

History of the Montana Grayling

By Professor Morton J. Elrod of Missoula, Montana State University



M. J. Elrod

EXQUISITELY colored, graceful in action, shapely in form, gamey to the last, the Montana grayling is the delight of sportsmen. It is the "ultima thule" of fresh water fishes, living only in clear, cold and rushing water, feeding mainly on insects and their larvae. It is even better than trout as food, and is in every way desirable. For food or for fly fishing sport

it is sought eagerly by fishermen. Its propagation and distribution by states in the Rocky Mountain region and by the Bureau of Fisheries of the federal government has been fostered assiduously in recent years. All eggs that can possibly be secured are carefully nurtured and rather widely distributed.

So selective is the grayling in its habitat that it frequently does not thrive well when planted in a new environment. It prefers clear, cool, swift streams with gravelly beds. Rock strewn and bouldery streams are not to its liking, although it will enter them in search of food. It is said that it will travel long distances in search of food. But it has now been established in many sections of the Northern Rockies, and its success in other places seems assured if its demands for food and spawning places are met.

The name *Thymallus* goes back to 1829, established by the famous French zoologist Cuvier. It comes from the Greek word, referring to the odor of thyme which is supposed to be evident when the fish is first taken from the water. This may or may not be apparent. Izaak Walton says of it, "some think he feeds on water thyme for he smells of it when first taken from the water." There seems to be disagreement about the odor. Henshall says of the grayling that "however it may have been in days of old, it is not so now, though an odor of cucumbers is sometimes perceptible when it is first out of the water." It may be possible that the European grayling, which Cuvier knew, has a slightly different odor from the American species. Since thyme is not native to the Rocky Mountains it can in no way affect the odor of the fish of the region.

The graylings belong to the family Thymallidae, proposed by Gill in 1894. They agree closely in external structure and habits with the family Salmonidae, which includes various species of trout and salmon. There are structural differences which the ordinary

Grayling Feeding Problem Unsolved

PERFECTION of food and feeding system for the Montana grayling, classified by Izaak Walton as "the flower of fishes," is a problem that is commanding the attention of fish culturists throughout the nation. Alvin Seale, superintendent of the great Steinhart Aquarium at San Francisco, has taken a keen interest in the problem. The Steinhart Aquarium was founded in 1917 by Ignatz Steinhart and is under the management of the California Academy of Sciences, Golden Gate Park.

In a letter to Kenneth F. MacDonald, superintendent of Montana fisheries, Mr. Seale writes: "As you are aware, I have been working on the plan to find some food that the baby grayling would take as soon as the food sac is absorbed. This work has covered some four years. In the first season's trial I used hard boiled egg pressed through a cloth, and also beef heart and liver in equal parts ground fine. None of these proved of any great value as the young fish died of starvation within a few months.

"The next year I tried the preparing of live food for the baby fish and had several tanks of infusoria grown and ready for them when they were free swimming, but this did not prove any more satisfactory. Although a number of other foods were tried on these young fish none of them were successful. I believe that the problem is absolutely unsolved insofar as our experiments have gone."

person would not observe. The dorsal fin is high, rather long, composed of 19 to 24 rays, the anterior half of simple rays, the posterior half of bifurcate or little branched rays, colored with orange, red or purplish spots. Behind the dorsal fin is a small adipose fin, present also in the Salmonidae. The air bladder is very large. In the lateral line are about 90 small scales. The caudal fin is forked. The small anal fin has 12 to 15 rays.

The distribution of the graylings is interesting. They are confined to the cold water, clear rivers and streams of cold or Arctic regions. They are the most specialized of fresh water fishes, very select in their food, and adapted to only cold water. About five existing species are reported, three of which are in North America.

The European species, *Thymallus thymallus*, is found in Siberia, Russia, Germany, France, Switzerland, and England.

The Arctic grayling, *Thymallus signifer*, is found from the Mackenzie river westward through Alaska, north to the Arctic ocean. The Michigan grayling, *Thymallus ontariensis*, was formerly found in certain streams of Michigan.

