Evermann, Barton W., and Ulysses O. Cox

UNITED STATES COMMISSION OF FISH AND FISHERIES.

PART XX.

REPORT

OF

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FOR

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5.—A REPORT UPON THE FISHES OF THE MISSOURI RIVER BASIN.

By Barton W. Evermann and Ulysses O. Cox.

INTRODUCTION.

The investigations upon which this report is primarily based were provided for by two items in the sundry civil bill approved August 5, 1892. First, "for investigation and report respecting the advisability of establishing fish-hatching stations at suitable points in the States of South Dakota, Iowa, and Nebraska, $1,000, or as much thereof as may be necessary"; and second, "for investigation and report respecting the advisability of establishing a fish-hatching station at some suitable point in Wyoming, $400."

The conditions which determine the desirability of locating one or more fish-hatcheries in these States made it expedient to conduct each investigation as being a part of one general inquiry. It was wholly impracticable to separate them or to consider their results as pertaining alone to Wyoming on the one hand, or to Iowa, South Dakota, and Nebraska, on the other. They were, therefore, conducted with reference to the general fish-cultural needs of the entire group of north-central States west of the Mississippi River.

It became apparent, early in the consideration of the matter, that the greatest need of this region, so far as fish-culture is concerned, is a station for the hatching and rearing of the various pond and river fishes. With the exception of a few streams in northeastern Iowa, two or three small creeks in northern Nebraska, and the Black Hills streams in South Dakota, the waters of these three States are not adapted to trout. The streams of Wyoming which are suitable for trout are, with few unimportant exceptions, confined to that portion west of the Powder River and north of the Sweetwater. This is a region which can probably be best reached and stocked with trout from the station now being established at Bozeman, Montana.

It therefore appears that if but one station is established for these States it should be chiefly devoted to the hatching and rearing of the species of fishes which are indigenous to the waters of this region, and that the best location, geographically, would be somewhere in South Dakota, Nebraska, or Iowa. If it should be regarded as desirable to establish at any time a second station in these States it might very well be a trout station, and should be located in or near the Black Hills. If

but one station is established it should be a composite station, or one which, though chiefly devoted to pond and river fishes, could also engage in trout culture to some extent.

SUMMARY OF REPORT.

These investigations were begun in the fall of 1892 (October 6 to November 2), but owing to cold weather the work was suspended the first week in November, and was not taken up again until June, 1893. The work done in 1892 was carried on by Professor Evermann, assisted by Mr. Lewis M. McCormick, formerly of Oberlin College, now of the Glen Island Museum, New York.

ITINERARY, 1892.

Oct. 6. Began work at Deadwood, S. Dak.
7. Drove to Spearfish and examined Spearfish Creek and numerous springs in vicinity.
8. Drove from Spearfish to Beulah, Wyo.; examined Cook's Pond, Chicken and Crow creeks, Cox and Montana lakes, and Sand and Redwater creeks.
9. Returned to Deadwood.
10. Went to Lead City and examined Whitewood Creek and Gold Run.
11. Went to Belle Fourche, examined the waters in that vicinity, and seined Belle Fourche River.
12. Seined Redwater and Middle creeks and returned to Deadwood.
13. Went to Crystal Cave, S. Dak.
14. Examined Elk Creek, then went to Rapid City, S. Dak.
15. Examined Rapid Creek, Cleghorn's and Miller's springs, and went to Hot Springs.
16. At Hot Springs.
17. Drove to Cheyenne Falls.
18. Examined Fall River and various springs about Hot Springs and went to Edgemont.
19. Examined Cottonwood Creek and Cheyenne River.
20. Went to Newcastle, Wyo., and examined Salt and Beaver creeks.
21. Went to Ardmore, S. Dak., where we seined Hat Creek; took night train for Ravenna, Nebr.
22. Seined Mud Creek and South Loup River at Ravenna.
23. Took train for Lincoln.
24. Spent at Lincoln and vicinity.
25. Went to South Bend and examined Nebraska fish-hatchery there. Returned to Lincoln in the evening.
26. Went to Crete and examined Blue River. Took night train for Albia, Iowa.
27. Went to Lovilla, Iowa, where we examined Bluff Creek.
28. Went to Ames, Iowa.
29. Examined springs and streams near Ames.
30. At Ames. Went to Cedar Rapids, Iowa, at night.
31. Examined springs in the vicinity of Cedar Rapids.

Nov. 1. Went to Spirit Lake, Iowa.
2. Cold weather having set in, we decided to close the work here, and returned to Washington.

The work was resumed June 16, 1893, and carried on for several weeks, under the immediate direction of Professor Evermann, who was assisted by Prof. U. O. Cox, teacher of biology in the State Normal School at Mankato, Minn., Mr. Cloudsley Rutter, then of Long Pine, Nebr., now a student at Stanford University, and Prof. Robert G. Gillum, professor of chemistry and physics in the Indiana State Normal School. During the time that Professor Evermann was unable to remain with the party Mr. Cox was placed in charge.

The examination and determination of the physical and biological features of the streams of these States was made an important part of these investigations, and it was this phase of the work to which Mr. Cox and his assistants chiefly directed their attention. The work in Iowa was done by Professor Evermann alone, and was in most part devoted to the examination of springs and the smaller streams.

ITINERARY, 1893.

June 16. Messrs. Cox and Rutter began the work at Mitchell, S. Dak.
17. Examined the Dakota River, Rock Creek, and Firesteel Creek, near Mitchell.
18. Made collections in Enemy Creek, near Mitchell.
19 to 21. Spent in making further investigations on Dakota River and Rock Creek.
22. Professor Evermann joined the party. Went to Chamberlain, S. Dak.
23. Drove north of Chamberlain and examined Crow and Smith creeks.
24. Drove 15 miles southwest of Chamberlain and examined White River.
25. Sunday. Spent the day at Chamberlain.
26. Went from Chamberlain to Scotland, S. Dak., where we examined Prairie Creek; went to Springfield, S. Dak., in the evening.
27. Drove northwest of Springfield and examined Emanuel and Choteau creeks; then to Running Water, S. Dak., where we crossed the Missouri River and went to Niobrara, Nebr.
28. Went 3 miles west of Niobrara to Ponca Creek; examined it and Niobrara River, then drove east to Bazile Creek, which we examined; went to Verdigris, Nebr., in the evening.
29. Examined the Verdigris River and a small creek near Verdigris, and in the afternoon went to Creighton, Nebr., where we examined a large pond.
30. Drove to Bazile Mills, where we examined Spring Creek; then took train to Norfolk Junction, and fished Elkhorn River and Norfolk Creek.

July 1. Messrs. Cox and Rutter went to Ewing, Nebr., where they examined the Elkhorn River and other waters in that vicinity. In the evening they went to Long Pine, Nebr. Prof. Evermann examined springs near Council Bluffs, Iowa.
3 and 4. Messrs. Cox and Rutter examined streams about Long Pine, and were rejoined on the 4th by Messrs. Evermann and Gillum.
5 and 6. Examined various streams and springs about Long Pine.
7. Professor Evermann left the party here and went to Lake Erie; the others drove south of Long Pine and examined Lake George and Carp Lake, returning to Long Pine on evening of the 8th.
9. Went from Long Pine to Valentine, Nebr.
10. Fished the Niobrara River, Minnechaduza Creek, and another small creek near Valentine. Left in the evening for Chadron, Nebr.
11. Examined White River, Chadron Creek, and Lone Tree Creek near Chadron.
12. Went by rail to Casper, Wyo.
13. Examined the North Platte and a small creek at Casper.
14. Went from Casper to Glenrock, Wyo., and examined Deer Creek and North Platte River.
15. Went to Douglas, Wyo., and examined the North Platte at that place.
16. Sunday, spent at Douglas.
17. Went to Crawford, Nebr.
18. Went to Sheridan, Wyo.
19. Examined Big Goose Creek at Sheridan, and left in the afternoon for a three days' wagon trip to the mountains.

ITINERARY, 1893—Continued.

July 20. Investigated Tongue River.
21. Investigated Big Goose Creek.
22. Went to Little Goose Creek and returned to Sheridan.
23. Sunday, spent at Sheridan.
24. Left for Arvada, Wyo., Mr. Rutter stopping at Clermont to fish Clear Creek; fished Powder River at Arvada.
25. Went to Newcastle, Wyo.
26. Examined Salt and Beaver creeks near Newcastle, and went to Edgemont, S. Dak., in the evening.
27. Fished Cheyenne River and went to Hot Springs, S. Dak., where Prof. Evermann rejoined the party.
28. Examined Fall and Cheyenne rivers. Messrs. Evermann and Rutter left the party here and went to Cheyenne, Wyo., then to Idaho to take up work in Columbia River basin. Messrs. Cox and Gillum went to Buffalo Gap, S. Dak.
29. Fished Beaver Creek at Buffalo Gap and returned to Hot Springs at night.
30. Sunday, spent at Hot Springs.
31. Went from Hot Springs to Custer, S. Dak., and examined French Creek.

Aug. 1. Went to Hill City, S. Dak., and examined a small stream there.
2. Went from Hill City to Deadwood, S. Dak.
3. Went by stage to Spearfish, S. Dak., where examined Spearfish Creek.
4. Drove northwest of Spearfish and examined Cox, Hopkins, and Montana lakes and Redwater Creek.
5. Returned to Deadwood.
6. Went to Crawford, Nebr.
7. Fished White River and then went to Marsland, Nebr.
8. Examined the Niobrara River at Marsland, and then went to Dunning, Nebr.
9. Examined Dismal River and the North Loup, and then went to Ravenna, Nebr.
10. Examined Mud Creek and the South Loup at Ravenna.
11. Went to Grand Island, where we fished the Platte River.
12. Went to York, Nebr., and fished Lincoln and Beaver creeks.
13. Sunday, spent at York.
14. Went to Seward, Nebr., and examined Lincoln Creek and Blue River.
15. Went from Seward to Lincoln, Nebr., where the work was brought to a close, and Mr. Cox and Mr. Gillum returned home.

Professor Evermann's examinations for the selection of a hatchery site in Iowa were made on the following dates: July 17, at Manchester; July 18, at Waterloo; July 19, at Marshalltown; July 20, at Cedar Rapids; July 21, at Ames; July 22, at Des Moines; October 23 and 24, at Spirit Lake; October 25, at Decorah; October 26, at McGregor; October 27, at Jesup.

As already stated, these investigations were not limited to the examination of proposed hatchery sites, but included an examination and study of the physical and biological features of the waters of the region, with especial reference to the species of fish and other animal life they already contain, and their suitability for stocking with other species of food-fishes not indigenous to them.

A report has already been made to the Commissioner, in which were given the details of the investigations bearing directly upon the selection of a hatchery site. In this particular work more than 100 springs were examined, their temperatures taken, their volume measured or approximately estimated, and the topographic features surrounding each noted and recorded.

After a careful consideration of the advantages and disadvantages of each place, the Commissioner selected a site on Spring Branch, near Manchester, Iowa, and the station is now under construction there.

In the present paper are given the results of the examination of the various streams visited in South Dakota, Nebraska, and Wyoming, together with our report upon the large collections of fishes obtained.

ACKNOWLEDGMENTS.

During the progress of our work in 1892, and again in 1893, numerous courtesies of one kind or another were shown us by various gentlemen who are interested in the work of the Commission, and we desire here to express our thanks to all these gentlemen for their many kindnesses. Especial mention should be made of Hon. George W. Holdredge, general manager of the Burlington and Missouri River Railroad; Hon. C. J. Ives, president of the Burlington, Cedar Rapids and Northern Railroad, and Hon. Roswell Miller, president of the Chicago, Milwaukee and St. Paul Railroad, all of whom took an active interest in our work and furnished facilities in the way of transportation which enabled us to greatly extend the field of our investigations.

