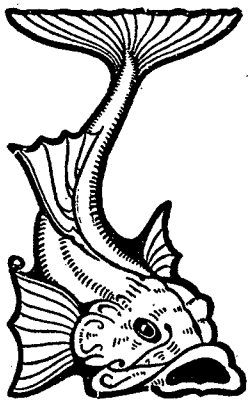
History file

The Rainbow Trout in Michigan

By SEYMOUR BOWER



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THE RAINBOW TROUT IN MICHIGAN

By Seymour Bower,
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Detroit, Mich.

The few points I desire to present in regard to rainbow trout cannot be considered as rising to the dignity of a formal paper, but are offered for what they are worth and mainly with a view to calling out discussion as to the relative value and comparative merits of one of the gamest of American fishes. In speaking of rainbow trout I wish to explain that I also include steelhead trout, which for practical purposes may be considered one and the same species. Indeed, so high an authority as Dr. David Starr Jordan told me within the past thirty days that he now considers the rainbow and steelhead as one species, although he was formerly in doubt and at one time regarded them as separate.

The introduction of rainbow trout into Michigan streams dates back to the early eighties, in fact, a small planting of rainbows was made in the Ausable River in the middle seventies by the late N. W. Clark, of Clarkston, and the late Daniel Fitzhugh, of Bay City. Prior to that time the rainbow was a total stranger to Michigan waters and was entirely unknown throughout the east and middle west. For nearly twenty years after the first planting by the Michigan Fish Commission, the distribution was exceedingly limited in numbers and was confined to a few streams. The total number planted by the Michigan Fish Commission from 1880 to 1889, inclusive, was only 67,000 fry. During the next decade the total of the plants was 437,000, or an average of less than 50,000 per year. Beginning with the year 1900, however, the distribution of rainbows by the Michigan Board was made on a somewhat more generous scale. From 1900 to 1908, inclusive, a total of about 5,500,000 fry and

nearly 100,000 fingerlings were deposited, or an average of over 600,000 per year. During the present year our total output will approximate two million fry and a quarter of a million fingerlings. From present indications our output of 1910 will total between three and four million. Thus it will be seen that the Board of Fish Commissioners of Michigan believe that the planting of rainbows is a valuable contribution to the fishery resources of the State.

Since the planting of these fish in Michigan was taken up by our State Board, distributions to some of the same waters have also been made by the United States Fish Commission and Bureau of Fisheries, but in much smaller numbers. It if safe to say that less than 10,000,000 rainbow trout all told have been distributed throughout Michigan during the thirty years in which the work has been carried on, or an average of less than 350,000 per year. Nearly ten times as many brook trout have been planted in Michigan during the same period by the State Board alone, yet in proportion to the number distributed the production of adult rainbows is much greater than of brook trout. Indeed the planting of rainbows in this State has been attended with more generous results and perhaps has proved more successful in every way than any fish cultural work attempted by our Board. Rainbows weighing five pounds and upwards now inhabit many of our streams by the hundreds. In the St. Mary's, Pere Marquette, Pentwater, Boardman, Pine, Muskegon, and other rivers, 8, 10 and 12 pounders are not uncommon and specimens ranging from 14 to 16 pounds have been taken. Twenty pounders have also been reported as having been caught with nets, but it is difficult to verify these reports because net fishing for rainbows is illegal. There is, however, scarcely a doubt that rainbows of that size now inhabit some of the above waters. The Ausable River, which with its numerous spring-fed tributaries constitutes one of the greatest brook trout systems in this country, if not in the world, is also one of the best rainbow trout streams in Michigan in the middle and lower reaches of the main river.

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Here as elsewhere the larger rainbows, or those of a spawning size, do not as a rule run into or invade brook trout territory proper, except during the spawning season, after which they drop down stream to their old haunts where food and temperature conditions are more congenial. In some cases large rainbows prefer to inhabit deep and moderately cool lakes, ascending tributary streams only during the spawning season.