The Montana grayling, *Thymallus montana*, originally inhabited the streams flowing into the Missouri river above Great Falls, and is now being extensively propagated and widely distributed.

The Arctic grayling is called bluefish and Back's grayling in Chamber's "The Unexploited West," the latter name in honor of Lieutenant, afterward Captain Sir George Black, who accompanied Sir John Franklin on his exploring expeditions. Captain Black descended the Great Fish river to its mouth in 1834. The river name was changed to Bach river, in recognition of this exploration. In July, 1834, Captain Bach mentions having observed grayling rising to flies at the outlet of Pelly lake on Bach's river.

The following quotations from "The Unexplored West," (295, 296) will be of interest:

"Before the Senate committee of 1888, Dr. G. M. Dawson stated that all the waters tributary to the Mackenzie, the Arctic grayling, or Back's grayling, which is an excellent fish, was to be found. It is a fish resembling the trout in appearance and size, but has a very large back fin. It is a very game fish, much like the trout, takes the fly, and is excellent eating. . . . It is a purely fresh water fish, and a two-pounder would be a fair-sized one."

E. A. Preble is quoted in the same publication as follows: "The Arctic grayling, usually called bluefish in the north, has a very extensive range. It occurs throughout the region from Peace river and Athabasca lake northward and northwestward to the Arctic ocean. . . . As it prefers clear streams it is somewhat local in distribution, occurring but seldom in the main rivers, which are usually muddy, but being abundant in many of the clear tributaries and the lakes which they drain. . . . It is common in Great Bear lake near Fort Franklin, where many were being taken in whitefish nets."

"I am not aware that the grayling has been recorded from any stream tributary to Hudson Bay, except in one instance. Dr. Bell mentions that it was taken in tributaries of the lake by Churchill and that a specimen was identified by Professor Gill as *Thymallus signifer*. A possible explanation of the occurrence of this fish in the Churchill is suggested by the connection between Churchill river and Athabasca lake. The grayling occurs in Black or Stone river, which flows from Wollaston lake into Athabasca lake. The waters of another outlet of Wollaston lake, Cochrane river, flow by way of Reindeer lake into the



MONTANA WILD LIFE



Churchill, thus affording to a torrent-fishing species like the Arctic grayling already means of communication."

Professor John Macconn is quoted as saying before the Senate committee in 1883 that "he had caught Back's grayling in the tributaries of Peace river, in the Rocky Mountains. It is both an Arctic and a mountain fish, and delights in clear water. It is very game, and takes all kinds of bait. When it took the bait it would jump clear out of the water, many times a couple of feet or so, and of course, the beautiful colors (more beautiful than those of the mackerel even), glistening in the sun, made the anglers thrill with excitement. They are a white-fleshed fish, and not anything like as hard as the trout."

It seems, therefore, from reading the reports, that the Arctic grayling, Back's grayling, or Bluefish, is very abundant in many streams of the north draining into the Arctic ocean, and that it will continue in abundance for a long time, owing to the scarcity of population, inaccessibility by sportsmen and fishermen, and lack of transportation facilities.

The Michigan grayling, *Thymallus ontariensis*, was originally described by Cuvier and Valenciennes. The specimen was received from Milbert's New York collection, recorded as coming from Lake Ontario. The authors report it as very near to that of the lake of Geneva. The specimens were said to be a foot long. Jordan and Evermann sum up the evidence as follows: "It is wholly uncertain where Valenciennes got the specimen which he called *Thymallus ontariensis*. It is probably the ordinary grayling, *Thymallus thymallus*, of Europe, erroneously attributed to Milbert's New York collection. In any case, its identity with the Michigan grayling is more than doubtful, as the rivers in which the latter occurs were then unexplored."