Capt. Frank A. Whittemore, of Long Pine; Mr. Fred Ingalls and Mr. and Mrs. Blodgett, of Brown County, Nebr.; Dr. John Dixon and Messrs. John Harlow and John Johnson, of Spearfish; Mr. J. R. Brennan, of Rapid City; Major Wolcott, of Glenrock, Wyo.; Hon. Joseph M. Carey, Hon. Henry A. Coffeen, and Mr. Charles L. Decker, of Wyoming, all rendered us valuable assistance in various ways.

The following gentlemen in Iowa showed us many courtesies: Col. B. F. Shaw, ex-State fish commissioner, Cedar Rapids; Mr. T. J. Griggs, of Spirit Lake, then State fish commissioner; William Mynster, esq., Council Bluffs; Mr. J. A. Laird, Jesup; Mr. J. H. Larson, McGregor; Mr. Frank S. Landers, Decorah; Mr. A. M. Sherwood, Manchester; Mr. O. L. F. Browne, Des Moines; Prof. Herbert Osborn, Ames, and E. T. Cowin, esq., Waterloo.

THE MISSOURI RIVER BASIN.

The Missouri is the longest river in North America. Its headwaters are among the Rocky Mountains of Montana, Wyoming, and Colorado. At numerous places its sources are but a few miles from those of the Saskatchewan, the Columbia, and the Colorado. In northwestern Montana are the sources of Milk River, which are said to be connected directly with those of the Saskatchewan, while only a few miles to the westward the drainage is into Flathead River and thence into the Columbia. In southwestern Montana the headwaters of the Big Hole, Beaverhead, Red Rock, and Madison, on one hand, closely approach those of the Bitter Root, Salmon, and Snake on the other. In northwestern Wyoming, just south of the Yellowstone National Park, the headwaters of the Columbia and Missouri actually unite in Two-Ocean Pass, forming a continuous waterway from the mouth of the Columbia to that of the Mississippi.

In Wyoming the Sweetwater, a tributary of the North Platte, and in Colorado the South Platte, rise within a few miles of streams which are tributary to the Colorado of the West.

The headwaters of these various tributary streams are 8,000 to 14,000 feet above sea level. Gallatin, Mont., where the Jefferson, Madison, and Gallatin rivers unite to form the Missouri proper, is 4,132 feet in altitude; the sources of the Madison River are over 8,300 feet above the sea, while Two-Ocean Pass is about 8,200 feet.

The mouth of the Missouri River is about 400 feet above sea level; the total fall of this river is therefore over 7,000 feet, or 3,732 feet between Gallatin and the Mississippi. The length of the Missouri proper is given as 3,000 miles; add to this the length of Madison River and we have 3,230 miles, which may properly be regarded as the total length of the Missouri. Among the important tributaries may be named Milk River; Jefferson Fork, 140 miles; Gallatin Fork, 170 miles; Yellowstone River, 1,100 miles; Platte River, 1,250 miles (including the North Platte); and the Kansas River, 900 miles (including the Smoky Hill Fork). The area drained by this great river is given as 518,000 square miles. This includes the entire State of Nebraska, all of South Dakota except a few square miles in the northeast corner, nearly all of Montana, North Dakota, and Wyoming, about half of Kansas, more than half of Missouri, and large parts of Iowa and Colorado.

In the mountains at the headwaters of the various tributary streams there is an abundance of rainfall in summer and snow in winter. As a rule, the mountains were naturally heavily timbered, and the moisture was therefore conserved and fed out slowly during the season of drought. This is still true in general, but the reckless destruction of the forests in many places is having its effect upon the streams.

After leaving the mountains the tributaries of the Missouri, with scarcely an exception, enter a broad plain almost entirely devoid of trees except along the water-courses. This plain extends over eastern Montana, the two Dakotas, eastern Wyoming, Nebraska, Kansas, and Iowa. The western portion is barren, in some places even desolate. This is particularly true of the Bad Lands, or Mauvaises Terres, of South Dakota, and parts of North Dakota, Montana, Wyoming, and Nebraska. These are Miocene beds of great thickness. The White River Tertiary beds of parts of Wyoming, Nebraska, and South Dakota are several hundred feet thick, full of alkali, and in most places easily eroded.

The eastern part of South Dakota, nearly all of Nebraska and Kansas, and those parts of Colorado and Iowa in the Missouri basin constitute a more or less gently undulating prairie country, becoming dry, almost arid to the westward, but receiving an abundance of moisture and being very rich and productive in the eastern parts. In the State of Missouri there is more timber and plenty of moisture. The Missouri basin as a whole, however, is a country whose soils erode with unusual ease, and after getting out of the mountains and upon the plains few of the streams are ever really clear. The Missouri River always carries

vast amounts of solid matter in suspension, and justly deserves the name "Big Muddy." The channels of the Missouri and all the larger tributaries are constantly changing and shifting the beds of the streams. All this, of course, has its effect upon the fishes.

Classified list of streams examined in the Missouri River Basin in 1892 and 1893.

Missouri River at Chamberlain and Running Water, S. D.
- Yellowstone River:
  - Tongue River at Sheridan, Wyo.
  - South Fork of Tongue River at Sheridan.
  - Big Goose Creek at Sheridan.
  - Wolf Creek at Sheridan.
  - Little Goose Creek at Sheridan.
  - Powder River at Arvada, Wyo.
  - Clear Creek at Clermont, Wyo.
- Big Cheyenne:
  - North Fork or Belle Fourche at Belle Fourche, S. D.
  - Redwater Creek at Spearfish, S. D.
  - Montana Lake at Spearfish, S. D.
  - Cox Lake at Spearfish, S. D.
  - Spearfish Creek at Spearfish, S.D.
  - Crow Creek near Spearfish.
  - Chicken Creek near Spearfish.
  - Sand Creek near Beulah, Wyo.
  - Whitewood Creek at Deadwood.
  - Rapid Creek at Rapid City, S. D.
- South Fork at Hot Springs and Edgemont, S. D.
  - Fall River at Hot Springs, S. D.
  - Beaver Creek at New Castle, Wyo.
  - Salt Creek at New Castle, Wyo.
  - Hat Creek at Ardmore, S. D.
  - Beaver Creek at Buffalo Gap, S. D.
  - French Creek at Custer, S. D.
  - Spring Creek at Hill City, S. D.
- Crow Creek at Chamberlain, S. D.
  - Smith Creek at Chamberlain, S. D.
- White River at Chadron and Crawford, Neb., and Chamberlain, S. D.
  - Chadron Creek at Chadron, Nebr.
  - Lone Tree Creek at Chadron, Nebr.
- Choteau Creek at Springfield, S. D.
- Ponca Creek at Niobrara, Nebr.
- Niobrara River at Marsland, Valentine, Long Pine, and Niobrara.
  - Schlegel Creek at Valentine, Nebr.
  - Minnechaduza Creek at Valentine.

Missouri River—Continued.
- Niobrara River—Continued.
  - Long Pine Creek at Long Pine.
  - Bone Creek at Long Pine, Nebr.
  - Ponds along creek at Long Pine.
  - Verdigris River and a small creek at Verdigris, Nebr.
- Emanuel Creek at Springfield, S. D.
- Bazile Creek at Niobrara, Nebr.
  - Ponds at Creighton, Nebr.
  - Spring Creek at Bazile Mills, Nebr.
- James or Dakota River at Mitchell, S. D.
  - Rock, Firesteel, and Enemy creeks at Mitchell, S. D.
  - Prairie Creek at Scotland, S. D.
- Platte River at Grand Island and South Bend, Nebr.
  - North Fork of Platte River at Casper, Glenrock and Douglas, Wyo.
  - Garden Creek at Casper, Wyo.
  - Deer Creek at Glenrock, Wyo.
  - Little Deer Creek at Glenrock.
  - Wood River at Grand Island, Nebr.
  - Loup River at Grand Island, Nebr.
  - Middle Loup and Dismal rivers at Dunning, Nebr.
  - South Loup River and Mud Creek at Ravenna, Nebr.
  - Calamus River:
  - Isolated lakes near Long Pine.
  - Carp Lake and Lake George near Long Pine, Nebr.
- Elkhorn River at Ewing and Norfolk, Nebr.
  - Bayous, south fork of Elkhorn, and pond, at Ewing, Nebr.
  - Ponds and Norfolk Creek at Norfolk, Nebr.
- Kansas River:
  - Big Blue River at Seward and Crete, Nebr.
  - Lincoln Creek at York and Seward.
  - Beaver Creek at York, Nebr.

The Missouri River itself was examined at Chamberlain, S. Dak., where the stream is divided into two channels by an island, the west channel being 1,200 feet wide and the east 1,436 feet. At the time of the visit the water was higher than usual, "the June rise," as the people call it, and the current was swift, in some places averaging 3 feet per second. Owing to the high water it was impossible to do successful seining, although we attempted it at the north end of the island. As is usually the case with this river, the water was exceedingly muddy. At places the recently deposited silt was so deep that it was dangerous to attempt to wade in the water over it. Where the water had receded enough to allow a light crust to form on top of the mud it was possible to stand and shake the whole mass for a distance of 10 feet or more in all directions. The Missouri was also examined at Running Water, opposite Niobrara, but no specimens were obtained.

The larger and more important river fishes, such as sturgeon, cat, and buffalo are said to be abundant in this portion of the river and to furnish a considerable food supply.

Tongue River rises in the Big Horn Mountains west of Sheridan, Wyo., flows northeast, and empties into the Yellowstone River in southeastern Montana. We examined the Tongue River at the mouth of the canyon where it leaves the mountains. At this place it is a very swiftly flowing stream, current 3½ feet per second, discharging about 127,200 gallons of water a minute. The bed of the stream is everywhere strewn with bowlders, which made it next to impossible to seine in it. Considerable pine timber is found along the banks, which are composed in most part of granite, enough having been disintegrated and collected in places to allow the growth of a scanty vegetation. The source of the water supply is the melting snow on the mountains, and since there is barely any limestone with which it can come in contact the water is very pure and soft. The temperature of the water in the canyon was 54°, air 90°. While our fishing was done under many unfavorable circumstances, we secured one fine specimen of mountain trout (*Salmo mykiss lewisii*) 20 inches long, a black-nosed dace (*Rhinichthys cataractæ dulcis*), and from a fisherman a specimen of whitefish (*Coregonus williamsoni cismontanus*). The whitefish is said to be quite common there. Many persons were seen along the river fishing for trout. Taking everything into consideration, it would certainly be hard to find a more ideal trout stream. Small parties have reported as many as 800 fish taken with hook and line in a few days. There is so much fishing done now in that region that most residents are of the opinion that if something is not done to stock the stream its fame as a fishing resort will soon be lost.

South Fork of Tongue River.—Not far from where the Tongue River leaves the canyon it is joined by a small stream from the south called the south fork of Tongue River. We fished it a few miles from its mouth on Mr. Dinwiddie's ranch. At this place it averaged 8 inches deep and 5 to 20 feet wide, with a current of 2 feet per second. The water was clear and pure and the bottom was covered with gravel and bowlders. We seined it very carefully and secured several specimens of *Pantosteus jordani*, several mountain trout, and a number of dace. The water was not cold, being 70°. The banks were lined with box-elders and a few low shrubs.

Big Goose Creek, a stream similar to Tongue River and one of its tributaries, flows from the mountains about 12 miles south of Tongue River. Big Goose Creek is a stream nearly as large as Tongue River, has a swift current, bottom covered with bowlders, and water clear and very pure. All the streams in this region have irrigation ditches connected with them, consequently the volume is much reduced outside the canyon. Goose Creek was fished in two places, at Beck's ranch about 3 miles from the mouth of the canyon, and at Sheridan. At the former place we took several mountain trout, one dace, and a sucker. At Sheridan we found the temperature of the water 62°, current 2 feet per second, stream 35 feet wide and ranging 2 to 5 feet deep. The bottom was gravelly, but in many places there were bowlders in addition. At this place we took one species of sucker and two species of minnows.