There is scarcely a doubt that the rainbow in the course of time will rank as a commercial fish of considerable importance in Lakes Michigan, Superior and Huron, and in these waters they should not be regarded or treated as a game fish but rather as a commercial fish, subject only to the same restrictions as are applied to the other commercial varieties. Large rainbow trout lose their game qualities to a great extent anyway after inhabiting lakes for a time.

Regarding the food qualities of rainbows as compared with brook trout, it must be acknowledged that they are usually softer and less palatable than the latter when young or immature, that is to say, the flesh of a 7 or 8-inch rainbow is not so firm and sweet and rich as that of a brook trout of the same size. One reason is that an 8-inch rainbow is not nearly so far advanced toward maturity as an 8-inch brook trout. Rainbow trout do not spawn in Michigan waters until they are 3 and most of them until they are 4 years old, whereas brook trout spawn when about 20 to 22 months old. It is, however, the almost unanimous opinion of anglers and epicures that rainbows of two pounds and upwards are not in the least inferior to brook trout of a corresponding size or age. For this reason, the legal limit for rainbow trout should be considerably greater than for brook trout. It should not be less than 10 inches.

Although the rainbow trout has very many firm and even enthusiastic friends, and the list is constantly growing, yet there has been and still is considerable opposition to its further introduction into our streams. This opposition is not because it is not recognized as a high grade food and

game fish but because it is considered inferior to brook trout and is driving the latter out. A careful investigation of the situation, however, will, I believe, show to a very great extent that this claim has little or no foundation in fact. It is true that a number of our larger streams, once suitable for brook trout from sources to mouth, are now occupied by rainbow trout in the middle and lower waters, almost to the exclusion of brook trout. The natural supposition is that the latter have been driven out, when as a matter of fact such waters would now be deserted by the brook trout if the rainbows had never been introduced. The clearing up of heavily timbered areas or sections has so changed the character and temperature of many streams that the brook trout have retreated nearer and nearer the headwaters. I do not for one moment favor the planting of rainbow trout into any stream or stream system that is suitable for brook trout from sources to mouth, though the introduction of rainbows into such waters will not displace the brook trout to anything like the extent that is generally supposed. The truth is that while the young rainbows may mingle with the brook trout until they are one or two years old, they are certain sooner or later to drop down stream, seeking warmer and more congenial waters. Another good reason why rainbow fry should not be planted in cold brook trout waters is that they are to a great extent preyed upon and destroyed by the brook trout. The hatching season of the rainbow occurs in May and June, and if the young fish are turned out as fry they are just about the right size to serve as food for young brook trout whose hatching season is about six months earlier, as well as for the yearlings. Brook trout are more carnivorous, more destructive of their own kind and of fish life generally than are rainbows. In proportion to their size they have a much larger mouth, more teeth, are more ravenous and feed more during the months of May and June than at any time of the year. Although rainbows will spawn to some extent on the same grounds as brook trout, I believe that the fry should be planted farther downstream. But wherever planted, the separation of these

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two species will take care of itself in a great measure, because each is at its best under a different set of conditions, and will seek those conditions.

The game qualities of rainbows are so well understood by anglers generally that little need be said on this point. Of course I do not refer to the old and superannuated fellows who are passing the evening of their life in the quiet waters of lakes, but to the lusty and vigorous young stock of the pools and riffles and rapid waters of our larger rivers. Doubtless many of the members of this society have read the following from Jordan and Evermann's "American Food and Game Fishes." If any of those present have read it, I am sure you will be pleased to hear it again, and if any of you have not, you have missed something good:

