different living conditions, and again entered fresh water. Those who believe this theory agree that a trout may be a rainbow at one period and a steelhead at another, and they believe that not all rainbows migrate to the sea and become steelheads because some become landlocked. The rainbow trout of Lake Superior, Lake Huron, Georgian Bay, and many lakes in Michigan are steelheads, planted there in 1895. Then there is the theory that the two are separate and distinct species, the finer scales, larger size, and duller color of the steelhead being held as sufficient proof that it is a different fish.

The rainbow is native only west of the Sierra Nevada Mountains from British Columbia to Mexico, but is widely planted in the East, in New Zealand, and in Europe. The rainbow typical of the upper Sacramento, with a profusely spotted body and a red stripe along the side, is the type which has been transplanted to many eastern streams and lakes, where its considerable size and magnificent sporting qualities have made it a favorite game fish. It is

now often found in the East in the same waters with the European or brown trout.

In beauty, gracefulness, reckless dash, and the spectacular quality of its fight, the rainbow is second to none as a contributor of thrills to the fly fishermen. It feeds on water insects and worms. It is particularly famous for its repeated leaps from the water in its efforts to free itself from the hook. Weights range from $\frac{1}{2}$ to 16 pounds, but the average weight usually does not exceed 2 or 3 pounds.

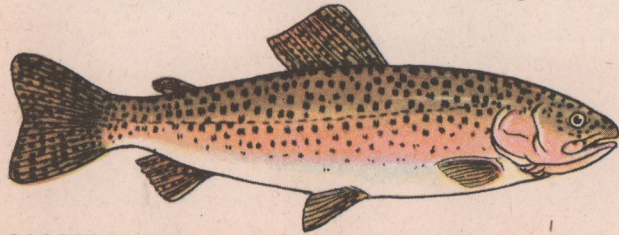
From coastwise streams the rainbow often enters the sea where its color changes to a bright silver and its spots sometimes disappear. It is a hardier fish than the eastern brook trout, being comparable in this respect to the brown trout. Like the latter it is suitable for stocking streams.



Steelhead Trout (*Salmo gairdneri*)

THIS GREAT game fish often weighs 12 to 20 pounds. Some steelheads live in the sea and ascend rivers of the Pacific Coast Range to spawn. Others live entirely in fresh water. Like Atlantic salmon, most steelheads make their way back to the sea, though emaciated, and live to spawn again. The ocean steelhead is steel blue above, with pink on the sides; it has few spots. In fresh water it changes to greenish above, with more and larger spots, and the pink turns to red. Found in all coastwise rivers and some lakes from California to British Columbia and southern Alaska, steelheads have a long varying spawning season. In the Columbia, where they are abundant, some spawn in the spring, others in the fall. The young steelhead remains in fresh water for a year or more before descending to the sea. Those that do not migrate

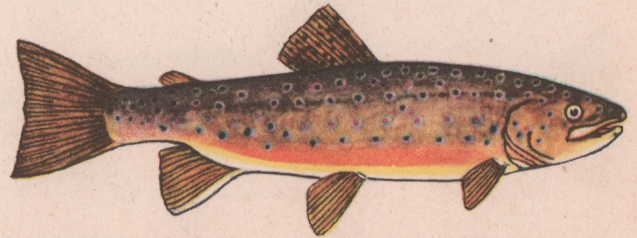
seldom exceed 5 or 6 pounds. Sportsmen take them on a fly or by trolling artificial lures near river mouths. This black-spotted sportsman is often called *steelhead*, *hardhead*, and *steelhead salmon*.



Brown Trout (*Salmo fario*)

THE BROWN TROUT is a native trout of Europe, praised by Izaak Walton and many English writers since his time. It has been extensively introduced in North America. It thrives best in clear, cold, rapid streams. It is brown, with black spots on the back and red spots on the sides. It appeared in America in 1883 as an immigrant from Germany. It found life here agreeable and has become a thoroughly naturalized citizen, being well established on the Atlantic seaboard and in many western states. It can live in warmer and less pure water than the brook trout, grows larger, and has equal sporting qualifications. Perhaps it is even a better game fish, for it is a constant surface feeder and thus is an ideal dry-fly quarry. It is excellent for restoring good fishing to streams where native trout have retreated before civilization.

It should not be introduced to waters that can support brook trout. The "brownie" feeds mostly in the early morning and at night. Spawning begins in October and continues through December. In large lakes brown trout attain a weight of more than 20 pounds.



Cutthroat Trout (*Salmo clarkii*)

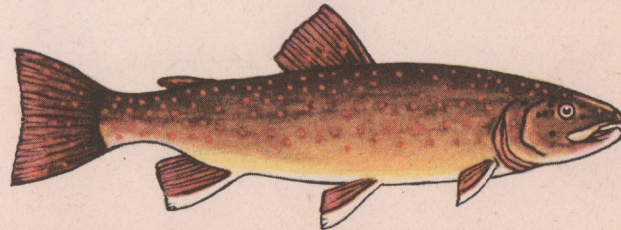
THIS NATIVE of western streams is named for the deep red color under the lower jaw. The teeth on the back of the tongue are additional to the forward teeth that all trout have. Its appearance varies according to localities. The small scales are finer than the rainbow's or steelhead's. Averaging 4 pounds, it rarely reaches 41 pounds. This trout occurs naturally as far east as the eastern slopes of the Rockies. It rises readily to a fly and, when hooked, often leaps from the water. Vancouver Island anglers prefer flies such as the Royal Coachman, Professor, or Peter Ross. When sea fishing for cutthroats, the same fly rod and reel are used, but a Silver Doctor or any other silvery fly is best. Cutthroats spawn in fresh water, entering streams in



spring, running up tributaries, seeking shallow lake waters near shore. Not so game as the rainbow or eastern trout, in cold waters it fights bravely. It is taken with the fly or by trolling.

Dolly Varden Trout (*Salvelinus spectabilis*)

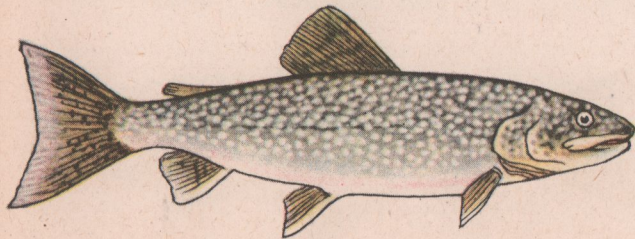
THE DOLLY VARDEN is a red-spotted trout common in many western streams. In beauty and gameness it matches its cousin, the brook trout. It is large, slender, and square-tailed. Its color is brownish. On its sides are round red and orange spots, on its back are similar but smaller spots, and on the lower fins a pale stripe much the same as on brook trout. Big ones weigh up to 25 pounds. This trout goes to sea and spawns up coastal streams in the fall, but it is not popular because it is very destructive to eggs of salmon and other trout. In streams, anglers catch them with the fly rod, and in lakes by trolling or still fishing with artificial or live bait such as salmon eggs or minnows. Its range is from British Columbia to northern California and along the Columbia River as far as Idaho and Montana. It is often called *bull trout*, *Oregon charr*, *western charr*, or *red-spotted trout*. It has a near relative, called the *bull trout*, which is abundant in Alaskan waters, and this, too, is very destructive to salmon eggs.