On Mr. Decker's ranch, about 10 miles northwest of Sheridan, we examined a small brook which was fed partially by springs. The largest spring we found discharged about 945 gallons per minute, and when this amount of water was flowing the temperature was 65°. The spring did not originate in any one place, but the water seemed to seep from the banks along the spring brook. We did not take any fish from either of these streams.

Little Goose Creek flows from the mountains some 7 or 8 miles south of Big Goose and is very much smaller than the latter. We did not fish in it, but found it a characteristic mountain stream similar to the other except in size. At the town of Bighorn we visited an artificial fish pond whose outlet is Little Goose Creek. The pond was fed by a spring whose temperature was 51°. The temperature of the water at the surface in the pond was 72°. At one edge of the pond there were considerable algæ and a very great amount of white water-crowfoot (*Batrachium trichophyllum*). The owner of the pond was trying to cultivate trout, but had not been successful. From appearances it is possible that black bass would do much better than trout. From the overflow stream we took two species of minnows and one species of sucker.

The streams about Sheridan are the finest of any that we visited in Wyoming, and were the most numerous for the region over which they were distributed. They are nearly all fed by melting snow, and since the snow does not entirely leave during the year, they never go dry. They are all filled with bowlders and the currents of all were swift. Big Goose and Tongue rivers are the longest, and have probably the most picturesque canyons.

Powder River was fished at Arvada, a watering station on the Burlington and Missouri road. The bed of the river at this place was 250

lector. Whenever the character of the paper permits it, the summary is given in briefer form.

The first printed references to fishes of the Missouri River basin that have come under our notice are those by Lewis and Clark in the journal of their famous expedition to the mouth of the Columbia River in 1803–1806. The original edition of the history of this expedition was published in 1814.

In 1893 appeared the elegant and splendidly annotated new edition by Dr. Elliott Coues. In this edition all the fishes mentioned in the original journals and note books of the expedition are identified when the reference is sufficiently full.

The fishes mentioned are, as would be expected, those which they were able to catch for food, and we find the following noted with sufficient detail to render identification possible: *Ictalurus punctatus*, *Leptops olivaris* or *Ameiurus lacustris*, *Stizostedion canadense boreum*, *Moxostoma aureolum*, *Pantosteus jordani*, and *Salmo mykiss lewisi*.

The following are the more important notes on the fishes seen. The references are to the new edition of Lewis and Clark, in four volumes, by Dr. Elliott Coues (New York, 1893):

Vol. I, p. 54: "White catfish [*Ictalurus punctatus*], the eyes of which were small, and its tail resembling that of a dolphin"; Missouri River near mouth of Papillion Creek, near present site of Omaha.

Vol. I, p. 70: "August 16. * * * A party had gone out yesterday to the Maha Creek [and] a second went to-day. They made a kind of drag with small willows and bark, and swept the creek. The first company brought 318 fish, the second upward of 800, consisting of pike [probably *Lucius lucius*], bass [*Micropterus salmoides?*], fish resembling salmon trout, red-horse [*Moxostoma aureolum*], buffalo fish [*Ictiobus sp.?*], rockfish, one flat-back, perch, catfish, a small species of perch called on the Ohio silver-fish, a shrimp of the same size, shape, and flavor of those about New Orleans and the lower part of the Mississippi. We also found very fat mussels." Few, if any, of these are certainly identifiable. This locality is in the present Dakota County, Nebraska, a little south of Dakota City. They called the place "Fishing Camp."

Vol. I, p. 88: "Some large catfish, nine that would together weigh 300 pounds." Nine miles below mouth of Bow Creek, Cedar County, Nebraska. These may have been *Leptops olivaris* or *Ameiurus lacustris*.

Vol. I, p. 320: "We have caught very few fish on this side of the Mandans, and these were the white catfish of two to five pounds"; Missouri River near mouth of Beauchamp Creek, Mont., longitude about 108° W.

Vol. II, p. 363: "The white cat [-fish] continues as high as Marias River, but they are scarce in this part of the Missouri, nor have we caught any of them since leaving the Mandans which weighed more than six pounds."

Vol. II, p. 364: "I amused myself catching those white [cat-] fish yesterday. I caught upward of a dozen in a few minutes; they bite most freely at the melt of a deer which Goodrich brought with him for the purpose of fishing." (Lewis.) This locality was near the mouth of Marias River, longitude about 110° 30′ W.

Vol. II, p. 367: "Both kinds of white fish" [*I. punctatus* and *Stizostedion canadense boreum*]. Falls of Missouri.

Vol. III, p. 1159: "Some catfish and soft-shelled turtles were procured"; near mouth of Tongue River.

Vol. II, p. 362: "June 11. One of the men caught several dozen fish of two species. The first is about nine inches long, of a white color, round in shape; the mouth is beset both above and below with a rim of fine, sharp teeth, the eye moderately large, the pupil dark, the iris narrow, and of a yellowish brown. In form and size it resembles the white chub of the Potomac, though its head is proportionally smaller. These readily bite at meat or grasshoppers; the flesh, though soft and of a fine white color, is not highly flavored. The second species is precisely of the form and about the size of the fish known by the name of hickory-shad or old-wife, though it differs from it in having the outer edge of both the upper and lower jaw set with a rim of teeth, and the tongue and palate also defended by long, sharp teeth bending inward; the eye is very large, the iris wide, and of a silvery color. These do not inhabit muddy water, and the flavor is much superior to that of the former species. Of the first kind we have seen a few before we reached Marias River; but had found none of the last before we caught them in the Missouri above its junction with that river." This locality was near the mouth of Marias River. The first species is *Stizostedion canadense boreum*, and the other either *Hiodon alosoides* or *Hiodon tergisus*.

Vol. II, p. 367: "June 13. In the afternoon they caught in the falls some of both kinds of the white fish, and half a dozen trout from 16 to 23 inches long, precisely resembling in form and in the position of the fins the mountain or speckled trout of the United States, except that the specks of the former are of a deep black while those of the latter are of a red or gold color. They have long, sharp teeth on the palate and tongue, and generally a small speck of red on each side behind the front ventral fins; the flesh is of a pale yellowish red, or when in good order of a rose-colored red." This locality is the lower or Crooked Falls of the Missouri, below the present town of Great Falls, Montana. The two kinds of "white fish" were probably *Ictalurus punctatus* and *Hiodon alosoides*, and the trout, of course, was *Salmo mykiss lewisi*.

Vol. II, p. 373: The next day and at the same place they "obtained a number of fine trout and several small catfish, weighing about four pounds and differing from the white catfish lower down the Missouri." These were probably not different from the other white catfish.

Vol. II, p. 431: "July 20. Since the river has become shallow we have caught a number of trout and a fish white on the belly and sides, but of a bluish cast on the back, with a long, pointed mouth opening somewhat like that of a shad." This was in the Missouri nearly due east of Helena. The fish were *Salmo mykiss lewisi* and probably *Hiodon alosoides*.

Vol. II, p. 458: "August 3. The only fish observed in this part of the river were the trout and a species of white fish with a remarkably long, small mouth, which one of our men recognized as the fish called in the Eastern States the 'bottlenose.'" This was in Jefferson Fork of the Missouri, near the mouth of Whitetail Deer Creek, south of Helena. The trout was *Salmo mykiss lewisi;* the "bottlenose" is not identifiable; it may have been *Coregonus williamsoni cismontanus* or *Pantosteus jordani*.

Vol. II, p. 495: "August 13. Some very fine trout [*Salmo mykiss lewisi*] were caught, as also for several days past." This was in Beaverhead River near the mouth of Grasshopper Creek, south of Dillon, Mont.

Vol. III, p. 1138: "July 16. One of the men caught a fish which they had not seen before. It was eight inches long, and resembled a trout in form, but its mouth was like that of a sturgeon, and it had a red streak passing on each side from the gills to the tail." This locality was in the Yellowstone River near the mouth of Little Timber Creek, some 30 miles below Livingston, Mont. The fish was undoubtedly a sucker, and almost certainly the species named *Pantosteus jordani* 87 years afterward. There is, of course, a possibility of its having been *Catostomus catostomus*.

The papers whose titles follow are each more or less faunal in character and each contains references to fishes from definite Missouri Basin localities.

1854. LOUIS AGASSIZ. Notice of a collection of fishes from the southern bend of the Tennessee River, in the State of Alabama. <Amer. Journ. Science and Arts, 2d series, vol. XVII, No. 50, March, 1854, 297–308, and No. 51, May, 1854, 353–365.

In a footnote on page 304 of this paper Professor Agassiz described as new two darters collected in the Osage River, Missouri, by Mr. George Stolley. These are *Pœcilichthys spectabilis* (=*Etheostoma cœruleum spectabile*) and *Pœcilichthys punctulatus* (=*Etheostoma punctulatum*).

1856. CHARLES GIRARD. Researches upon the cyprinoid fishes inhabiting the fresh waters of the United States west of the Mississippi Valley, from specimens in the museum of the Smithsonian Institution. <Proc. Ac. Nat. Sci. Phila. 1856, 165–218.

This is the first of the several papers based wholly or partly upon the collections made by the naturalists connected with the Pacific Railroad Survey parties which traversed portions of the Missouri Basin. The localities from which the specimens of these collections came are seldom given with any definiteness, as will appear from an examination of the following table. In this table, and in all others of like character in the present paper, the names of new species are printed in italics.

Page.	Nominal species.	Identification.	Locality.	Collector.
170	Carpiodes *damalis*	Carpiodes velifer	Milk River	Suckley.
172	Ptychostomus *haydeni*	Minytrema melanops	Missouri River at Fort Pierre.	Evans and Hayden.
			Yellowstone River.	Do.
174	Catostomus (Acomus) *lactarius.*	Catostomus griseus	Milk River	Suckley.
174	Catostomus (Acomus) *griseus.*	do	Sweetwater River	Bowman.
175	Catostomus *sucklii*	Catostomus commersonii	Milk River	Suckley.
180	Pimephales *fasciatus*	Pimephales promelas	Yellowstone River.	Hayden.
182	Hybognathus *argyritis*	Hybognathus argyrite	Milk River	Suckley.
182	Hybognathus *evansi*	Hybognathus nuchale evansi.	Fort Pierre, Nebr	Evans.
185	Argyreus *dulcis*	Rhinichthys cataractæ dulcis.	Sweetwater River	Bowman.
188	Pogonichthys *communis*	Platygobio gracilis	Fort Pierre, Nebr.	Evans.
			Fort Union	Denig.
			Above Fort Union.	Suckley.
			Milk River	Do.
			Yellowstone River.	Hayden.
			Sweetwater River	Bowman.
188	Gobio *gelidus*	Hybopsis gelidus	Milk River	Suckley.
189	Leucosomus *dissimilis*	Couesius dissimilis	Milk and Little Muddy rivers.	Do.
190	Nocomis *nebracensis*	Hybopsis kentuckiensis	Sweetwater River	Bowma.
190	Plagyrus *bowmani*	Notropis cornutus	do	Do.
204	Semotilus *macrocephalus*	Semotilus atromaculatus	Fort Pierre, Nebr.	Evans.
204	Semotilus *speciosus*	do	Sweetwater River	Bowman.

1858. CHARLES GIRARD. The fishes [of the Pacific Railroad Surveys]; Pacific Railroad Report, vol. X, 1–400, numerous plates, 1858; vol. VI, part IV, No. 1, 9–34, 11 plates.