> In beauty of color, gracefulness of form and movement, sprightliness when in the water, reckless dash with which it springs from the water to meet the descending fly ere it strikes the surface, and the mad and repeated leaps from the water when hooked, the rainbow trout must ever hold a very high rank. The gamest fish we have ever seen was a 16-inch rainbow trout taken on a fly in a small spring branch tributary of Williamson River in Southern Oregon. It was in a broad and deep pool of exceedingly clear water. As the angler from behind a clump of bushes made the cast, the trout bounded from the water and met the fly in the air a foot or more above the surface; missing it he dropped upon the water only to turn about and strike viciously a second time at the fly as it touched the surface; though he again missed the fly, the hook caught him in the lower jaw from the outside, and then began a fight which would delight the heart of any angler. His first effort was to reach the bottom of the pool, then, doubling upon the line, he made three jumps from the water in quick succession, clearing the surface in each instance from one to four feet, and every time doing his utmost to free himself from the hook by shaking his head as vigorously as a dog shakes a rat. Then he would dash wildly about in the large pool, now trying the opposite direction, and often striving to hide under one or the other of the banks. It was easy to handle the fish when the dash was made up or down stream or for the opposite side, but when he turned about and made a rush for the protection of the overhanging bank upon which the angler stood, it was not easy to keep the line taut. Movements such as these were frequently repeated and two more leaps were made. But finally he was worn out after as honest a fight as trout ever made.
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> The rainbow takes the fly so readily that there is no reason for resorting to grasshoppers, salmon-eggs, or other bait. It is a fish whose gameness will satisfy the most exacting of expert anglers and whose readiness to take any proper lure will please the most impatient of inexperienced amateurs.

DISCUSSION.

DR. BARTON W. EVERMANN: The rainbow still stands as the banner game fish of those that I have ever caught. The Society may be interested in hearing a word in regard to an investigation that the Bureau is carrying on now with reference to the relationship of the rainbow, steelhead and cut-throat trouts of the Pacific Coast. Dr. Gilbert of Stanford University began more than a year ago to study this question seriously, and is still continuing it. Among other things he examined the stock of fish at all of the trout hatcheries in California, Washington and Oregon. He collected from various undefiled streams (so as to get if possible native fish) fish that had not been contaminated through fish cultural operations. He then took and fertilized eggs from what were regarded as undoubted rainbows; then the eggs of undoubted steelheads were likewise taken and fertilized. He is keeping the progeny separate and under observation until they reach a size that will enable him to know whether any differences develop. The experiments are being carried on chiefly at the Brookdale hatchery near Santa Cruz, California. The California Fish Commission is heartily co-operating with the Bureau of Fisheries in this work. Dr. Gilbert feels that when he gets through with the investigation he will know positively the taxonomic relationships of the steelhead and rainbow for the regions in which he experiments. He has already gone far enough to justify him in saying that the conclusions which will be reached from a study of the rainbow and the steelhead of the Santa Cruz region, south of San Francisco, will not necessarily hold with regard to the rainbow or steelhead in Washington or Oregon, so that there are several local problems each of which must be solved on the ground.

It is regretted, I think by all of us, that the stocks of rainbows and steelheads and hybrid rainbows and steelheads in the hatcheries on the west coast are not safe for experimental purposes. You cannot be sure of the genealogy or ancestry of any of them; so wild stock has to be obtained in every case. But even considering the great care taken, in many cases doubts will arise. However, I think Dr. Gilbert is eliminating all individuals where there is any doubt as to the true stock; he is experimenting only with what he believes to be undoubted rainbows on the one hand and undoubted steelheads on the other. He has written a number of letters to the Bureau from time to time detailing his experiments and expressing in a tentative way some of his conclusions, but closing in every case by saying that all these conclusions are merely tentative.

PRESIDENT: I know I ought to keep my seat, but I cannot help breaking in. I have studied the rainbow trout to some extent and am very much interested in them. I suggest that before Dr. Gilbert finishes his studies he will necessarily have to go to Alaska and study the rainbow and steelhead there, because if I know anything about fish, I am sure that they do not represent the same species. Some years ago Dr. Jordan,

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after having declared that the rainbow and steelhead trout were identical, found what is now recognized as a steelhead and he set it up as a distinct species. Dr. Evermann I think even now is inclined to believe that this particular species must be set off from the common rainbow as well as from the steelhead.