Lake Trout (*Cristivomer namaycush*)

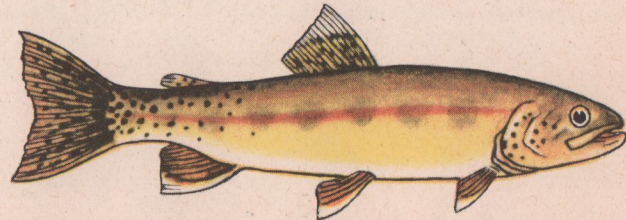
THE LARGEST of trout, the lake trout is found in most large lakes from New Brunswick and Maine westward through the Great Lakes region to Vancouver Island and then northward to Alaska. Its average is 5 pounds, but 80-pound specimens have been caught. This gray, light-spotted swimmer is both a game fish and delicious food. It is caught in spring and until late fall, when it spawns. Some sportsmen take it by trolling deep with a copper line and salmon spoon. In spring and fall, when it comes up on reefs in shallow water, salmon spoons are cast up to shore. Lake trout caught this way provide fine sport. Lake of the Woods, Isle Royal, and St. Ignace Island in Lake Superior are famous casting places. Common names of

this trout include *lake trout*, *Great Lakes trout*, and *Mackinaw trout* in the Great Lakes region; *togue* in Maine; *gray trout* in eastern Canada; and *salmon trout*, *laker* and *namaycush* elsewhere.



Golden Trout (*Salmo agua-bonita roosevelti*)

THIS IS the most beautiful of trout. First found in Volcano Creek, California, in the high Sierra Nevadas, it has been planted in Kern River tributaries 10,000 feet or more above sea level. Its brilliant yellow is marked with red; the lower fins are red, with white tips; the back and tail fins are profusely spotted. The broad, rosy lateral line is crossed by gray blotches. The three varieties of golden trout, all small (7 to 20 inches), have different markings. The one pictured here, a native of Volcano Creek named after Theodore Roosevelt, has prominent dark spots toward the tail. The species of the western tributaries of the Kern is the *Stewart White*, with a red lateral line, an orange belly, yellow low on the sides, and many small dark spots on the dorsal and tail fins. The *sweet-water trout* of the south fork of the Kern has more spots, but no spots on the lower two-thirds of the sides. When introduced into new waters, golden trout grow larger but their gorgeous colors fade.



Pickrel (Esox reticulatus)

THE PICKEREL is the smallest member of the pike family. It is green, with shades varying to golden brown, and is marked with horizontal streaks on the sides. It is found in creeks, rivers, ponds, and lakes from Maine to Florida, west to Texas, up the Mississippi River, and into southern Wisconsin and connecting waters. Its small size and mediocre fighting qualities often class it as a young angler's game fish. The three groups of pikes belonging to the genus *Esox* are easily told apart by the distribution of the scales. The first group, including the *grass pickerel* and *chain pickerel*, are fully scaled on both cheeks and gill covers. The second group, including only the species *Esox lucius*, is known by many names, as *common pike*, *northern pike*, *pickerel*, *jackfish*, and *snake*. Often weighing more than 15 pounds, it differs from the grass pickerel in having scales on the cheeks but none on the lower half of the gill covers. The third group contains the three species of *muskalonge*, which have no scales on the lower part of the cheeks and gill covers.



Pike (Esox lucius)

THE PIKE is a voracious feeder, eating heartily of other fish, bugs, and water animals. It is found in northern lakes and rivers all over the world. It ranges from Labrador to Alaska, to Siberia and Europe, and to England, where it is a prized game fish. In North America it is found as far south as the Ohio River. It has many names, including *common pike*, *great northern pike*, *grass pike*, *lake pickerel*, *pickerel*, *jackfish*, *jack*, and *snake*. It is a popular game fish and a good food fish. In the market places it is called jackfish. The pike differs from the grass pickerel and muskalonge in that the lower half of the gill cover (opercle) is without scales, but as in its pickerel brother, the cheeks are completely scaled. It is darker than the grass pickerel, with horizontal yellowish spots on a dark background. Like the pickerel and muskalonge, it spawns in shallow waters after the ice goes out. It grows to 40 pounds in Minnesota, but the average is 8 pounds. It is caught by artificial bait casting, trolling, or still fishing. When hooked it puts up such a stubborn fight that it is increasing in popularity among anglers.



Muskalonge (*Esox immaculatus*)

THE MUSKALONGE is one of the top-ranking game fish in North American waters, always being ready for a good fight. Because of its size, running up to 100 pounds, it is the largest member of the pike family. It is found in weed beds and on bars in lakes and streams. It is a good food fish, especially when it is of average size and is baked. The average size is about 15 pounds. The muskalonge is a long, fine-scaled fish with a long head, a projecting lower jaw, and large teeth. Its food consists of suckers, minnows, frogs, and even the young of water-fowl. It differs from the northern pike in that the lower half of both cheeks is without scales. The "muskie" has shadowy vertical bars or blotches of a darker color along its gray-green or light brown sides; the northern pike has yellowish spots on blue-gray-green sides. The fins are usually brown, sometimes reddish, and have black spots. Color changes among muskalonge are quite startling, for this fish always adapts its color to its surroundings, and it always stays quite close to one locality. When a muskalonge lives near an old tree top, for instance, its crossbars look like the shadows of the dead limbs. Muskalonge go on the spawning beds as soon as the ice goes out, and they scatter their eggs in the reeds and rushes.

The four best ways to catch a muskalonge are: (1) casting artificial lures such as plugs, spoons, and bucktails from a boat across bars, under fallen trees, into reeds and rushes around islands, or near shore. (2) Casting live suckers in the same places. (3) Trolling artificial lures with an outboard motor. (4) Still fishing with bait in rivers.

There are three species of muskalonge, all with different colors and markings. The northern

(or Wisconsin or tiger) muskalonge (*Esox immaculatus*) has a golden bronze hue and inhabits the rivers and lakes of northern Wisconsin and Minnesota in the Mississippi basin and northward to Hudson Bay. The St. Lawrence muskalonge (*masquinongy*) is grey and silvery and inhabits the clear waters of the St. Lawrence River, the lower Great Lakes, and the lakes and rivers of Ontario and Western Quebec. The Chautauqua or Ohio muskalonge (*Esox ohioensis*) is a mixture of greens in color, and inhabits the Ohio River and its tributaries in Alabama, Indiana, Kentucky, North Carolina, Ohio, Pennsylvania, Tennessee, and West Virginia.