The reports of the Pacific Railroad Survey credit but 23 nominal species to the Missouri Basin.

Page.	Nominal species.	Identification.	Locality.	Collector.
17	Calliurus longulus	Apomotis cyanellus	Platte River	Captain Pope.
32	Stizostedion boreus	Stizostedion canadense boreum.	Fort Sarpy, Nebr	Dr. Hayden.
			Milk River, Mont.	Dr. Suckley.
			Fort Union, Mont.	Dr. Hayden.
98	Amblodon grunniens	Aplodinotus grunniens	Milk River, Mont.	Dr. Suckley.
212	Pimelodus *olivaceus*	Ictalurus punctatus	Fort Pierre, Nebr.	Dr. Evans.
			Milk River, Mont.	Dr. Suckley.
			Yellowstone River, Nebr.	Mr. Walker, Dr. Hayden.
219	Carpiodes damalis	Carpiodes velifer	Milk River	Dr. Suckley.
221	Ptychostomus haydeni	Minytrema melanops	Fort Pierre, Nebr.	Dr. Evans.
21			Yellowstone River	Dr. Hayden.
222	Acomus griseus	Catostomus griseus	Missouri River at Fort Pierre, Nebr.	Dr. Evans.
22			Sweetwater River	J. S. Bowman.
223	Acomus lactarius	do	Milk River	Dr. Suckley.
226	Catostomus sucklii	Catostomus commersonii	do	Do.
234	Pimephales fasciatus	Pimephales promelas	Yellowstone River.	Dr. Hayden.
236	Hybognathus argyritis	Hybognathus argyrite	Milk River	Dr. Suckley.
22			do	Do.
237	Hybognathus evansi	Hybognathus nuchale evansi.	Fort Pierre, Nebr.	Dr. Evans.
243	Argyreus dulcis	Rhinichthys cataractæ dulcis.	Sweetwater River	J. S. Bowman.
			do	Do.
248	Pogonichthys communis	Platygobio gracilis	Milk River	Dr. Suckley.
			Sweetwater River	J. S. Bowman.
			Missouri River at Fort Union.	E. J. Denig.
			Milk River above Fort Union.	Dr. Suckley.
			Fort Pierre, Nebr.	Dr. Evans.
			Yellowstone River.	Dr. Hayden.
249	Gobio gelidus	Hybopsis gelidus	Milk River	Dr. Suckley
251	Leucosomus dissimilis	Couesius dissimilis	do	Do.
			Little Muddy River	Do.
253	Leucosomus macrocephalus.	Semotilus atromaculatus	Fort Pierre, Nebr.	Dr. Evans.
254	Nocomus nebrascensis	Hybopsis kentuckiensis	Sweetwater River	J. S. Bowman.
23				
264	Plagyrus bowmani	Notropis cornutus	do	Do.
284	Semotilus speciosus	Semotilus atromaculatus	Tributary of Platte River, Nebr.	Do.
25				
320	Salar lewisi	Salmo mykiss lewisi	Falls of Missouri River.	Dr. Suckley.
357	Scaphirhynchus platirhynchus.	Scaphirhynchus platorhynchus.	Missouri River	Dr. Shumard.
59				
358	Polyodon folium	Polyodon spathula	Fort Pierre, Nebr.	Dr. Evans.

1859. CHARLES GIRARD. Ichthyological Notices. <Proc. Ac. Nat. Sci. Phila. 1859, 100–104.

In these "notices" Dr. Girard described as new two species of darters from the Missouri Basin, viz: In Notice XXXVII, p. 103, *Boleichthys exilis*, obtained by Dr. George Suckley in the Little Muddy River, and in Notice XL, p. 104, *Boleichthys warreni* (=*Boleichthys exilis*), obtained by Dr. F. V. Hayden in the Cannon Ball River September, 1856. The Cannon Ball flows into the Missouri just below Bismarck, N. Dak., in long. 100° 30′, lat. 46° 30′. The stream called Little Muddy River is probably near Bismarck.

1860. CHARLES C. ABBOTT. Descriptions of two new species of *Pimelodus* from Kansas. <Proc. Ac. Nat. Sci. Phila. 1860, 568–569.

In this paper are given descriptions of the two nominal species, *Pimelodus hammondii* (=*Ictalurus punctatus*) and *Pimelodus notatus* (=*Ictalurus punctatus*). The types of each were collected at Fort Riley, Kans., by Dr. W. A. Hammond, presumably from the Kansas River.

1860. Dr. GEORGE SUCKLEY. Report upon the fishes collected on the [Pacific Railroad] Survey; chapter 1, Report upon the *Salmonidæ;* chapter 2, Report upon the fishes exclusive of the *Salmonidæ.* Pacific Railroad Report, vol. XII, part III, No. 5, pp. 307–368, with 21 plates, 1860; and in Natural History of Washington Territory, same pagination, plates, and date.

All of the dozen Missouri Basin fishes mentioned in this paper were collected by Dr. Suckley.

Page.	Nominal species.	Identification.	Locality.
348	(Salmo) Salar lewisi	Salmo mykiss lewisi	Falls of Missouri River.
351	Stizostedion boreus	Stizostedion canadense boreum	Milk River.
355	Amblodon grunniens	Aplodinotus grunniens	Do.
359	Pimelodus olivaceus	Ictalurus punctatus	Do.
360	Carpiodes damalis	Carpiodes velifer	Do.
360	Acomus lactarius	Catostomus griseus	Do.
360	Catostomus sucklii	Catostomus commersonii	Upper Missouri and its tributaries.
360	Pimephales fasciatus	Pimephales promelas	Milk River.
361	Hybognathus argyritis	Hybognathus argyrite	Do.
361	Pogonichthys communis	Platygobio gracilis	Do.
361	Gobio gelidus	Hybopsis gelidus	Do.
364	Hyodon tergisus	Hiodon tergisus	West of Fort Union.

1862. THEODORE GILL. Observations on the genus *Cottus,* and descriptions of two new species (abridged from the forthcoming report of Capt. J. H. Simpson.) <Proc. Bost. Soc. Nat. Hist., VIII, 1862, 40–42.

In this paper, page 40, is given the original description of *Potamocottus punctulatus* (=*Cottus bairdi punctulatus*), the type a single specimen obtained by Dr. George Suckley in 1859, "between Bridger's Pass and Fort Bridger." This is probably in the Missouri Basin.

1862a. THEODORE GILL. Descriptions of new species of *Pimelodinæ* (abridged from the forthcoming report of Capt. J. H. Simpson). <Proc. Bost Soc Nat. Hist., VIII, 1862, 42–46.

In this paper Dr. Gill described as new 3 species of catfishes, viz. *Ictalurus simpsonii* (=*I. punctatus*), from the "Big Sandy River of Kansas" (probably the Kansas River); *Amiurus obesus* (=*Ameiurus melas*), "supposed to be from Nebraska" (collected by Mr. McCarthy); and *Noturus occidentalis* (=*N. flavus*) from Platte River. The first and third were collected by Dr. Suckley.

1863. F. W. PUTNAM. List of the fishes sent by the Museum to different institutions in exchange for other specimens, with annotations. <Bull. Mus. Comp. Zool., vol. I, No. 1, 2–16, 1863.

In this paper are described 2 species supposed to be new. The types of each were collected by Mr. Stolley in the Osage River, Missouri. They are *Alburnus lineolatus* Agassiz MS., 1854, and *Alburnus zonatus* Agassiz MS., 1854 (=*Notropis zonatus*). The first of these is unidentifiable; it may be *Notropis scylla.*

1864. THEODORE GILL. A new species of *Percopsis* (*Percopsis hammondii*) from Kansas. <Proc. Ac. Nat. Sci. Phila. 1864, 151.

In this note Dr. Gill describes *Percopsis hammondii* (=*Percopsis guttattus*), the specimen said to have been obtained in Kansas by Dr. W. A. Hammond.

1864. E. D. COPE. On a blind Silurid from Pennsylvania. <Proc. Ac. Nat. Sci. Phila. 1864, 231–233.

In the paper bearing this inadequate title Professor Cope describes not only the blind catfish from Pennsylvania and a new darter from New Jersey, but a new darter (as *Pœcilichthys mesœus* = *Boleosoma nigrum*) from Platte River, near Fort Kearney, Nebr. The type was collected by Dr. Hammond.

1864a. EDWARD D. COPE. Partial catalogue of the cold-blooded Vertebrata of Michigan. Part I. <Proc. Ac. Nat. Sci. Phila. 1864, 276–285.

In this paper Professor Cope records 5 species of fishes from the Missouri Basin, 4 of which he describes as new. All were collected by Dr. W. A. Hammond.

Page.	Species.	Present identification.	Locality.
277	Pogonichthys (Platygobio) *gulonellus.*	Platygobio gracilis	Near Bridger Pass.
278	Rhinichthys *maxillosus*	Rhinichthys cataractæ dulcis	Kansas.
282	Alburnus *oligaspis*	Notropis dilectus	Do
283	Hybognathus evansi	Hybognathus nuchale evansi	Upper Platte River.
284	Campostoma *hippops*	Campostoma anomalum	Platte River at Fort Kearney, Kans.

1865. EDWARD D. COPE. Partial catalogue of the cold-blooded Vertebrata of Michigan. Part II. <Proc. Ac. Nat. Sci. Phila. 1865, 78–88.

In this paper Professor Cope incorporates a "Note on fishes brought from the Platte [Kansas] River, near Fort Riley, by Dr. W. A. Hammond." Twenty-four species are mentioned, three of which (*Gasterosteus micropus, Fundulus sciadicus,* and *Lepidosteus otarius*) are described as new. The localities assigned to some of these species seem to be erroneous. *Gila affinis* certainly did not come from any Missouri Basin locality, and the trout mentioned as *Trutta lewisi* probably came from some point in the headwaters of the South Platte rather than

from Fort Riley. Fort Riley was on the Kansas River, in what is now Davis County, Kans., near the present town of Junction City. It is very doubtful if trout ever occurred so far east in Kansas.

Page.	Nominal species.	Identification.
85	Bryttus longulus	Apomotis cyanellus.
85	Stizostedium americanum	Stizostedion canadense.
85	Pœcilichthys mesæus	Boleosoma nigrum.
81	Gasterosteus *micropus*	Eucalia inconstans.
85	Trutta lewisi	Salmo mykiss stomias.
85	Hyodon tergisus	Hiodon tergisus.
85	Percopsis hammondii	Percopsis guttatus.
78	Fundulus *sciadicus*	Fundulus sciadicus.
85	Carpiodes damalis	Carpiodes velifer.
85	Catostomus chloropterum	Catostomus commersonii.
85	Campostoma hippops	Campostoma anomalum.
85	Hybognathus evansi	Hybognathus nuchale evansi.
85	Pimephales promelas	Pimephales promelas.
85	Alburnus oligaspis	Notropis dilectus.
85	Gila affinis	Gila robusta (locality erroneous).
85	Semotilus corporalis	Semotilus atromaculatus.
85	Semotilus pallidus	Do.
85	Platygobio gulonellus	Platygobio gracilis.
85	Ceratichthys cyclotis	Hybopsis kentuckiensis.
85	Rhinichthys maxillosus	Rhinichthys cataractæ dulcis.
85	Ictalurus cærulescens	Ictalurus punctatus.
86	Ictalurus notatus	Do.
86	Amia calva	Amia calva.
86	Lepidosteus *otarius*	Lepisosteus osseus.

1870. EDWARD D. COPE. A partial synopsis of the fishes of the fresh waters of North Carolina. <Proc. Amer. Philos. Soc. 1869–70 (June 7, 1870), 448–495.

In this paper, page 482, *Carpiodes grayi* (=*Carpiodes velifer*) is described as new. The definite locality is not known, but Prof. Cope says "it is probably from one of the Western States."