I am too much engaged in trying to produce and distribute fish to have time to follow the details of the technical study of fishes, but we get eggs from a race of rainbows that cannot be distinguished by external marks from the original rainbow brought from the McCloud River in California. We take eggs as early as December and at some of our stations as late as April, or pretty close to the first of May.

Now, are there several races of the *irideus?* I suppose so—some early spawners and others spawning later. We certainly have them, and I think you will find by looking over the records of the early work of the New York Commission that the difference was noted as early as 1868 or 1869, long before eastern fish culturists had meddled with the relationships of the western fauna. It is an interesting point. I think I can tell the difference between a young rainbow and a young steelhead every time. I may be wrong, but I think the steelhead is always slimmer, that he has more white margin on his anal fin, and perhaps a white caudal tip which I do not find on the rainbow.

I am very glad that Dr. Gilbert is going into this subject with the wild fish, for the question will never be settled until a conclusion is reached on virgin ground. As it stands now we certainly have two races of rainbow trout, and neither one of them is the same as the steelhead, at least not what I call the steelhead.

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Mr. John W. Titcomb: Mr. Bower's paper has opened my eyes somewhat about the rainbows in Michigan. When I was engaged in fish culture in Vermont I supposed from what I had read that the introduction of the steelhead and rainbow into the waters which by deforestation had become warmer in the summer, would be a good plan. But there we encountered the obstacle which usually comes with the warmer water of summer, namely, the extremely cold water of winter. I discovered the rainbow was sensitive to anchor ice, which not only would cause large mortality in hatching but also among the adult fish when little needles of ice were flowing through the water. The rainbows which have been introduced in New England and New York in large numbers for a good many years do not seem to have produced very favorable results. There are today but few streams which have been successfully stocked, and in few of those which have been stocked do the adult fish hold their own by natural reproduction.

Now, as to the identity of the steelhead and rainbow, I think you all understand that the rainbow of New Zealand is the steelhead of California. It has been thoroughly identified from the source of supply, and is what might be called a sea-run rainbow. I could not see the difference between the steelhead hatched in Vermont and the rainbow hatched in Vermont. If they got mixed I was unable to sort them, although I always imagined the steelhead was a little more gamy than the rainbow.

I remember calling on Commissioner Brice in Washington once, and saying to him that I could not see any difference between the two fish; that I thought they must be very closely related; and he said: "Well, I have given out word that the rainbow and steelhead are two distinct species, and that settles it!" (Laughter.)

Now, as to the spawning time to which you have referred: I find so far as my observations go, and what I learn from the different superintendents, that it is regulated very largely by water temperature. As you know, at Wytheville, Virginia, we have handled rainbows for a great many years, and the first hatch from the domesticated stock there was in the spring. As time went on the spawning season gradually turned backward until now we take eggs in November from descendants of the same stock of rainbows. In Vermont rainbows hatched and reared in very cold water where anchor ice flowed part of the time, did not spawn, as I remember it, until April or May. In Colorado where the rainbow is an introduced species it spawns just before the native trout in the same waters; in others at about the same time; but on the average in April and May, perhaps a month earlier than the native trout.

PRESIDENT: By native trout you mean the black-spotted?

MR. TITCOMB: Yes. We are taking black-spotted trout eggs now. I do not see how we can connect the spawning time with the species, for it will be found that fish of the same stock will spawn in one water even three months earlier than in another.

PRESIDENT: In Lake Cayuga last fall we took rainbow eggs in December, and again in the same lake as late as April. We also took a steelhead in Keuka Lake last fall. If it was not a steelhead I do not know what it was, for certainly it was not a rainbow.