There are at least 40 correct ways to spell *muskalonge*. The Indians called this fish *maskinonge*, and this spelling is now commonly used in Canada. The French called it *masque-al-longe*. It is also called by such names as *muskie*, *lunge*, *kinongé*, *mascallonge*, *mascanongy*, *maskallonge*, *maskanonge*, *maskenosha*, *muscallunge*, *muscalunge*, *muskellunge*, and *noscononge*.



Walleyed Pike (*Stizostedion vitreum*)

IN SPITE of its name, this warrior bears no relation to the pike family. Rather, it is a member of the perch family, and is the largest of that clan. It is one of the most numerous of fresh-water fishes. It is a sturdy fighter and, with its smaller cousin, the sauger or sand pike, ranks among our most important game fishes. The walleye's color varies widely in different waters, but in the main it is a brassy brown with oblique bars. It labors under a heavy load of common names, some of them being *yellow pike*, *golden pike*, *pike-perch*, *doré*, *jack*, and in the South, *jack salmon*.

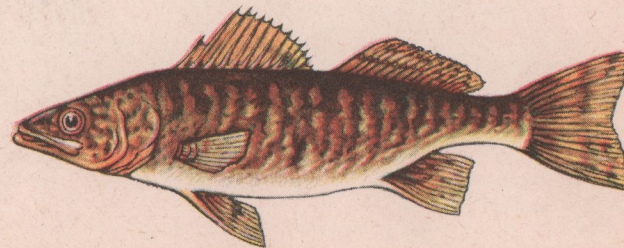
The size of the walleyed pike varies greatly, the largest being about 3 feet long and weighing about 25 pounds. This, however, is an unusually big fish, the usual catch weighing from 4 to 5 pounds. This fish is very generally distributed throughout the United States east of the Mississippi River, living principally in lakes, though it is also frequently found in rivers. The greatest walleye fishing in the country is to be found in the lakes of Minnesota.

Spawning begins in the early spring, even before the ice goes out. In shallow water on hard gravel bottoms, the very small eggs are deposited in incredible numbers, a 20-pound fish yielding about 900,000 eggs. The young begin to practice cannibalism on one another ten days or so after hatching. This is one of the most important fishes propagated by the United

States Fish Commission. Its flesh is firm and delicious. The name is derived from the characteristic cloudy or milky appearance of the cornea of the eye. The food of this fish consists principally of other fishes.

The sporting qualities of this fresh-water citizen are of the highest. It takes live bait eagerly and at times rises well to the fly and other artificial baits. Since it is a nocturnal feeder, the hours between sunset and dusk are the best time to fish for walleyed pike. In lakes it should be sought in rather deep water over pebbly or rocky bottoms. In winter it is caught by those who pursue their sport through holes in the ice.

Bright spoons, feathered lures, frogs, and live minnows are the most popular baits used by sportsmen in catching this popular fish. Because of its value as a food fish, it is taken in large quantities by commercial fishermen.



Small-Mouth Black Bass (*Micropterus dolomieu*)

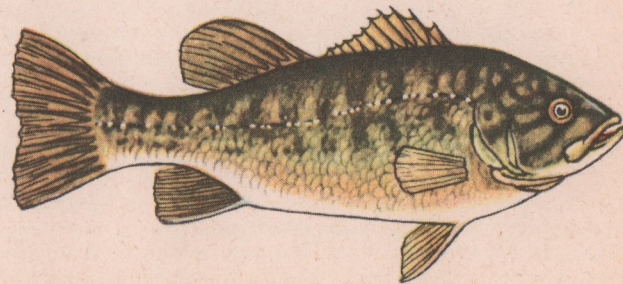
FISHERMEN would never agree as to which is the gamiest fighter among American fishes, but the small-mouth black bass, with its rush and vigor, will always have many backers. The small-mouth black bass is known by many local names. In many parts of the south, it is called *trout*. In other places it is called *river bass*, *small-mouth*, *Kentucky bass*, *tiger bass*, and *jumper*. In shape, it is the trimmest and most graceful member of the sunfish family. The mouth, though large, does not extend back of the eye. This is the chief point of difference from its twin brother, the large-mouth black bass, whose mouth extends to a point well back of the eye. The body of both species is olive green, which deepens to black in some waters. The large-mouth bass has a horizontal dark band along its side; the small-mouth has a pattern of vertical bands.

The size of the small-mouth varies greatly. A 2- or 3-pounder is a very satisfactory prize, and smaller ones are not to be scorned. Because of its pre-eminence as a game fish, the natural range of the black bass has been widely increased artificially. It is native to the upper Mississippi Valley, the Great Lakes region, southern Canada and the Atlantic slope, and it is found from Quebec to Georgia. It lives probably in greatest numbers in Lakes Erie, Huron, Ontario, and Michigan, and also in such waters as Georgian Bay, Lake St. Clair, and the St. Lawrence River. The principal method of fishing in these waters is with rod and reel and live minnows as bait.

The eggs, when laid, are encased in a long, gelatinous sack. They cannot be stripped from

the female and artificially hatched, as they can in the case of trout. Bass are propagated by pond culture, the larger fish being placed in ponds in the early spring for spawning. Spawning begins in early spring, when these bass hollow out circular nests on the pebbly bottoms near shore. The female deserts as soon as the eggs have been laid and fertilized. The male then hovers over the nest, maintains a constant current across the eggs by gently waving its fins, and vigorously attacks any enemy that approaches. After the young are a few days old, they leave the nest and begin life on their own.

Though the small-mouth is naturally a fish of swift, clear streams, it has been stocked successfully in many lakes. The Kentucky bass, found in the waters of Ohio, West Virginia, Indiana, and Kentucky, has large scales like the large-mouth, but in body form and character it is like the small-mouth.



Large-Mouth Black Bass (*Micropterus salmoides*)

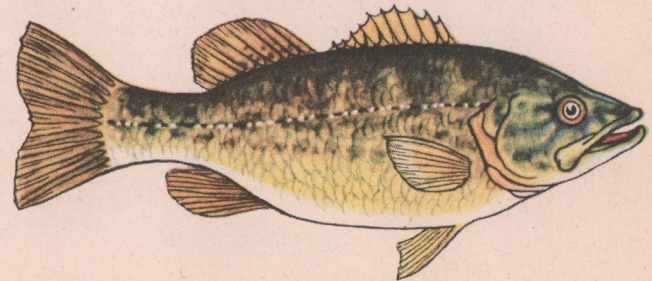
THE LARGE-MOUTH bass is a favorite fish with the sportsman. It is well known because of both its abundance and its fighting qualities. As a game fish it ranks second only to the small-mouth black bass. It prefers waters where there are lily pads, weeds, and snags, and where the bottoms are chiefly of mud. For this reason the large-mouth bass is found in lakes, ponds, bayous, and sluggish rivers where the waters are warm. Despite its weedy habitat the large-mouth is an excellent food fish.