1870. AUG. DUMÉRIL. Histoire naturelle des poissons, ou ichthyologie générale, vol. II, 1870.

In this work the common sturgeon of the Great Lakes and the Mississippi Valley is described as new no fewer than sixteen times. The types of three of these nominal species are reputed to have come from the Missouri Basin. They are the following: *Acipenser* (*Huso*) *copei*, Upper Missouri; *Acipenser* (*Huso*) *rauchii*, Osage River, Missouri, and *Acipenser* (*Huso*) *anasimos*, Missouri River, near St. Louis.

1871. EDWARD D. COPE. Recent reptiles and fishes. Report on the reptiles and fishes obtained by the naturalists of the expedition. <Preliminary Report U. S. Geological Survey of Wyoming and portions of contiguous territory, being a second annual report of progress, 432–442, 1870 (1871).

This paper is a report upon the fishes collected by the naturalists of the Hayden Survey during the season of 1870. Most of the specimens were probably collected by C. P. Carrington, zoologist, and Henry D. Schmidt, naturalist, of the expedition. Some were obtained by Dr. W. A. Hammond, and others by Dr. William Stimpson.

Page.	Nominal species.	Present name.	Locality.
433	Salmo (Salar) *stomias*	Salmo mykiss stomias	Platte [Kansas] River near Fort Riley.
434	Catostomus sucklii	Catostomus commersonii	Platte River.
434	Catostomus griseum	Catostomus griseus	Horse Creek, Red Cloud Creek, Platte River.
437	Ptychostomus *bucco*	Moxostoma bucco	St. Joseph, Mo.
437	Campostoma anomalum	Campostoma anomalum	Probably headwaters of Platte River.
437	Coliscus *parietalis*	Pimephales promelas	Missouri River near St. Joseph.
437	Hybopsis *missuriensis*	Notropis blennius	Near St. Joseph, Mo.
438	Hybopsis *scylla*	Notropis scylla	Red Cloud Creek.
438	Photogenis *piptolepis*	Notropis piptolepis	North Platte River and Red Cloud Creek.
439	Hypsilepis cornutus	Notropis cornutus	Red Cloud Creek.
439	Cyprinella *billingsiana*	Notropis lutrensis	St. Joseph, Mo.
439	Moniana *jugalis*	do	Do.
440	Alburnellus *percobromus*	Notropis rubrifrons	Do.
440	Sarcidium *scopiferum*	Phenacobius scopifer	Missouri River near St. Joseph, Mo.
442	Rhinichthys maxillosus	Rhinichthys cataractæ dulcis.	Red Cloud Creek and Platte River.
442	Noturus flavus	Noturus flavus	Platte River.

1872. EDWARD D. COPE. Report on the recent reptiles and fishes of the survey, collected by Campbell Carrington and C. M. Dawes. <Preliminary Report U. S. Geological Survey of Montana and portions of adjacent territory, being a fifth annual report of progress, 467–476, 1872.

Only three or four species from the Missouri Basin are mentioned in this paper.

Page.	Nominal species.	Present name.	Locality.
469	Thymallus tricolor	Thymallus signifer ontariensis.	Yellow Creek and the Gallatin Fork of the Missouri in Montana; headwaters of Yellowstone.
471	Salmo *pleuriticus*	Salmo mykiss stomias and Salmo mykiss lewisi.	Platte River and Yellowstone River; Yellow Creek and Gallatin Fork of Missouri, Montana; Yellowstone Lake.
476	Uranidea punctulata.	Cottus bairdi punctulatus.	Gallatin Fork of the Missouri River.

1874. EDWARD D. COPE. On the *Plagopterinæ* and the ichthyology of Utah. <Proc. Amer. Philos. Soc. Phila. 1874, 129–139, 1–11 of reprint.

In this paper one species is recorded from the Missouri Basin, viz: *Fundulus floripinnis*, which is described as new (as *Haplochilus floripinnis*, on page 10 of reprint). The specimens were obtained by Mr. J. M. Keasbey from the South Platte River near Denver.

1874. GEORGE SUCKLEY. On the North American species of salmon and trout. <Report U. S. Fish Comm. 1872–73 (1874), 91–160.

This paper was written by Dr. Suckley in 1861, but was not printed and published until 1874. Only one species is mentioned from the Missouri Basin, viz: *Salmo mykiss lewisi* (as *Salmo lewisi*), on page 139, from headwaters of the Missouri (Dr. Suckley; Dr. Cooper); southern tributaries of the Yellowstone; Black Hills, Nebr. (Dr. Hayden); on page 140, "Falls of the Missouri in Nebraska" (Dr. Cooper); "Great Falls of the Missouri" (the types; Dr. Suckley).

1874. JAMES W. MILNER. Notes on the grayling of North America. <Report U. S. Fish Comm. 1872–73 (1874), 729–742.

In this paper, p. 741, Professor Milner describes the grayling of the headwaters of the Missouri as a new species, to which he gives the name *Thymallus montanus*. The type came from Camp Baker, Montana.

1876. E. D. COPE and H. C. YARROW. Report upon the collections of fishes made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 1871, 1872, 1873, and 1874. <U. S. Geographical Surveys west of the one hundredth meridian, in charge of First Lieut. G. M. Wheeler, Corps of Engineers, U. S. Army, vol. v, Zoology, Fishes, 635–703, pls. XXVI–XXXII, 1875 (1876).

The only species mentioned in this report from the Missouri Basin is *Fundulus floripinnis* (as *Haplochilus floripinnis*, p. 695, pl. XXVIII, figs. 4, 4*a*, 4*b*), from Denver, Colo.

1876. THEODORE GILL. Report on [the] ichthyology [of Captain Simpson's explorations across the Great Basin of the Territory of Utah in 1859]. Appendix L, 385–431, pls. I–IX, 1876.

In this report the following species are mentioned as having been obtained from Missouri Basin localities:

Page.	Nominal species.	Present name.	Locality.
408	Platygobio communis	Platygobio gracilis	Platte Valley.*
417	Ictalurus simpsoni	Ictalurus punctatus	Big Sandy River of Kansas.
420	Amiurus obesus	Ameiurus melas	Probably Nebraska.
423	Noturus occidentalis	Noturus flavus	Platte River.

*The specimens of this species which Dr. Gill records from "Green River, Utah," almost certainly came from some point in the Missouri Basin. It is not known to occur in the Green River Basin. This is not the Big Sandy Fork of Green River, but probably the Platte, or possibly the Arkansas.

1878. DAVID STARR JORDAN. Report on the collection of fishes made by Dr. Elliott Coues, U. S. A., in Dakota and Montana during the seasons of 1873 and 1874. <Bull. U. S. Geol. and Geog. Surv. Terr., IV, 1878.

The fishes reported upon in this paper were collected by Dr. Elliott Coues, naturalist of the United States Northern Boundary Survey. The localities are not, in most cases, stated with such definiteness as is desirable. The following 9 species are reported from the Missouri Basin:

Page.	Nominal species.	Present name.	Locality.
777	Scaphyrynchus platyrhynchus.	Scaphirhynchus platorynchus	Fort Buford, N. Dak.
777, 778	Ichthælurus punctatus	Ictalurus punctatus	Big Muddy River.
777, 792	Hyodon chrysopsis	Hiodon alosoides	Quaking Ash River.
777	Catostomus teres	Catostomus commersonii	Five Forks of Milk River; headwaters of Milk River.
777, 780	Pantosteus virescens	Pantosteus jordani	Sweet Grass Hills.
777, 797	Salmo clarki	Salmo mykiss lewisi	St. Marys River.
777	Polyodon follum (?)	Polyodon spathula	Do.
778, 798	Esox lucius	Lucius lucius	Do.
791	Cliola chlora	Notropis scylla	Upper Missouri.

1879. E. D. COPE. A contribution to the zoology of Montana. <American Naturalist, XIII, July, 1879, 432–441.

In the summer and autumn of 1876 Professor Cope made an expedition into Montana and South Dakota, the special object of which was the investigation of the beds of the Judith River lignite formation and the extraction of their fossils. Some attention was given to the present fauna of the region, and this paper contains his notes on the fishes and other animals observed. The fishes mentioned were seen chiefly in the vicinity of Fort Benton, on the Missouri River, in longitude 110° 40′ west, latitude 47° 50′ north, and near the mouth of Battle Creek, which empties into the Missouri a short distance north of the mouth of the Moreau River, South Dakota, longitude 100° 30′ west, latitude 45° 25′ north. The streams from which fishes are recorded in this paper are: Missouri River at Fort Benton and near mouth of Battle Creek; lower portion of Battle Creek, South Dakota; Judith River, Montana, and headwaters of the Upper Missouri.

Page.	Nominal species.	Present name.	Locality.
439, 440	Lucioperca borea	Stizostedion canadense boreum.	Missouri River at Fort Benton and elsewhere, abundant.
440	Lota maculosa	Lota lota maculosa	Battle Creek.
440	Ichthælurus punctatus	Ictalurus punctatus	Pools left by river near Battle Creek.
440	Semotilus corporalis	Semotilus atromaculatus	Battle Creek.
440	Pogonichthys communis	Platygobio gracilis	Fort Benton, Judith River.
440	Rhinichthys maxillosus	Rhinichthys cataractæ dulcis.	Battle Creek.
440	Phoxinus *milnerianus*	Leuciscus milnerianus	Battle Creek, probably.
440	Chrosomus sp. (?)	Chrosomus dakotensis?	Battle Creek.
440	Hybognathus evansi	Hybognathus nuchale evansi.	Do.
440	Hyborhynchus nigellus	Pimephales promelas	Do.
441	Hyodon tergisus	Hiodon tergisus	Judith River and river pools near Battle Creek.
441	Coregonus williamsonii	Coregonus williamsoni cismontanus.	Heads of tributaries of the Upper Missouri.
441	Lepidosteus productus	Lepisosteus platostomus	River pools near Battle Creek.
441	Lepidosteus otarius	Lepisosteus osseus	Do.
441	Scaphirhynchops platyrhynchus.	Scaphirhynchus platorynchus.	Missouri River at Fort Benton.

1881. SAMUEL GARMAN. New and little-known reptiles and fishes in the Museum collections. Bull. Mus. Comp. Zool., VIII, No. 3, 85–93, February, 1881.

This paper contains a single reference to the Missouri Basin. On page 88 *Fundulus lineatus* is described as new (as *Zygonectes lineatus*), and "northeastern Wyoming" is given as the type locality.

1881a. SAMUEL GARMAN. North American fresh-water fishes (1). Science Observer, vol. III, No. 8, 1881, 57–63.

In this paper is given a synopsis of the species of *Rhinichthys*. The western dace (*Rhinichthys cataractæ dulcis*) is recorded from Missouri Basin localities as follows: Northeast Wyoming and Montana (as *R. ocella* sp. nov.); Cheyenne, Wyo. (as *R. dulcis*); and from Kansas (as *R. maxillosus*).

1889. CHARLES H. GILBERT. Fourth series of notes on the fishes of Kansas. <Bull. Washburn Laboratory of Natural History, vol. II, No. 9, 38–43, January, 1889.

These collections also were made by Professor Cragin and his students (James L. Poston and Dana McVicar) during the summer of 1887 for the Washburn College Laboratory of Natural History. The Missouri Basin localities are the following:

(*a*) Republican River, near Wano, Cheyenne County.
(*b*) Sappa Creek, a tributary of Republican River, Oberlin, Decatur County.
(*c*) North fork of Solomon River, Logan, Phillips County.
(*d*) North fork of Solomon River, Harlan, Smith County.
(*e*) Middle Beaver Creek, a tributary of North fork of Solomon River, Smith County.
(*f*) A spring branch of Spring Creek, near Smith Center, Smith County.
(*g*) Osage River, La Cygne, Linn County.