MR. TITCOMB: My observations agree with those of Mr. Bower, that rainbow trout seek the lower waters. In Vermont they take the waters usually below those where brook trout are found, except an occasional straggler or a very large fish that goes farther down into the deeper pools. This water is rather warm for brook trout. In Colorado the native black-spotted trout occupies the head waters, the eastern brook trout the middle course, while rainbows are principally found in the lower and larger portions of a stream. There the rainbow is the most popular of the three species, I think, the eastern brook trout ranks second and the native third.

You may be interested in knowing that the Denver & Rio Grande passenger agent has a standing offer to any angler who lands with fly and rod and reel a rainbow trout weighing ten pounds or more. His reward is a $20 gold piece for each fish, which he usually has to pay about twice a year. The largest rainbows are generally taken from the Gunnison River.

MR. W. E. MEEHAN: The matter raises a query as to what we have at Bellefonte. Some four or five years ago we received from the United States Bureau of Fisheries station at Wytheville, Virginia, what was stated to be a consignment of rainbow trout. They were fingerlings and as they grew up, apparently two species developed. They were so dif-

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ferent that any person standing on the edge of a pond could distinguish them. In one case the fish were much darker on the head and back, with a square tail—just as square as the brook trout—and in the other case the fish were much lighter, and with a decidedly forked tail, with other marks such as you have mentioned as belonging to the steelhead. The former were supposed to be steelheads and the latter rainbows. Both fish spawn at the same time, from the latter part of November to about the first of January, the water temperature being about 54 degrees F. in the ponds.

As regards the spawning period of the rainbow trout, I have this experience to relate. Early in the 70's there was received from the United States Commission a shipment of rainbow trout eggs, presumably from the west. They were hatched and appeared to be all alike. They were divided into two lots, one being sent to the Allentown station and the other to the Corry station. The water at the Allentown station was 52 degrees F. and at Corry 48 degrees F. The Corry fish when they reached maturity spawned in April, towards May. The fish from the same lot of eggs spawned at Allentown about the first of November.

Mr. Titcomb: What is your experience with the rainbow in Pennsylvania waters? We have sent carloads of rainbow trout there, in response to the great demand for them, and then all of a sudden the anglers said they did not want rainbows.

Mr. Meehan: I have made inquiries everywhere but I cannot find a single stream in Pennsylvania where the rainbow or steelhead seems to thrive naturally, or at least to any great extent. There were one or two places where it appeared as though they were spawning naturally in a stream, but investigation showed that people who were getting rainbow trout for certain other streams, instead of carrying them to those streams, were planting them in the stream in which we were finding evidently three-year-old rainbows, two-year-old rainbows, yearling rainbows and fingerlings. I do not know of a stream in Pennsylvania where rainbows seem to be spawning naturally.

At the Allentown station we also found a very large percentage of unfertile fish every year. Today at the Bellefonte station at least 50 per cent. of the males and females are barren. At the Corry hatchery the percentage of fertile males and females is better, but even there many of the fish are unfertile. There has been such a large percentage of unfertile rainbows at the Wayne station that their propagation has been discontinued at that place.

Going back to the fish at the Bellefonte station, the square-tailed fish that we have supposed to be steelheads, though much the same as the other fish which I presumed to be rainbows, the question is, what are they if not steelheads?

I have a mounted specimen of a fish caught in an Erie County stream, said to be a steelhead trout, that weighs ten pounds. The fish had a square tail and other alleged marks of a steelhead. There was also another specimen of the same species taken from Lake Giles in Pike County, but it was destroyed by fire last year.

as it almost always does. It mixes things inextricably, so that in many regions problems of geographic distribution will remain forever unsolved. For illustration, consider the Panama Canal. If a careful biological survey of the waters of the two coasts and of the fresh waters of the isthmus is not made before the canal is completed and water runs through, many important problems which ought to be solved will forever remain unsolved.

MR. TITCOMB: It is true that we get our rainbows from two or three sources in California, and our steelheads from California, Oregon, Washington and the Puget Sound region. Of course they have become more or less mixed. Some have gone to Colorado waters, where eggs have since been taken and shipped east. The stock at the Wytheville station was obtained from different sources, but a part of it came from Colorado.