In some lakes with considerable depth and cool water, with a bottom partly mud and partly sand, we find both large- and small-mouth bass. The large-mouth ranges farther south than the small-mouth. In southern waters, where the fish feed in summer as well as in winter, they grow to larger sizes, the largest ever taken with hook and line having a weight of over 22 pounds. In northern cooler waters, the large-mouth is a fish with great fighting spirit. When taken on a fly rod or a light-weight bait-casting rod, it is one of the gamiest of all fish.

This species has many names. It is often called *straw bass*, *trout*, *bayou bass*, *green bass*, *yellow bass*, and *big-mouth bass*. It is related to the sunfishes, but has a longer body, the first dorsal (top fin) being low and joined with the second dorsal at the base. It spawns in the spring of the year. The coloring is dark green on top, dull green on the sides, and pale below. The green cheeks are mottled. The best method of distinguishing it from the small-mouth bass is to notice that the large-mouth's bony upper jaw extends back of the eye, whereas the

small-mouth's does not. The large-mouth is also a chunkier fish with a larger mouth. The principal food is minnows, frogs, insects, and small fish. Fishermen can lure this bass with live bait, but using plugs, spinners, and flies with light tackle is more fun.

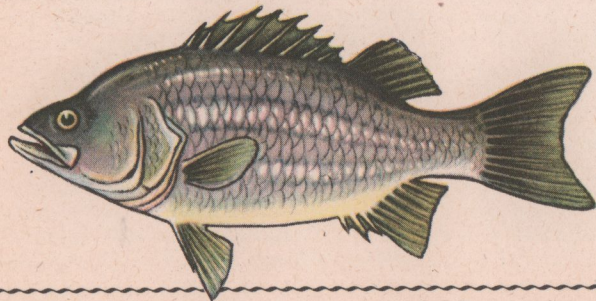
Black bass normally search for food in the morning and evening. Experience tells us that these bass have a time each day for a "striking spree," when they bite freely. It is not true that bass bite best when they are jumping, although many anglers like to be on hand for this so-called "jump-fishing" because it usually means good fishing. The large-mouth rarely jumps, but no fish fights harder if the fisherman uses light tackle. In Canada the large-mouth is generously distributed throughout Ontario and in the lower Great Lakes, Georgian Bay, Kawartha and Rideau Lakes, and in connecting rivers.



White Bass (*Roccus chrysops*)

THE WHITE BASS, often called *silver bass* or *striped lake bass*, is the fresh-water edition of the striped bass or rockfish. Except in size, the white bass resembles closely its sea-going cousin. The latter, the huge "striper" which is the surf fisherman's delight, sometimes reaches a weight of 100 pounds. The white bass is smaller, seldom being longer than 18 inches, and weighing from 1 to 3 pounds. The white bass has a deep, compressed body with an arched back. The color is silver, the sides having horizontal stripes. This fish ranks well as a food fish, and anglers who use light tackle regard it as the equal of the black bass as a fighter.

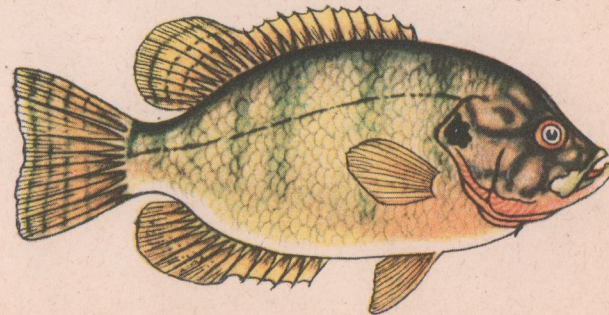
In the Lake of the Ozarks the white bass is the "scrappiest" fish that swims. It lives habitually in the deeper waters of rivers and lakes, coming into the shallows in spring and early summer to spawn. It is found in the Great Lakes and Mississippi Valley regions.



Rock Bass (*Ambloplites rupestris*)

THIS HANDSOME member of the sunfish family is a familiar pan fish. The body and fins somewhat resemble those of black bass. It is golden brown, slightly barred with green; the head is mottled brown, with a black spot on the gill cover. The mouth is large; the lower jaw projects slightly. This bass is found from Manitoba to the Gulf Coast east of the Mississippi. It often weighs a pound or two, sometimes exceeding a foot in length. Often called *sunfish bass*, *goggle-eye bass*, *redeye perch*, and *redeye*, it spawns in spring and

early summer, eats small fish and insects, is found in cool lakes and streams. It travels in schools and enjoys living in weeds and near rocks. Anglers like best to catch them with fly rod and flies. Minnows, worms, grasshoppers, small plugs, spoons, and spinners also are used.



Bluegill (*Lepomis pallidus*)

AS A GAME FISH, this is by far the best of all the true sunfishes. It grows to a greater size than the others, the largest reaching a length of from 12 to 22 inches and weighing from a pound up to 3 pounds. Its flesh is firm, flaky, and delicious. It will take almost any kind of bait, and for its size it is an exceedingly hard fighter. The bluegill takes the hook daintily, sucks the bait, and then goes about its business. Its plan of campaign consists in turning its broad side toward the fisherman. Thus it adds the resistance of the water to its dashes and tugs.

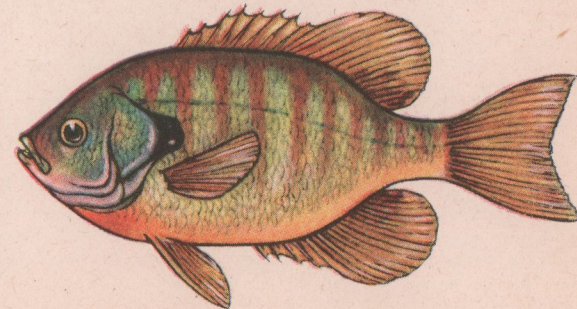
Its common names include *blue sunfish*, *blue perch*, *bream*, *copper-nosed bream*, and *dollardee*. It is found throughout the Great Lakes region, the Mississippi Valley, and the South Atlantic States, thriving in streams, ponds, and particularly in lakes, where it reaches its greatest size. It feeds on insects and their larvae, small minnows, and other minute animal and vegetable life. It spawns in the spring and early summer and has the thrifty, home-making habits of other sunfishes. Rather large nests are scooped out on sandy or pebbly bottoms. The nests are often in colonies, for this species is rather sociable in its domestic life. The parents guard the incubating eggs and accompany and care for the young fry. A male mates with several females during a spawning season.

This fish rises well to the fly. In some parts of the country where the trout is not found, it is much sought by anglers, who find that it gives them ample opportunity to exercise their skill in the use of the fly and light tackle. It can be caught through the ice in winter. It runs

in schools, and where one is caught many successive catches are usually made.