Localities *a* to *f* are in the northwestern part of the State, while *g* is near the middle of the eastern boundary.

Page.	Nominal species.	Identification.	Locality.
38	Amiurus melas	Ameiurus melas	Sappa Creek.
38	Notropis deliciosus lineolatus.	Notropis blennius	Republican River; Logan and Harlan; Ward Creek, Shawnee County.
39	Notropis topeka	Notropis topeka	Sappa Creek.
39	Notropis lutrensis	Notropis lutrensis	Do.
39	Notropis jejunus	Notropis jejunus	Do.
39	Phenacobius mirabilis	Phenacobius mirabilis	Do.
39	Semotilus atromaculatus	Semotilus atromaculatus	Republican River.
39	Fundulus zebrinus	Fundulus zebrinus	Do.
39	Lepomis humilis	Lepomis humilis	Sappa Creek.
39	Etheostoma olmstedi maculatum.	Boleosoma nigrum	Do.
40	Amiurus melas	Ameiurus melas	Logan and Harlan; Middle Beaver Creek.
40	Ictalurus punctatus	Ictalurus punctatus	Harlan.
40	Noturus flavus	Noturus flavus	Logan and Harlan.
40	Catostomus teres	Catostomus commersonii	Middle Beaver Creek and Logan.
40	Campostoma anomalum	Campostoma anomalum	Middle Beaver Creek and spring branch of Spring Creek.
40	Hybognathus nuchalis	Hybognathus nuchale	Logan.
40	Pimephales promelas	Pimephales promelas	Middle Beaver Creek and Logan.
40	Notropis deliciosus lineolatus.	Notropis blennius	Middle Beaver and Spring creeks and Logan.
40	Notropis lutrensis	Notropis lutrensis	Do.
40	Notropis megalops	Notropis cornutus	Logan.
40	Phenacobius mirabilis	Phenacobius mirabilis	Do.
40	Semotilus atromaculatus	Semotilus atromaculatus	Middle Beaver and Spring Creeks.
40	Fundulus zebrinus	Fundulus zebrinus	Logan and in a spring branch of Sand Creek 5 miles southwest of Logan.
40	Lepomis humilis	Lepomis humilis	Smith County. ?
40	Ictalurus punctatus	Ictalurus punctatus	Osage River at La Cygne, Linn County, Kans.
40	Noturus flavus	Noturus flavus	Do.
40	Notropis deliciosus	Notropis blennius	Do.
40	Notropis lutrensis	Notropis lutrensis	Do.
40	Notropis rubrifrons	Notropis rubrifrons	Do.
40	Phenacobius mirabilis	Phenacobius mirabilis	Do.
40	Hybopsis biguttatus	Hybopsis kentuckiensis	Do.
40	Dorosoma cepedianum	Dorosoma cepedianum	Do.
40	Lepomis humilis	Lepomis humilis	Do.
40	Lepomis cyanellus	Apomotis cyanellus	Do.
40	Etheostoma phoxocephalus	Hadropterus phoxocephalus	Do.

1891. DAVID STARR JORDAN. Report of explorations in Colorado and Utah during the summer of 1889, with an account of the fishes found in each of the river basins examined. <Bull. U. S. Fish Comm., IX, 1889 (May 29, 1891), 1–40, plates 1–5.

During July and August, 1889, these collections were made under the direction of the United States Fish Commission. In making them Dr. Jordan was assisted by Messrs. Barton W. Evermann, Bert Fesler, and Bradley M. Davis. Specimens from the Missouri Basin were obtained at the following places:

(*a*) South Platte River near Denver.
(*b*) South Platte River at Hartsel Hot Springs.
(*c*) Bear Creek near Morrison, Jefferson County, Colo. This creek is a small tributary of South Platte. The specimens from this place were obtained by Messrs. Fesler and Davis.
(*d*) Middle Boulder Creek near Boulder, Boulder County, Colo. This is also a tributary of the South Platte. The collecting here was done by Messrs. Jordan and Evermann.

The following species were obtained:

Page.	Nominal species.	Identification.	Locality.
7	Catostomus teres sucklii	Catostomus commersonii	Denver.
7	Catostomus griseus	Catostomus griseus	Denver, Hartsel Hot Springs, Morrison, and Boulder.
8	Hybognathus nuchalis (? var. placita).	Hybognathus nuchale evansi.	Denver.
8	Notropis scylla	Notropis scylla	Do.
8	Notropis gilberti	Notropis gilberti	Do.
8	Notropis megalops	Notropis cornutus	Do.
8	Notropis lutrensis	Notropis lutrensis	Do.
8	Semotilus atromaculatus	Semotilus atromaculatus	Do.
8	Rhinichthys dulcis	Rhinichthys cataractæ dulcis.	Denver, Hartsel Hot Springs, and Morrison.
8	Zygonectes floripinnis	Fundulus floripinnis	Denver.
8	Etheostoma nigrum	Boleosoma nigrum	Do.
8	Salmo mykiss stomias	Salmo mykiss stomias	Morrison.

1891a. DAVID STARR JORDAN. A reconnoissance of the streams and lakes of the Yellowstone National Park, Wyoming, in the interest of the United States Fish Commission. <Bull. U. S. Fish Comm., IX, 1889 (July 11, 1891), 41–63, plates 7–22, and map.

The investigations upon which this paper was based were made under the direction of the United States Fish Commissioner in October, 1889, by Dr. Jordan, assisted by Dr. C. H. Gilbert. The following streams in the Missouri Basin were examined:

(*a*) Yellowstone and Gardiner rivers near Mammoth Hot Springs, and Yellowstone River at Livingston, Mont.
(*b*) Madison River, Yellowstone Park.
(*c*) Horsethief Springs, Gallatin County, Mont.
(*d*) Gallatin River west of Yellowstone Park.
(*e*) Riddle Lake and Solution Creek, Yellowstone Park.
(*f*) Canyon Creek, Yellowstone Park.

The following species were found in the Missouri Basin:

Page.	Nominal species.	Identification.	Locality.
46	Catostomus griseus.....	Catostomus griseus.....	Yellowstone and Gardiner rivers.
48	Rhinichthys dulcis.....	Rhinichthys cataractæ dulcis.	Gardiner River.
49	Coregonus williamsoni *cismontanus*.	Coregonus williamsoni cismontanus.	Madison, Yellowstone, and Gardiner rivers, and Horsethief Springs.
49	Thymallus signifer ontariensis.	Thymallus signifer ontariensis.	Madison River, Horsethief Springs, and Gallatin River.
50	Salmo mykiss.....	Salmo mykiss lewisi.....	Livingston, Gardiner River below the falls, Solution Creek, Riddle Lake, Canyon Creek, and Madison River.
53	Cottus bairdi punctulatus..	Cottus bairdi punctulatus	Gibbon and Madison rivers, and Canyon Creek.

1891. SETH EUGENE MEEK. Report of explorations made in Missouri and Arkansas during 1889, with an account of the fishes observed in each of the river basins examined. <Bull. U. S. Fish Comm., IX, 1889 (1891), 113–141.

The collections reported upon in this paper were made between July 17 and August 21, 1889, for the United States Fish Commission, by Professor Meek, assisted by Messrs. Frank M. Drew and Louis J. Rettger. Collections were made in Missouri in the Missouri Basin at the following places: Gasconade River at Arlington, Phelps County, and at a point 5 miles above Arlington; Little Piney River, an eastern tributary of the Gasconade at Arlington, and also at Newburg, Phelps County; Osage Fork of Gasconade River, 6 miles southeast of Marshfield, Webster County; Lock Fork of Gasconade River, Mansfield-Wright County; Big Piney River, a southern tributary of the Gasconade, near Cabool, Texas County; Jones Creek, a small western tributary of the Gasconade, near Dixon, Pulaski County; Marais River, near Dixon; Niangua River, near Marshfield; and Sac River, near Springfield, Greene County. The last three streams mentioned are tributaries of Osage River, the most important southern tributary of the Missouri in Missouri.

The following 16 species were obtained from the Gasconade River at or near Arlington:

Leptops olivaris.
Ictalurus punctatus.
Catostomus nigricans.
Moxostoma aureolum (as M. duquesnei).
Notropis shumardi (as N. boops).
Notropis zonatus.
Hybopsis kentuckiensis.
Hybopsis dissimilis.
Semotilus atromaculatus.
Fundulus catenatus.
Apomotis cyanellus (as Lepomis cyanellus).
Lepomis pallidus.
Micropterus dolomieu.
Diplesion blennioides (as Etheostoma blennioides).
Cottogaster uranidea (as Etheostoma uranidea).
Etheostoma cœruleum spectabile.

From Little Piney River at Arlington and Newburg 25 species were obtained, as follows:

Schilbeodes exilis (as Noturus exilis).
Catostomus nigricans.
Moxostoma aureolum (as M. duquesnei).
Hybognathus nubilum.
Pimephales notatus.
Notropis shumardi (as N. boops).
Notropis lutrensis.
Notropis whipplii.
Notropis zonatus.
Hybopsis kentuckiensis.
Hybopsis dissimilis.
Semotilus atromaculatus.
Dorosoma cepedianum.
Fundulus catenatus.
Apomotis cyanellus (as Lepomis cyanellus).
Lepomis pallidus.
Micropterus dolomieu.
Micropterus salmoides.
Diplesion blennioides (as Etheostoma blennioides).
Cottogaster uranidea (as Etheostoma uranidea).
Hadropterus aspro (as Etheostoma aspro).
Hypohomus cymatotænia (as Etheostoma cymatotænia).
Etheostoma flabellare.
Etheostoma cœruleum spectabile.
Cottus bairdi.

From Osage Fork of the Gasconade the following 27 species were taken:

Ameiurus nebulosus.
Catostomus nigricans.
Moxostoma aureolum (as M. duquesnei).
Campostoma anomalum.
Chrosomus erythrogaster.
Hybognathus nubilum.
Pimephales notatus
Notropis cayuga.
Notropis whipplii.
Notropis umbratilis cyanocephalus.
Notropis zonatus.
Notropis rubrifrons.
Hybopsis kentuckiensis.
Semotilus atromaculatus.
Fundulus macdonaldi (as Zygonectes macdonaldi).
Labidesthes sicculus.
Lepomis macrochirus.
Lepomis pallidus.
Lepomis megalotis.
Micropterus dolomieu.
Micropterus salmoides.
Percina caprodes (as Etheostoma caprodes).
Diplesion blennioides (as Etheostoma blennioides).
Hypohomus cymatotaenia (as Etheostoma cymatotaenia).
Etheostoma flabellare.
Etheostoma punctulatum.
Etheostoma cœruleum spectabile.
Cottus bairdi.

The following 20 species were found in Lock Fork of the Gasconade:

Catostomus nigricans.
Moxostoma aureolum (as M. duquesnei).
Campostoma anomalum.
Hybognathus nubilum.
Pimephales notatus.
Notropis cayuga.
Notropis umbratilis cyanocephalus.
Notropis zonatus.
Notropis cornutus (as N. megalops).
Notropis rubrifrons.
Hybopsis kentuckiensis.
Semotilus atromaculatus.
Lepomis macrochirus.
Micropterus salmoides.
Etheostoma punctulatum.
Etheostoma cœruleum spectabile.
Boleosoma nigrum (as Etheostoma nigrum).
Diplesion blennioides (as Etheostoma blennioides).
Percina caprodes (as Etheostoma caprodes).
Cottus bairdi.