The Michigan grayling was described by Cope in 1865 as *Thymallus tricolor*, the name Jordan and Evermann retained. However, *Thymallus ontariensis* is used by the Bureau of Fisheries in their recent publication. This name will doubtless be used hereafter in scientific literature wherein references to the Michigan grayling are made.

The Michigan grayling has a dorsal fin of moderate height, with 19 to 21 rays; the Arctic grayling has a very high dorsal fin 22 to 24 rays; the Michigan grayling, found formerly in the streams of northern Michigan, formerly abundant in Au Sable river, Jordan river, and other streams in the northern peninsula, are considered to represent only a detached colony of *Thymallus signifer*, left from the former or post-Glacial extension of the range of that species, of which it was once a variety. While it still remains in the Au Sable river and possibly in other streams in northern Michigan, it has nearly disappeared from the waters of the southern peninsula. Leach says the opinion is expressed by observers that the introduction of the non-indigenous brook trout and rainbow

trout has been a factor of importance in their disappearance." The Michigan grayling averages probably not more than one-half pound, and rarely exceeds one and one-half pounds in weight."

Grayling were first artificially propagated in Michigan in 1874. Recently Michigan fish authorities have undertaken with energy their propagation.

The Montana grayling was first described by Milner (Rept. U. S. Fish Comm. 11, 1872-73, printed 1874) from specimens taken from a tributary of the Missouri river at Camp Baker. While it has been known for more than 50 years, and anglers have traveled long distances to take the handsome specimens from the cold water of their native streams, its propagation and distribution to other streams has been undertaken during the past 20 years. Perhaps 10 years will include the time during which eggs in numbers sufficient to propagate and establish the species in other places than their native habitat.

The species is said by Jordan and Evermann to be an isolated colony of the Arctic grayling. It originally existed only in the tributaries of the Missouri river above Great Falls, principally in Smith or Deep river and its tributaries, and the three forks of the Missouri, the Madison, Gallatin, and Jefferson rivers, and their tributaries. It has also been reported from Sun river at Fort Shaw by Dr. J. C. Merrill.

The following general description of the Montana grayling will be of value, as given by Leach, condensed:

"Body elongated, compressed, the depth contained four and one-half times in the length; head subconic, of moderate size, its length one-fifth that of the body; dorsal outline a uniform gentle curve, highest at the beginning of the dorsal fin; mouth oblique, terminal, of moderate size; teeth rather feeble, of uniform size, on jaws, palatines, and vomer; gill rakers short and stiff, 17 in number; eye large, exceeding the length of the snout, contained three and one-half times in length of head; scales, 82 to 85 along lateral line, eight rows above and 10 rows below the line; dorsal fin long and high, 18 to 21 rays, length and height both equalling depth of body; tail strongly forked; color, gray back with purplish reflections, sides of head and body lighter, with purplish and silvery iridescence; bell pure white; anterior part of body with a few V-shaped black spots; dark heavy line, more distinct in males, along upper border of belly from ventral to

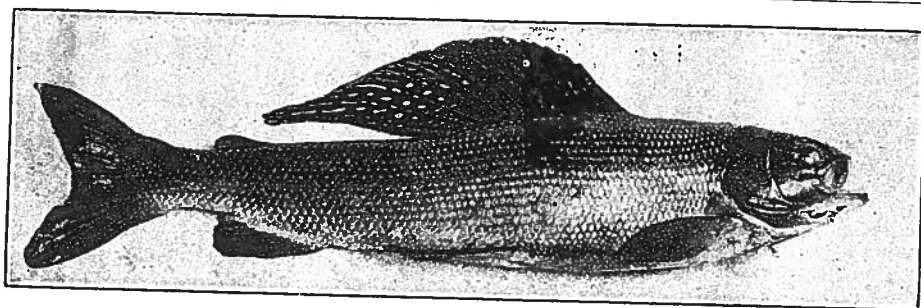
pectoral fins; dorsal fin richly variegated with rosy border, four to six rows of roundish rosy spots in whitish areas, dark lines forming blotches between the spots; ventral fins with three rose-colored branching stripes along the rays; anal and pectoral fins plain, with dark border."