The bluegill is one of the very best fishes for private pond culture. It adapts itself readily to local conditions and breeds prolifically. An actual count of fingerlings produced in a pond by 50 adults showed more than 41,000 in a single season. It must not be supposed, however, that all these young hopefuls reached maturity. The incredible number of young produced by most fishes seems to be a necessary provision of nature to insure the maintenance of the species against its vast array of enemies.

It will bite on almost any kind of bait, but prefers worms, grasshoppers, crickets, and small minnows. Because the baby bluegill is "peaches, cream, and honey," to black bass, bluegill and bass are usually found in the same waters. The bluegill has a near relative in the *gold perch*, or *chainside*, of the Ohio River Valley.



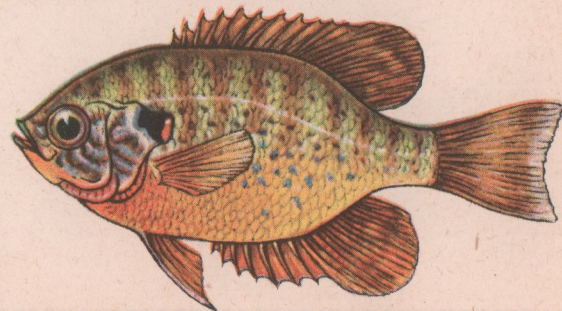
Common Sunfish (*Eupomotis gibbosus*)

THE LARGE FAMILY of sunfishes comprises about 38 species, including some of our most important game fishes, notably the black basses. The common sunfish has an orange-yellow belly, orange cheeks with wavy blue streaks, a greenish color, sides with vertical stripes of orange, and orange lower fins. It is our most familiar sunfish. It is found in abundance from Maine to the Great Lakes and south to Florida. Sometimes called *pumpkinseed*, *sun bass*, and *sand perch*, it is pre-eminently a small boy's fish. Most of its food consists of small mollusks and crawfish. Both its small size and its inclination are against devouring many other fish, but it preys to some extent on insects. It hardly ever weighs more than a pound; usually much less. It is a handsome, compact little fellow—a perfect example of efficient fish construction. If one has sufficient patience to clean enough for a meal, it is a good pan fish. Because it is tough and hardy, thriving under poor conditions, its range has been widely extended by artificial transplanting and reaches even to Europe. Its extreme fondness for mosquitoes has made its planting desirable in mosquito-ridden localities.

Like other sunfishes it is a home builder and a good parent. Spawning takes place in May and June. The male makes a circular nest by removing weeds and brush from the bottom over a space nearly a foot in diameter, excavating this area to a depth of 3 or 4 inches. These nests are placed in shallow water and are surrounded by aquatic plants. The male, as is fitting and proper, does all the work of guarding the nest and young. The female may stay near, but she leaves to her lord the duty of fighting off intruders. In courtship and in battle, the

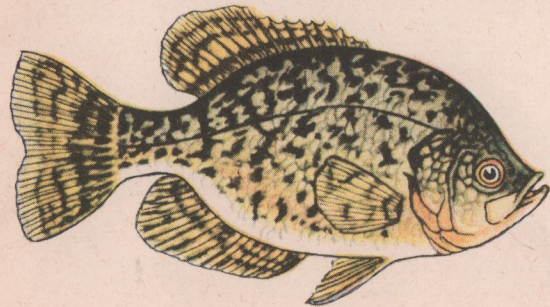
male has the habit of raising and puffing out its gill covers and ear flaps. The black ear flaps present in many sunfishes are not really ears and have nothing to do with hearing. No fish has an external ear, the hearing apparatus being buried inside the skull. Hearing ability is probably limited to perceiving a jar or splash in the water. The senses of sight, smell, and touch are mainly relied upon in the search for food. Another probable aid to hearing is the so-called lateral line possessed by all fishes: this is a row of specially constructed scales running along each side from head to tail and connected to nerves.

Other well-known sunfishes are the many basses of American waters; the red-breasted bream, found from Maine to Louisiana; the long-eared sunfish, found from Maine to Virginia and abundant in Michigan and New York; the red-spotted sunfish, found from Ohio and Kentucky to Texas; and McKay's sunfish, found west of the Alleghenies from the Great Lakes to Mexico.



Crappie (*Pomoxis annularis*)

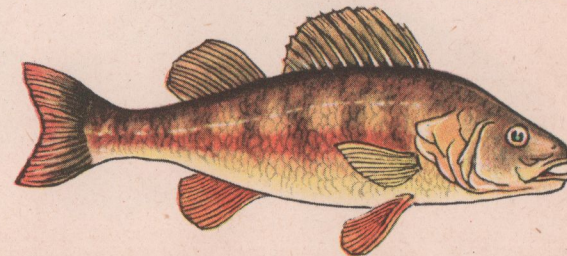
THE CRAPPIE and its near relative the calico bass (*Pomoxis sparoides*) are sunfishes valued for their sporting qualities and as food. The two species have the same range, look much alike, and are often confused. The crappie has a body relatively shallower than that of the calico bass, is lighter in color, and weighs less for the same length. Its blotchy markings tend to form vertical bands; those of the calico bass, horizontal bands. The color is olive, mottled with dark green. In both fish, the anal fin is larger than the dorsal. These fish range from the



region of the Great Lakes to Texas. Both feed on water insects and small fish. A 12-inch crappie weighing one pound is good-sized, will take almost any natural bait, and will give the fisherman a moderately exciting fight on light tackle. Common names for the crappie are *goggle-eye*, *speckled perch*, *bachelor perch*, and *white crappie*.

Yellow Perch (*Perca flavescens*)

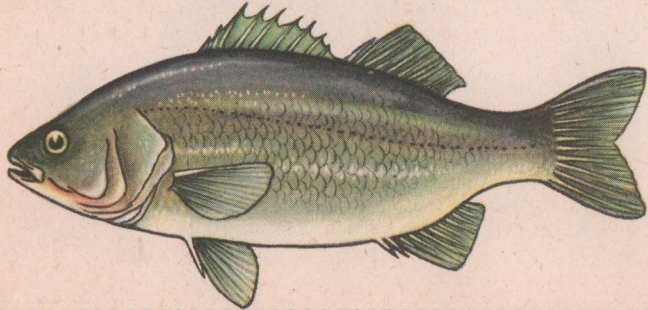
THE PERCHES comprise one of the largest and most interesting groups of fresh-water fishes. The two most important species are the yellow perch and walleyed pike. The yellow perch is probably our very best pan fish: it is the sweetest tasting of them all. Because it is so popular as a food fish it is caught by anglers with hook and line and commercial fishermen as well. Anglers lure perch by still fishing from a boat with small spinners or worms. The yellow perch is easily identified by its two separate dorsal fins and by its yellow sides, crossed by broad vertical bands, and by its pale belly. It grows up to 4 pounds, but the average weight is one pound. The perch is generally distributed over the country, but is found in largest numbers from Nova Scotia to the Mississippi Valley. It spawns in the spring. It is usually caught in great numbers, and the best tasting of this species come from Lake Erie, although Lake Michigan and Lake Huron perch are also delicious.