The collection from Big Piney River contained 16 species, as follows:

Ameiurus melas.
Catostomus commersonii (as C. teres).
Moxostoma aureolum (as M. duquesnei).
Campostoma anomalum.
Chrosomus erythrogaster.
Pimephales notatus.
Notropis cayuga.
Notropis zonatus.
Notropis cornutus (as N. megalops).
Hybopsis kentuckiensis.
Semotilus atromaculatus.
Labidesthes sicculus.
Apomotis cyanellus (as Lepomis cyanellus).
Lepomis pallidus.
Micropterus salmoides.
Etheostoma cœruleum spectabile.

1892. BARTON W. EVERMANN. A reconnaissance of the streams and lakes of western Montana and northwestern Wyoming, in Report of the Commissioner of Fish and Fisheries respecting the establishment of fish-cultural stations in the Rocky Mountain region and Gulf States. Senate Mis. Doc. 65, Fifty-second Congress, first session, 1–90, plates 1–36, May 25, 1892.

These investigations were carried on during July and August, 1891, by Professor Evermann, assisted by Prof. O. P. Jenkins, of Stanford University, and Mr. B. Clapham, of Monroeville, Ind.

The Missouri Basin localities from which specimens were obtained are the following:

(*a*) Red Rock River, near Red Rock, Beaverhead County, Mont.
(*b*) Beaverhead River, near Dillon, Beaverhead County, Mont.
(*c*) Junction of Firehole and Gibbon rivers, Yellowstone Park.
(*d*) Horsethief Springs, Gallatin County, Mont.
(*e*) Atlantic Creek, in and below Two-Ocean Pass, Wyoming.
(*f*) Mouth of Upper Yellowstone River, Yellowstone Park.
(*g*) Meadow Creek at its mouth on east side of Yellowstone Lake.
(*h*) East Fork of Gardiner River, below the falls, Yellowstone Park.
(*i*) McClellan Creek, near Helena, Mont.
(*j*) Canyon Creek, Yellowstone Park.

From these localities only 7 species were obtained, viz:

Page.	Species.	Identification.	Locality.
41	Catostomus discobolus	Pantosteus jordani	Red Rock and Beaverhead rivers.
42	Rhinichthys dulcis	Rhinichthys cataractæ dulcis.	Beaverhead River, Red Rock River, and junction of Firehole and Gibbon rivers.
47	Coregonus williamsoni	Coregonus williamsoni cismontanus.	Do.
47	Thymallus signifer	Thymallus signifer montanus.	Red Rock and Beaverhead rivers; junction of Firehole and Gibbon Rivers; Horsethief Springs.
48	Salmo mykiss	Salmo mykiss lewisi	Atlantic Creek in Two-Ocean Pass and one mile above its mouth; mouth of Upper Yellowstone River; Meadow Creek; east fork of Gardiner River; McClellan Creek.
51	Cottus bairdi punctulatus.	Cottus bairdi punctulatus.	Beaverhead and Red Rock rivers; Canyon Creek and junction of Firehole and Gibbon rivers.
52	Lota lota maculosa	Lota lota maculosa	Red Rock River.

1892a. BARTON W. EVERMANN. Report on the establishment of fish-cultural stations in the Rocky Mountain region and Gulf States. <Bull. U. S. Fish Comm., XI, 1891 (1892), 1–90, plates 1–36.

This is the Fish Commission edition of the above report, and contains no additional species.

1893 BARTON W. EVERMANN. Description of a new sucker, *Pantosteus jordani*, from the Upper Missouri Basin. <Bull. U. S. Fish Comm., XII, 1892 (January 27, 1893), 51–56, with figure.

This paper contains the original description of *Pantosteus jordani*. The type locality and all others from which specimens were obtained are given under this species in the general list and need not be repeated.

1893a. BARTON W. EVERMANN. The ichthyologic features of the Black Hills. <Proc. Indiana Ac. Sci. 1892 (1893), 73–78.

This was a preliminary paper upon the work done in the Black Hills and gives the Black Hills localities for the 15 species collected there in October, 1892, by Evermann and McCormick. All these localities are clearly given in the present report, and need not be repeated here.

1894. CARL H. EIGENMANN. Results of explorations in western Canada and the northwestern United States. <Bull. U. S. Fish Comm., XIV, 1894 (July 7), 101–132, plates 5–8.

During these explorations (summer of 1892) Dr. Eigenmann made two stations in the Missouri River basin—at Craig, Mont. (long. 112° W., lat. 47° N.), where collections were made from Missouri River, and at Poplar, Mont. (long. 105° W., lat. 48° N.), where Poplar River was examined.

The following species are recorded by Dr. Eigenmann:

Page.	Species.	Locality.
107	Noturus flavus	Missouri River at Craig, Mont.
107	Carpiodes velifer	Poplar River at Poplar, Mont.
108	Catostomus griseus	Missouri River at Craig.
108	Catostomus commersonii	Poplar River at Poplar.
108	Moxostoma aureolum	Poplar River.
108	Hybognathus nuchale evansi (as placita)	Do.
110	Notropis atherinoides	Do.
111	Rhinichthys cataractæ dulcis	Poplar River; Missouri River.
111	Couesius dissimilis	Poplar River.
111	Platygobio gracilis	Missouri River; Poplar River
114	Hiodon alosoides	Poplar River at Poplar.
115	Coregonus williamsoni	Missouri River at Craig.
115	Thymallus signifer ontariensis	Do.
116	Eucalia inconstans	Poplar River at Poplar.
118	Stizostedion canadense boreum (as griseum)	Do.
118	Cottus bairdi punctulatus	Missouri River at Craig.
118	Lota lota maculosa	Do.

1894. SETH EUGENE MEEK. Notes on the fishes of western Iowa and eastern Nebraska. <Bull. U. S. Fish Comm., XIV, 1894, 133–138.

The localities from which were obtained the specimens mentioned in this paper are the following:

(*a*) Spirit Lake, Dickinson County, Iowa.
(*b*) East and West Okoboji lakes, Dickinson County, Iowa.
(*c*) Little Sioux River, the outlet of Spirit and the Okoboji lakes, was examined at Cherokee, Cherokee County, Iowa.
(*d*) Floyd River was examined at Lemars, Plymouth County, and Sioux City, Woodbury County, Iowa.

Collections were made from these Iowa localities by Professor Meek in 1890. A few specimens from Spirit and East Okoboji lakes obtained by Professor Evermann, October 31, 1892, are also included.

(*e*) Platte River at Fremont, Dodge County, Nebr.
(*f*) Elkhorn River near Fremont, Nebr.
(*g*) Salt Creek near Lincoln, Nebr.
(*h*) Blue River at Crete, Saline County, Nebr.

CHARACTER OF THE FISH FAUNA OF THE MISSOURI RIVER BASIN.

The total number of species and subspecies of fishes at present known from the Missouri Basin is 143. These are distributed among 24 families and 68 genera, as may be seen from the table on pages 426–428. This table also shows the distribution of the species among the 9 different States of the Missouri Basin. It will be seen that the great majority of the species do not extend westward beyond the eastern counties of Kansas, Nebraska, and South Dakota. Only 55 of the 143 species are known from North Dakota, Montana, Wyoming, and Colorado, and but 10 of these are limited to those 4 States. On the other hand Missouri and the small part of Iowa drained by the Missouri furnish 94 species, or, if we include the narrow-timbered and abundantly-watered strip of eastern Kansas, Nebraska, and South Dakota, we have about 100 species occurring in this eastern or lower belt of the Missouri Basin.

The middle belt, or that portion lying between the one hundredth and the one hundred and fifth meridians, has such characteristic species as *Platygobio gracilis*, *Hybopsis gelidus*, *Rhinichthys cataractæ dulcis*, *Hybognathus nuchale evansi*, and the like. Few if any of these are confined to this belt, but they probably all extend more or less into the lower and upper belts.

The upper belt comprises the elevated mountain region where the water is comparatively clear and cold. The characteristic species here are the trout, whitefish, grayling, two or three species of suckers (*P. jordani*, *C. catostomus*, and *C. griseus*), and the western blob. These are all practically limited to this belt.

In the lower belt is found the limit in the westward extension of spiny-rayed fishes. West of the ninety-sixth meridian, which is approximately the eastern boundary of Nebraska and the Dakotas, not over a dozen species of spiny-rayed fishes are known to occur. This fact becomes interesting when we recall that a single small creek in Indiana (Bean Blossom Creek, Monroe County) is known to contain not fewer than 18 species of spiny-rayed fishes, and from the streams of Indiana alone we know at least 51 species of that group, nearly as many as the total number of species found in the entire fish fauna of the Missouri Basin west of the ninety-eighth meridian.

In the Missouri itself and in its larger tributaries are found such large river species as *Polyodon spathula*, *Scaphirhynchus platorynchus*, *Leptops olivaris*, *Ictalurus punctatus*, species of *Ictiobus*, and the like; but in the smaller streams *Catostomus*, *Hybognathus*, and *Notropis* are the principal genera represented. *Micropterus*, *Perca*, *Lepomis*, and *Etheostoma* are not rare on the eastern edge of this region, but they become more and more rare as we go westward and very soon disappear altogether. *Perca* has not been found west of Dakota River (98°30′ W.);

Micropterus has not been found west of Ravenna, Nebr. (98°30′ W.), and it is not likely that it occurs naturally even that far west.

Of the four darters whose range extends farthest west in this basin, *Boleosoma nigrum* reaches only to Dakota River, *Hadropterus aspro* to Ewing, Nebr. (98° 20′ W.), and to Jamestown, N. Dak. (98° 30′ W.). *Etheostoma iowæ* extends still farther west, it having been found by us at Valentine, Nebr. (100° 30′ W.), while *Boleichthys exilis*, a somewhat doubtful species, was found by Dr. Suckley even a little farther west in North Dakota.

THE ICHTHYOLOGIC PECULIARITIES OF THE BLACK HILLS.

The fish fauna of that portion of the Missouri system lying in and about the Black Hills is peculiarly restricted in its character, and presents a number of interesting problems in geographic distribution. The physical conditions of the region are briefly these:

(1) An isolated, mountainous region, approximately 75 by 100 miles in extent, covered with heavy pine forests and drained by more than a dozen good-sized creeks, whose waters are naturally cold, clear, and pure, and all flowing east, northeast, or southeast to the north or south fork of the Cheyenne.

(2) Surrounding this region on all sides is a broad plain 100 to 200 miles wide, in which the soil is full of alkali, where the rainfall is not great, where there are no forests, and where even herbaceous vegetation is very scant, where the soil is eroded with great ease, the streams are shallow, their beds constantly shifting, the water warm in the summer time and always strongly alkaline and full of solid matter in suspension. To the east and northeast, country of this character extends from the base of the Hills to the Missouri River at least, a distance of not less than 150 to 200 miles. To the southward is a broad strip almost equally uninviting, while on the west, extending from the base of the Hills to the Powder River, the country is barren in the main and the streams are of the same general character. Among the low hills on the east of the Powder River Valley are the headwaters of two streams; one of these is the Belle Fourche or north fork of the Cheyenne, which flows to the northeast and sweeps around the north base of the Black Hills; the other is the south fork of the Cheyenne, which, flowing east and south, hugs the south base of the Hills a little less closely, and then turning northeast unites with the north fork 30 or 40 miles east of the Hills, thereby forming the Big Cheyenne, which, after a course of more than 100 miles in a northeasterly direction, flows into the Missouri. Into one or the other of these two forks flow all the streams of the Hills.

Most of these streams were examined by us and collections made from them at many different places. Only 15 species of fishes were secured, and no other species has ever been reported from any definite locality of this region. The 15 species known from the Black Hills represent

142. Cottus bairdi punctulatus (Gill). *Rocky Mountain Blob.* Between Bridger Pass and Fort Bridger (as *Potamocottus punctulatus* type, Gill, 1862); Gallatin Fork of the Missouri River (as *Uranidea punctulata*, Cope, 1872); Gibbon and Madison rivers and Canyon Creek, Yellowstone National Park (Jordan, 1891*a*); Beaverhead River, Dillon, Mont.; Red Rock River, Red Rock, Mont.; Canyon Creek, Yellowstone Park; junction of Firehole and Gibbon rivers (Evermann, 1892); Missouri River, Craig, Mont. (Eigenmann, 1894).