The colors of the Montana grayling are gorgeous, the flesh is firm and flaky, very white, and of delicate flavor (Smith and Kendall); and the fish is active and gamey, even excelling the native trout. It rises eagerly to the artificial fly, and if it misses will rise again and again. It will take various baits, as caddis-fly larvae, grasshoppers, and worms. It stays in the bottom of pools in plain sight, and often in large numbers. It is reported to be an excellent fish for the aquarium and, of course, its beauty will attract attention. The artificial flies recommended are professor, Lord Baltimore, queen of the water, grizzly king, Henshall, coachman, various gauze-winged flies, using No. 10 and No. 12 hooks. Fish from Georgetown lake average from one and one-half to two pounds, from the South Fork of Madison river, two pounds, often weighing as much as three pounds.

The grayling does not seem to be easy to cultivate. In Montana the percentage of fry produced from grayling eggs seldom exceeds 75. The yolk sac of the eggs is small, and is absorbed within a week. The young fish are then about a half inch long. They move about in search of food, but are less active than trout or salmon fry. Leach says: "It is customary to distribute the fry within two or three days after incubation is completed, since attempts made to rear them have not given good results. The fry do not take readily to artificial feeding, and when moved from hatching troughs to rearing ponds they usually refuse food entirely for several days. However, the outcome of experiments along this line gives ground for the belief that with proper facilities this difficulty in rearing may be overcome."

The eggs are about one-eighth inch in diameter, pale yellow when first taken, semi-buoyant. The average egg production is about 3,000 per pound weight of parent fish. The eye spot, small gilt specks with a tiny black spot, appear in from 7 to 10 days. The eggs hatch in from 20 to 21 days, in water temperature of about 50 degrees F.

Eyed grayling eggs may be transported when properly packed. Both



The Montana Grayling



MONTANA WILD LIFE



eyed eggs of grayling and other species have been planted in the hitherto almost inaccessible lakes of Glacier National Park by transportation on a ranger's back. He is free to use his hands, and can traverse dense brush and thickets, wade streams, and place the eggs safely in barren water.

Minute water animals, live in all lakes in this region. Hence the little fish, when hatched from eggs, are able to find food, and have no enemies, or few enemies, in the water. When thus planted in a lake whose outlet has a high waterfall in its course, other species of fish are unable to ascend. Thus the planted fish will be able to live and thrive, unless the number of fish is too great for the size of the lake, and food becomes scarce. Fishermen and tourists reaching high mountain lakes in Glacier National Park may take grayling from perhaps a dozen small mountain lakes, and from many of the streams. Practically every lake of any size where tourists go is now stocked with one or more species of trout.

The propagation of Montana grayling in Montana began in 1908, but was carried on by the United States Bureau of Fisheries for many years previous. At the present time, Georgetown lake supplies the largest number of eggs. Millions are taken each year. The fact that this is a made lake, and that the fish therein have been planted by man, tells the story of what can be done in propagating this handsome and desirable species.

The native waters of the fish are east of the Rocky Mountains; **Georgetown lake** is in the Pacific ocean drainage, lying at an elevation of almost a mile above sea level, with clear, cold water for the lake supply. Not only does this fish furnish the large number of eggs used by the state hatcheries, but large exchanges are made with the Bureau of Fisheries. In 1927 the United States Bureau of Fisheries received from this source 3,221,050 grayling eggs for the Bozeman hatchery for co-operative planting in waters in which both the bureau and the state were interested. In 1929 the state commission furnished the Bozeman hatchery 1,335,000 grayling eggs for development in its Meadow Creek auxiliary, and more than a million eggs for the Glacier Park substation.