While we are on the subject of acclimatized species, I want to announce that anglers are having great sport at Sunapee Lake, New Hampshire, with the chinook salmon which has been introduced there from the Pacific coast along with the silver salmon. This year I received a letter from Mr. W. M. Kiel, of the Tuxedo hatchery in New York, saying that many chinook salmon weighing from four to five pounds and up to eight pounds are being caught. It is rather difficult to get hold of specimens because people catch and eat them without letting us know about it until afterwards. We are anxious to learn whether this Pacific coast fish will adapt itself to our New England lakes and breed there. Certainly it is furnishing great sport, and the New Hampshire Fish Commission is very enthusiastic over it.

PRESIDENT: What species did you say?

MR. TITCOMB: Both the silver and the chinook salmon, but only the chinook has so far been taken and officially identified. I think the silver salmon may also be found, as we planted more silvers than chinooks.

PRESIDENT: Do you recall the experiments of the Trocadero Aquarium in Paris?

MR. TITCOMB: Yes. Chinook salmon actually breed there.

PRESIDENT: I saw them.

MR. TITCOMB: Yes; and I saw their progeny.

MR. MEEHAN: Mr. Titcomb's reference to the silver and chinook salmon reminds me of our experiment with silver salmon. Two years ago we received 100,000 eggs from the Bureau of Fisheries and sent them to the Wayne hatchery. I retained 10,000 fry and endeavored to rear them. The rest have been planted in certain streams in Wayne County tributary to the Lackawaxen and Delaware Rivers. Several small specimens of silver salmon were caught by fly fishing before the close of the season. The fish were four or five inches long and were brought to the hatchery for identification. Meanwhile the 10,000 that we retained grew rapidly, took food and remained perfectly healthy. They are now about a year and a half old and will run from six to nine inches in length. They rise very freely to the flies that skim the water and take food eagerly and show every sign of being a fish that will thrive in confinement in fresh

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water. We may have to put fences around the pond to keep them from leaping out. They will jump two or three feet if anything is thrown to them, taking food as eagerly as brook trout. It looks as though the silver salmon is a fish that will thrive in our lakes. We feel very much encouraged in this work.

PRESIDENT: Going back to the origin of the rainbow trout in New York, I know from the records that the first eggs received at Caledonia came from J. B. Campbell, who was in the Shasta region. He was at one time an assistant of Mr. Livingston Stone on the McCloud River. That was the source of the first eggs hatched in New York; and others came from the same region a little later. Since that time New York has received rainbows from the United States Bureau of Fisheries. But the original stock of fish, it appeared to me, showed at least two subspecies. Mr. Frank N. Clark was on the McCloud River in my company in 1876, I think it was. At that time the rainbow trout were very plentiful in the river, and it seemed to me at least—I don't know whether Mr. Clark will remember it or not—that there were two kinds of rainbows in the McCloud River, the common stubby rainbow and a slimmer fish. I presume one was a subspecies and the other was a true *irideus*.

MR. FRANK N. CLARK: It is true that in 1876 Dr. Bean and I made a trip to the Sacramento River with shad, then went on up to the McCloud River. In 1877 I went to the coast, Mr. Quinn accompanying me. In 1878 I made the same trip with shad again, and in going to San Francisco I arranged with the proprietor of a private hatchery for a supply of yearling rainbow trout, which we brought back to Northville. The first rainbow eggs ever taken in Michigan were from those fish, but they were not the first rainbow trout planted in Michigan. Previous to 1876 we had eggs; just where we got them I don't remember; but they produced the fry that Mr. Bower mentioned as being the first rainbows planted in the Au Sable River. The next lot of fry came from the yearlings that we brought across from the coast in 1878. We started with 125 yearlings from four to twelve inches long and reached Northville with some of the larger fish. We had a small take of eggs from those fish and the fry were planted in the Au Sable River by Mr. Fitzhugh.