White Perch (*Morone americana*)

THE WHITE PERCH, of the sea bass family, lives in fresh or salt water. It is symmetrical, deep and compressed, and olive green to dark green, the sides being silver. It prefers clay and mud bottoms in brackish tidal waters, but ranges out to sea and up the rivers of the Atlantic seaboard from Nova Scotia to the Carolinas. It is landlocked in many lakes and ponds. Its natural breeding grounds are in coastal rivers near the mouths. Brackish water seems necessary for its propagation; it finally ceases to breed and dies out if permanently confined to fresh water. Spawning begins in spring and lasts about two months. This fish takes the hook

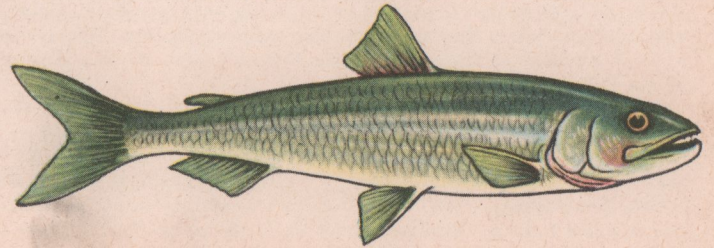
readily and is good to eat. The largest are caught in brackish or salt waters. Specimens a foot long are known, but this is above average. The usual baits are shrimp in salt water, insects and angleworms in fresh water.



Smelt (*Osmerus mordax*)

THE SMELT are small, slender, troutlike, silver-sided, delicious pan fish. They range from the St. Lawrence River to Virginia, and are found in Lake Champlain and the waters of the Great Lakes. They are known as the American smelt or icefish. They are greenish in color above the silver sides and attain a weight of a pound or pound and a half. Smelt are marine fish, but they have become permanently landlocked in many lakes in New England and Canada. They come inshore in winter and ascend fresh-water streams to spawn in the early spring, at which time they are caught in nets for the market. Because smelt are a favorite food of the lake trout, large numbers of smelt were planted in the many inland waterways as food for the trout. The result

has been that the smelt have multiplied rapidly. Every year in the spring millions of them now run up the streams emptying into Lake Michigan.



The Sturgeons (Acipenseridae)

THE STURGEONS are large fish of the northern seas and fresh waters. There are about 20 species, the best known of which are the *common sturgeon*, *lake sturgeon*, *white sturgeon*, *short-nosed sturgeon*, *green sturgeon*, and *shovel-nose sturgeon*. The sturgeons are clumsy, sluggish, bottom-feeding fishes, recognizable by the five rows of bony plates which, instead of scales, protect their bodies, and also by their overhanging snout, toothless jaws, suckerlike mouth set well back on the underside of the head, and the four barbels or feelers hanging below the snout and in front of the mouth.

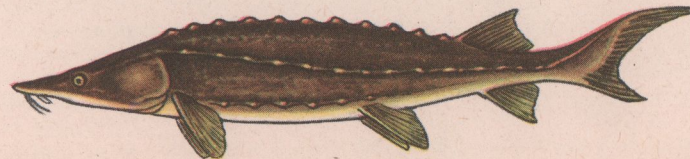
The sturgeon is not a game fish but is an excellent food fish, especially when smoked. By far the most valuable part of the sturgeon is the roe, from which is prepared that expensive product we call caviar. Sturgeon cruise lazily over muddy bottoms in search of bottom-living creatures which they suck into their toothless mouths. Gillnets resting on the bottom of the river are used to capture sturgeon. Although large in size, sturgeon struggle very little and are easily rolled into the boat from the net.

The *common sturgeon* is often called the *American sturgeon* or *sea sturgeon*, and is the sturgeon of the Atlantic Coast from the St. Lawrence River to South Carolina. It is olive gray or brownish in color, and has a long, pointed snout. It is migratory in habit, spends much time in salt water in the bays, and in the spring it runs up fresh-water rivers such as the Hudson, Susquehanna, James, and Delaware to spawn. It weighs up to 500 pounds. A good place to catch them is Chesapeake Bay, where the sturgeon still grows to large sizes.

The *lake sturgeon*, dark olive and reddish in color, inhabits the waters of the Great Lakes, the Mississippi Valley, and the Canadian lakes of this region. It is the largest fish of this region and is less abundant than formerly. It weighs up to 100 pounds and attains a length of over 6 feet. Although a bottom feeder, it is known to eat small fishes, crawfish, insects, and worms.

The *white sturgeon*, often called the *Oregon sturgeon*, *Pacific sturgeon*, or *Columbia River sturgeon*, is the common sturgeon of the Pacific Coast from Alaska to California. It is olive gray in color, and reaches a length of 14 feet and a weight sometimes over 1,000 pounds. It is regarded with disfavor when it gets into the nets of the salmon fishermen. In the spring the white sturgeon ascends the large rivers from the sea to spawn.

The *short-nosed sturgeon* is reddish brown, with black bands on the sides. It has a short snout, is smaller than the common sturgeon, and is found from New Jersey south to Florida. It weighs up to 12 pounds.



Whitefish (*Coregonus clupeiformis*)

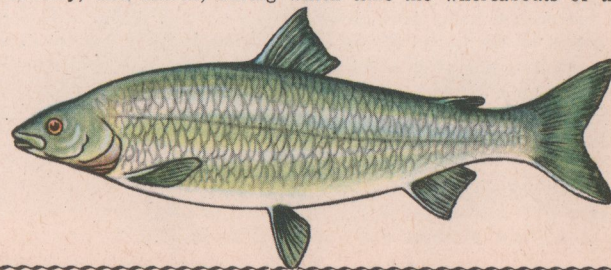
WHEN THE more adventurous of the early French settlers of Canada were pushing their explorations westward through the Great Lakes, they found an inexhaustible food supply ready at hand to sustain them during their long canoe journeys. This was the whitefish, on which such pioneers as Marquette, La Salle, and others had to depend for their food for months at a time. Their letters and reports bear witness to the excellence of the whitefish as a food. Today the abundance of the whitefish in the Great Lakes and its high quality as food make it by far the most commercially important of all our fresh-water fish. From Lake Champlain to Lake Superior, this delicious fish is netted in vast numbers and shipped to markets. The catch is made with gillnets on or near the bottom in comparatively deep water.

The whitefish is a cousin of the salmon, but unlike that king of game fishes, it furnishes little sport for the angler, for very rarely will it take a hook. Using pieces of small fish as bait, however, anglers fishing through the ice during the winter season in the Adirondacks catch many whitefish. Inhabiting only clear lakes and seldom entering streams except to spawn, the whitefish cannot endure warm or impure water. It does not habitually prey on other fishes but feeds on deep-water crustaceans, mollusks, and the larvae of water insects. It is commonly known as *Lake Superior whitefish*, *shad of Lake Champlain*, and *Labrador whitefish*.