The Montana grayling is artificially propagated by the United States Bureau of Fisheries and by the Montana State Fish and Game Commission. It is practically confined to the Montana State Game and Fish Commission, and nearly all of the eggs reared at the present time are taken in Montana by the state commission. For this excellent work in cultivating and developing a most beautiful and desirable food and game fish the Montana State Fish and Game Commission deserve much praise. The Bureau of Fisheries, in the bulletin, "Artificial Propagation of Whitefish, Grayling, and Lake Trout," give and recommend the methods pursued and recommended by the Montana State Fish and Game Commission.

Grayling has been introduced into many lakes and streams in the state

through the work of the Montana State Fish and Game Commission, and the distribution is being extended and enlarged yearly. It has been introduced in Colorado on both sides of the Continental divide by the United States Bureau of Fisheries, the Colorado State Fish Commission, and by local clubs. One hundred thousand fingerlings were liberated in 1901, and the work has been more or less continuous since.

The work of introducing grayling into other Rocky Mountain states is begun. It has been planted in the headwaters of the Salmon river in Idaho, and in Utah. Although it is difficult to establish in a new home, when once it becomes adapted it thrives and multiplies.

In its native home the grayling is still abundant. It is the principal fish in the South Fork of the Madison, and occurs in the backwater of the Madison at the dam. It occurs in Grayling creek, Fan creek, and the Firehole river as far as the Firehole falls. It is in Redrock river, Beaverhead river, and the Gibbon to its junction with the Firehole.

It is being propagated and distributed in the waters of Yellowstone National Park by the United States Bureau of Fisheries, co-operating with the Montana State Fish and Game Commission. Success in establishing it in so many places has stimulated the

work of propagation. It is attractive in color, gamey to the last, is clean in habits, lives in the swift streams in the rugged places of the great outdoors, is excellent for food, and is in every way desirable.

1. Evermann, Barton W., A Reconnaissance of the Streams and Lakes of Western Montana and Northwestern Wyoming. Bul. U. S. Fish Com., Vol. I, for 1931, pp. 3 to 60.
2. Gill, Theodore, Thymallidae, Proc. U. S. Nat. Mus., 1894.
3. Jordan, David S., and Evermann, Barton W., Fishes of North and Middle America. 3 Vols. Bul. U. S. Nat. Mus. No. 41, 1896.
4. Jordan, David Starr, A Reconnaissance of the Streams and Lakes of the Yellowstone National Park, Wyoming, in the Interest of the United States Fish Commission. Bul. U. S. Fish Com., Vol. I, for 1899, pp. 41-63.
5. Henshall, James A., A List of the Fishes of Montana. Bul. Univ. Mont. No. 34, Biol. Series No. 11, 1906.
6. Ellis, Max M., Fishes of Colorado. Univ. Colo. Studies, Vol. I, No. 1, 1914.
7. Chambers, Maj. Ernest J., The Unexploited West. Ottawa, 1914.
8. Smith, Hugh H., and Kendall, W. C., Fishes of the Yellowstone National Park. Bur. Fish. Doc. No. 904, 1921.
9. Leach, Glen C., Artificial Propagation of Whitefish, Grayling, and Lake Trout. Bur. Fish. Doc. No. 949, 1922.
10. Lock, S. B., Whitefish, Grayling, Trout and Salmon of the Intermountain Region. United States Bureau of Fisheries Document No. 1062, 1929.
11. Jordan, David Starr, Evermann, Barton Warren, and Clark, Howard Walter, Check List of the Fishes and Fishlike Vertebrates of North and Middle America North of the Northern Boundary of Venezuela and Colombia. Rep. U. S. Fish Com., 1928, Pt. 2, 1930.

Can't Yuh Smell 'Em Sizzlin' In the Pan?



HERE'S a trio of speckled beauties of the Loch Leven variety taken from a Montana stream where they were planted as fingerlings by the Montana State Fish and Game Department. Much of the money supplied by sportsmen for the purchase of licenses is devoted to the maintenance and operation of the state hatcheries and the five spawning stations which make possible the eventual hooking of these piscatorial beauties.