The whitefish is a compressed, oblong fish with a small head, small mouth, and blunt

snout, the color being white. Of the several species the *common whitefish* is the most abundant, grows to the largest size, and furnishes the great bulk of the commercial catch. The general run weigh from a pound and a half to 6 pounds, but occasionally one weighing as much as 12 pounds is caught. In spite of its vast numbers and commercial importance, the life history of the whitefish is by no means thoroughly known. Like the salmon, it travels far from its usual habitat to spawn. The regular fall and spring migrations to and from the spawning grounds are well known in the Great Lakes. Spawning takes place in shallow water from October to December. In Lake Erie, where the species is most abundant, there is practically no fishing during January, February, and March, during which time the whereabouts of the fish is unknown. Owing to the lack of adhesion in the eggs, the artificial propagation of the whitefish has resulted very successfully. This is fortunate, for the species seems to be diminishing in numbers.

The *round whitefish* is generally similar to the

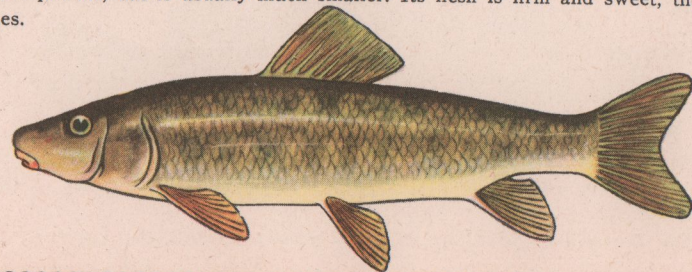


common species but has, however, a rather broad back, a dark bluish color above, and a silvery hue below. This species is known as the *frostfish* in the Adirondack lakes, the *pilotfish* in Lake Champlain, the *chivey* in Maine, the *Chateaugay shad* in Chateaugay Lake, the Menominee *whitefish* in Lake Superior, the *blackback* in Lake Michigan, and the *shadwaiter* in Lake Winnepesaukee. It is found in the Adirondack region, the Great Lakes, the lakes of New Hampshire, and northward to the Yukon, being the most widely distributed of all the American whitefishes. It is smaller than the common whitefish, never weighing more than 2 pounds and measuring from 12 to 15 inches. The average taken for market is about one pound. This fish ranges in the Great Lakes with the common whitefish and is commercially next in importance, the two species being doubtless the favorite food fishes caught from inland waters. Very little is known of the habits of the round whitefish. It is usually found in the deeper parts of a lake and does not often enter streams. Spawning occurs in the fall. It is not a game fish and seldom takes a hook.

The *Rock Mountain whitefish* (*Coregonus williamsoni*), troutlike in habit, lives in the western mountain lakes and streams from the west slope of the Rockies to the Pacific and from Utah to British Columbia. Though not so gamy as the trout, it rises to the fly and takes a baited hook. It grows up to 4 pounds in weight and may be caught in large numbers in Big Payette Lake and in the headwaters of the Salmon River in Idaho, in the Provo River, and in the lakes Pend d'Oreille and Coeur d'Alene in Utah.

Common Sucker (*Catostomus commersonii*)

EVERYBODY knows the sucker, the clumsy dolt of every stream and pond. In all kinds of water it cruises languidly over the bottom, sucking mud and small bottom-living animals into its unshapely mouth. It is brownish, mottled with darker color, but has a rosy appearance. There are about 60 species, most living east of the Rockies, some being native to the Great Basin and the Pacific slope. In early spring they run up streams to spawn, at this time being gayer in color. Anglers fishing for trout in streams often catch suckers with a fly or worm. The *brook sucker* is the commonest sucker east of the Rockies. It attains, in large streams, 20 inches and 5 pounds, but is usually much smaller. Its flesh is firm and sweet, though full of small bones.



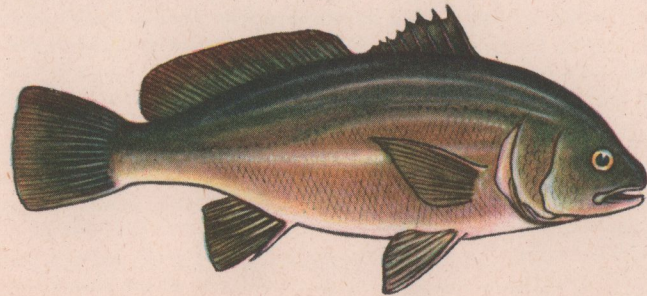
Fresh-water Drum (Aplodinotus grunniens)

THE FRESH-WATER DRUM is a large fresh-water fish found in the larger lakes, streams, and bayous west of the Alleghenies to the Great Lakes region, and south through the Mississippi Valley to Louisiana, Texas, and Mexico. It is found in abundance in the lowland streams through Texas to the mouth of the Rio Grande. It is grayish-green and silvery in color, dark above, with oblique streaks on both sides. It reaches a length of 4 feet and a weight of 60 pounds. It is a bottom fish, feeding on smaller fish and mollusks. It makes a croaking noise similar to its salt-water relatives. Fishermen who catch drum form the habit of looking for the "lucky stones," which are white bonelike stones found in both temples of this fish.

The drum, called *sheepshead* in the Great Lakes region, is not a food fish in the North. But in the South, where it grows to greater sizes and is called *gaspergou* and drum, it is of better quality and is found at all of the markets. The flesh is coarse; in the North it is as tough as shoe leather. In the lakes of northern Indiana it is called *crocus*; in Ohio it is the *white perch*, *gray perch*, or *perch*; in Louisiana it is the *gaspergou*; and elsewhere in the South it is the *drum* or *thunder-pumper*. It has also been referred to as the *croaker*, *jewelhead*, and *lake sheepshead*.

The *sea drum*, the *common drum*, and the *black drum* are well-known salt-water fish found

on sandy shores from New England to the Rio Grande. These have taller dorsal fins and grow to larger sizes than the fresh-water species. The drum makes a loud drumming noise, especially the males during spawning season. Like the fresh-water drum, in northern waters the sea drum is not a good food fish, but in the South, where it is of better quality than in the North, it is held in higher esteem.



Bullhead or Catfish (*Ameiurus nebulosus*)

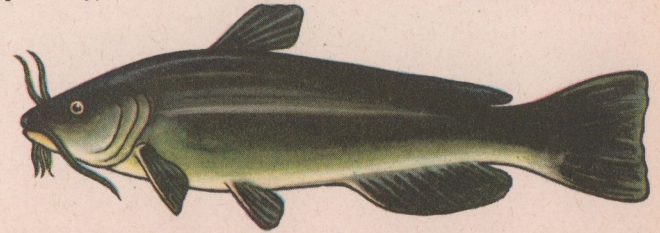
THE BEST KNOWN of our catfish is the bullhead or horned pout, a dull and blundering fellow, fond of warm, murky waters where it cruises about searching with its feelers for food on the muddy bottoms. Catfish can be recognized by such characteristics as its long, fleshy feelers (whiskers), its smooth scaleless skin, and its small, fleshy fin to the rear of the dorsal fin, exactly as in salmon and trout. Though the bullhead rarely grows longer than a foot and consists mostly of head, it is a toothsome morsel when properly cooked. Not at all fastidious in its feeding habits, it gulps down without hesitation or coquetry almost any kind of bait. It feeds usually at night but can often be taken during the day.

The bullhead is native to the whole of the eastern and southern part of the United States and has been introduced to the Pacific slopes. Its extreme tenacity of life and liking for warm, muddy waters where no other fish could survive make it highly suitable for pond culture when a food supply only is desired. Very little can be claimed for it on the score of beauty or sporting proclivities. In late fall it grows sluggish, ceases feeding, and finally buries itself in soft ooze to spend the winter.

Like all catfish, the bullhead makes a nest in a secluded place under a rock or log and does considerable work in adding to the natural conveniences of the chosen site. The cream-colored eggs are deposited in gelatinous masses similar to those of a frog and require only

a few days to hatch. During this time, the parents guard and fan the eggs with their fins, the male at times taking masses of them into its mouth—possibly to clean them, since they are quickly ejected. The young accompany the parents, who care for them as a hen cares for her chicks, until they are about an inch long.

In addition to the mottled bullhead there are several other varieties, colored black, white, or brown and usually without mottles or spots. One of the most celebrated qualities of the bullhead is its ability to live a long time out of the water. In this respect only the dogfish or bowfin surpasses it. There are several important catfish, including the *channel catfish* of the Great Lakes and Mississippi Valley, the *blue cat* of the Ohio and Mississippi Valleys, the *mud catfish* of the Mississippi and Gulf States, and the *tadpole* and *mad tom cats* east of the Alleghenies and in the Hudson River.



The Dogfish (*Amia calva*)

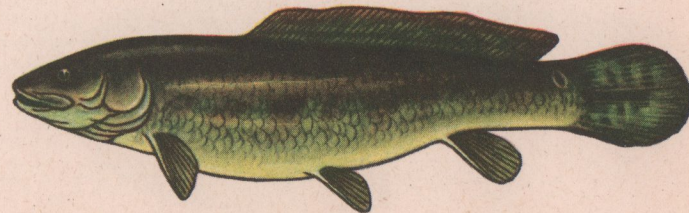
THE DOGFISH, variously called *bowfin*, *mudfish*, *lawyer*, *blackfish*, *cottonfish*, *speckled cat*, or *scaled ling* in New York, *grindle* in Virginia, and *choupiquel* in Louisiana, does not deserve the almost universal contempt in which it is held by fishermen. It is in some ways the most interesting and venerable of all American fishes. It is a "living fossil," the sole surviving species of a once numerous order that lived in very early geologic times. All other species of this order have become extinct and are known to us only as fossils. Its survival, unchanged, over practically all other forms of life of that time shows that it has remarkable qualities of endurance.

The dogfish abounds in the lakes and swamps of the Mississippi Valley, the Great Lakes region, and the Atlantic slope. It reaches a length of from 1½ to 2 feet, the male being smaller than the female and marked with a dark spot at the base of the tail. Unsavory in taste and very destructive to other fishes, especially the small black bass, it is not highly esteemed by sportsmen, who regard it as vermin. But when it takes the bait offered to more aristocratic fishes, it proves to be one of the hardest fighters that ever took a hook. In Louisiana its dried and smoked flesh is used in making jambalaya.

The dogfish is equipped with a lunglike air bladder which can function as a breathing apparatus, and it comes to the surface occasionally to breathe, although normally breathing

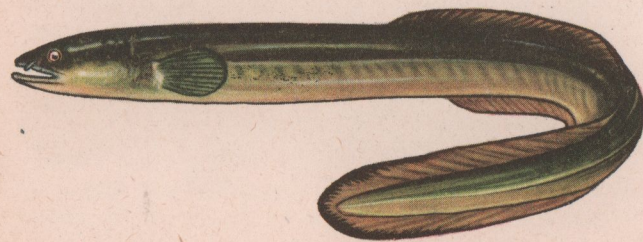
by means of gills. It can live out of water longer than any other fish of American waters, not excepting even the bullhead. It is always abundant throughout its range.

The dogfish is of a retiring disposition, habitually lying motionless among the water weeds on the bottom. At breeding time in the spring and early summer, it becomes more active. The male scoops out a shallow nest, fanning away small obstructions and biting off growing vegetation. After the eggs are laid, the male guards them during the hatching period of 8 or 10 days. It continues this paternal care during the week or so that the young remain in the nest. It even accompanies and guards them in their early efforts to shift for themselves. About 4,000 eggs are deposited in one nest, which is usually found in thick vegetation in a shallow part of the lake or river.



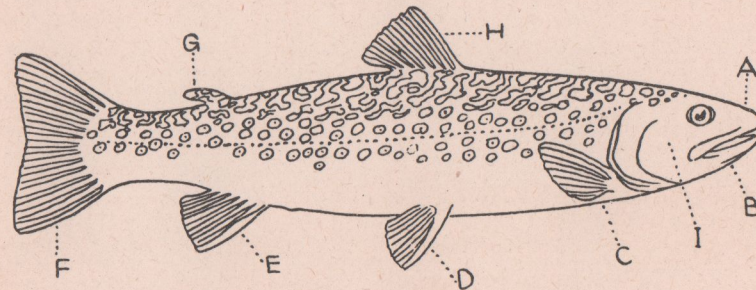
Common Eel (*Anguilla chrysopa*)

AN EEL is a long, greenish-brown, snakelike fresh-water fish with a dorsal fin that continues around the tail, meeting with the anal fin. Its scales, finely imbedded in the skin, are at right angles to one another. The eel has small teeth, small eyes, and a projecting lower jaw. They are found in rivers of North America from Canada to Mexico. Eels leave rivers in the fall to spawn in salt water, and there die. Young eels ascend the rivers in spring, many going far up the Mississippi Valley. Some swim so far inland that they become landlocked and grow very large. The average is 2 feet long, the maximum about 5 feet long. Eels feed at night on dead fish, fish spawn, shrimp, small fish, and other animal life. They have tasty, tender flesh and are caught for market in eelpots, nets, and on set lines. Like other fish that



live in fresh water and spawn in salt water, eels are called *cata-dromus*. Fish who live in salt water but go up fresh-water streams to spawn, such as salmon and shad, are *anadromous*.

TERMS USED IN DESCRIBING FRESH-WATER FISH



BROOK TROUT

A—Snout
B—Lower Jaw
C—Pectoral Fin

D—Ventral Fin
E—Anal Fin
F—Caudal Fin

G—Adipose Fin
H—Dorsal Fin
I—Cheek

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