143. Lota lota maculosa (Le Sueur). *Ling*; *Lawyer*. Battle Creek, S. Dak. (as *L. maculosa*, Cope, 1879); Missouri River at Wyandotte, Kans. (Cragin, 1885*a*); Missouri River at Leavenworth (Gilbert, 1887); Red Rock River, Red Rock, Mont. (Evermann, 1892); Cheyenne River at Cheyenne Falls, S. Dak. (Evermann, 1893); Missouri River, Craig, Mont. (Eigenmann, 1894). One specimen of the ling, 13 inches long, was taken in the south fork of the Cheyenne at Cheyenne Falls, S. Dak. Like all the fishes found in Cheyenne River this is greatly bleached and is much paler than specimens from the Great Lakes.

NOMINAL SPECIES DESCRIBED FROM MISSOURI BASIN LOCALITIES.

The total number of nominal species and subspecies which have been described from Missouri Basin localities is 74, representing 52 species as now recognized, and all but 28 of these 52 species had been previously described from localities not in the Missouri Basin.

Nominal species	Date.	Identification.	Type locality.
Acipenser copei Duméril	1870	Acipenser rubicundus	Upper Missouri.
Acipenser rauchi Duméril	1870	do	Osage River, Missouri.
Acipenser anasimos Duméril	1870	do	Missouri River.
Lepidosteus otarius Cope	1865	Lepisosteus osseus	Kansas River near Fort Riley, Kans.
Pimelodus olivaceus Girard	1858	Ictalurus punctatus	Fort Pierre, Milk and Yellowstone rivers, and Nebraska.
Pimelodus hammondii Abbott	1860	do	Fort Riley, Kans.
Pimelodus notatus Abbott	1860	do	Do.
Ictalurus simpsonii Gill	1862	do	Big Sandy River of Kansas (Platte River).
Amiurus obesus Gill	1862	Ameiurus melas	Nebraska.
Noturus occidentalis Gill	1862	Noturus flavus	Platte River.
Carpiodes bison Agassiz	1855	Carpiodes carpio	Osage River, Missouri.
Carpiodes damalis Girard	1856	Carpiodes velifer	Milk River.
Carpiodes grayi Cope	1870	do	"Probably from one of the Western States."
Pantosteus jordani Evermann	1893	Pantosteus jordani	Red Rock and Beaverhead rivers, Montana.
Catostomus (Acomus) griseus Girard.	1856	Catostomus griseus	Milk River.
Catostomus (Acomus) lactarius Girard.	1856	do	Do.
Catostomus retropinnis Jordan	1878	do	Milk River, Montana.
Catostomus sucklii Girard	1856	Catostomus commersonii	Upper Missouri River and tributaries.
Catostomus chloropteron Abbott	1860	do	Kansas.
Ptychostomus hayden Girard	1856	Minytrema melanops	Missouri River at Fort Pierre and Yellowstone River.
Ptychostomus bucco Cope	1871	Moxostoma bucco	St. Joseph, Mo.
Campostoma hippops Cope	1864	Campostoma anomalum	Platte River at Fort Kearney.
Chrosomus dakotensis Evermann & Cox.	1896	Chrosomus dakotensis	Crow Creek, Chamberlain, S. Dak.
Hybognathus evansi Girard	1856	Hybognathus nuchale evansi.	Missouri River at Fort Pierre.
Hybognathus argyritus Girard	1856	Hybognathus argyrite	Milk River.
Pimephales fasciatus Girard	1856	Pimephales promelas	Yellowstone River.
Coliscus parietalis Cope	1871	do	Missouri River at St. Joseph, Mo.
Semotilus macrocephalus Girard	1836	Semotilus atromaculatus	Fort Pierre.
Semotilus speciosus Girard	1856	do	Sweetwater River.
Semotilus hammondii Abbott	1856	do	Kansas River near Fort Riley.
Phoxinus milnerianus Cope	1879	Leuciscus milnerianus	Probably Battle Creek, S. Dak.
Cliola smithii Evermann & Cox.	1896	Cliola smithii	Prairie Creek, Scotland, S. Dak.

Nominal species.	Date.	Identification.	Type locality.
Notropis germanus Hay	1887	Notropis heterodon	Smoky Hill River, Wallace, Kans.
Hybopsis missuriensis Cope	1874	Notropis blennius	Missouri River at St. Joseph.
Alburnus lineolatus Agassiz	1863	Not identifiable; may be Notropis scylla.	Osage River, Missouri.
Hybopsis scylla Cope	1871	Notropis scylla	Red Cloud Creek, a tributary of North Platte River.
Cliola chlora Jordan	1878	do	Upper Missouri region.
Cliola (Hybopsis) topeka Gilbert.	1884	Notropis topeka	Shunganunga Creek, Topeka, Kans.
Notropis æneolus Hay	1887	do	Saline River, Wakeeney, Kans.
Photogenis piptolepis Cope	1871	Notropis piptolepis	Red Cloud Creek, a tributary of North Platte River.
Cyprinella billingsiana Cope	1871	Notropis lutrensis	St. Joseph, Mo.
Moniana jugalis Cope	1871	do	Do.
Notropis umbrifer Hay	1887	Notropis macrostomus	Solomon River, Beloit, Kans.
Alburnus notatus Agassiz	1863	Notropis notatus	Osage River, Missouri.
Plargyrus bowmani Girard	1856	Notropis cornutus	Sweetwater River.
Alburnus oligaspis Cope	1864	Notropis dilectus	Kansas.
Alburnellus percobromus Cope	1871	Notropis rubrifrons	St. Joseph, Mo.
Minnilus (Lythrurus) nigripinnis Gilbert.	1884	Notropis umbratilis umbratilis.	Shunganunga Creek, Topeka.
Sarcidium scopifer Cope	1871	Phenacobius scopifer	Missouri River, St. Joseph, Mo.
Argyreus dulcis Girard	1856	Rhinichthys cataractæ dulcis.	Sweetwater River.
Rhinichthys maxillosus Cope	1864	do	Kansas.
Rhinichthys ocella Garman	1881	do	Northeastern Wyoming and Montana.
Gobio gelidus Girard	1856	Hybopsis gelidus	Milk River.
Hybopsis meeki Jordan & Evermann.	1896	Hybopsis meeki	Missouri River at St. Joseph.
Hybopsis montanus Meek	1884	Hybopsis montanus	Upper Missouri region.
Nocomis nebracensis Girard	1856	Hybopsis kentuckiensis	Sweetwater River.
Leucosomus dissimilis Girard	1856	Couesius dissimilis	Milk and Little Muddy rivers.
Pogonichthys communis Girard.	1856	Platygobio gracilis	Fort Pierre; Fort Union; above Fort Union; Milk River; Yellowstone River; Sweetwater River.
Pogonichthys (Platygobio) gulonellus Cope.	1865	do	Near Bridger Pass.
Coregonus williamsoni cismontanus Jordan.	1891	Coregonus williamsoni cismontanus.	Madison, Yellowstone, and Gardiner rivers, and Horsethief Springs, Montana.
Salar lewisi Girard	1858	Salmo mykiss lewisi	Falls of Missouri River.
Salmo pleuriticus Cope	1872	do	Yellowstone River; Yellowstone Creek, Gallatin Fork, and Yellowstone Lake.
Salmo (Salar) stomias Cope	1871	Salmo mykiss stomias	Kansas River near Fort Riley.
Thymallus montanus Milner	1874	Thymallus ontariensis montanus.	Tributary of Missouri River at Camp Baker, Montana.
Zygonectes lineatus Garman	1881	Fundulus lineatus	Northeastern Wyoming.
Zygonectes macdonaldi Meek	1891	Fundulus macdonaldi	Jones Creek, Dixon, Mo.; Osage River, Mansfield, Mo.
Fundulus floripinnis Cope	1874	Fundulus floripinnis	South Platte River at Denver.
Fundulus sciadicus Cope	1865	Fundulus sciadicus	"Nebraska or Platte River."
Percopsis hammondii Gill	1864	Percopsis guttatus	Kansas.
Pœcilichthys mesæus Cope	1864	Boleosoma nigrum	Platte River near Fort Kearney, Nebr.
Pœcilichthys beani Jordan	1884	do	Tabo Creek, Lafayette County, Mo.
Boleichthys exilis Girard	1859	Boleichthys exilis	Little Muddy River.
Boleichthys warreni Girard	1859	do	Cannon Ball River.
Potamocottus punctulatus Gill.	1862	Cottus bairdi punctulatus.	Between Bridger Pass and Fort Bridger.

DISTRIBUTION OF SPECIES BY STATES.

The following table shows the distribution by States of the fishes of the Missouri Basin:

No.	Families and species.	Missouri.	Iowa.	Kansas.	Nebraska.	South Dakota.	North Dakota.	Montana.	Wyoming.	Colorado.
	PETROMYZONIDÆ.									
1	Ichthyomyzon concolor			×		×				
2	Ichthyomyzon castaneus			××						
3	Lampetra wilderi									
	POLYODONTIDÆ.									
4	Polyodon spathula		×	×	×			×		
	ACIPENSERIDÆ.									
5	Acipenser rubicundus	×	×	×	×	×				
6	Scaphirhynchus platorynchus	×	×	×	×		×	×	×	
	LEPISOSTEIDÆ.									
7	Lepisosteus osseus	×	×	×		×				
8	Lepisosteus platostomus			×		×				
	AMIIDÆ.									
9	Amia calva			×						
	SILURIDÆ.									
10	Ictalurus furcatus	×		×						
11	Ictalurus punctatus	×	×	×	×	×		×	×	
12	Ameiurus natalis	×		×			×			
13	Ameiurus nebulosus	×		×			×			
14	Ameiurus melas	×	×	×	×	×	×			
15	Leptops olivaris	×		×		×				
16	Noturus flavus	×	×	×	×	×		×	×	
17	Schilbeodes gyrinus		×		×	×				
18	Schilbeodes exilis	×		×						
19	Schilbeodes miurus			×						
	CATOSTOMIDÆ.									
20	Ictiobus cyprinella	×		×	×					
21	Ictiobus urus	×		×						
22	Ictiobus bubalus	×	×	×		×				
23	Carpiodes carpio	×		×	×	×				
24	Carpiodes velifer	×	×	×	×			×		
25	Cycleptus elongatus			×						
26	Pantosteus jordani				×	×		×	×	
27	Catostomus griseus				×			×	×	×
28	Catostomus catostomus								×	
29	Catostomus commersonii	×	×	×	×	×	×	×	×	
30	Catostomus nigricans	×		×						
31	Erimyzon sucetta oblongus			×						
32	Minytrema melanops			×	×			×		
33	Moxostoma bucco	×								
34	Moxostoma aureolum	×	×	×	×	×	×	×	×	
35	Placopharynx duquesnii		×							
	CYPRINIDÆ.									
36	Campostoma anomalum	×	×	×	×	×	×		×	
37	Chrosomus erythrogaster	×		×						
38	Chrosomus dakotensis				×	×				
39	Hybognathus nuchale	×	×	×	×		×			
40	Hybognathus nuchale evansi			×	×	×		×	×	
41	Hybognathus argyrite							×		
42	Hybognathus nubilum	×	×		×	×			×	
43	Pimephales promelas	×	×	×	×	×	×	×		
44	Pimephales notatus	×	×	×	×		×			
45	Semotilus atromaculatus	×	×	×	×	×	×		×	
46	Leuciscus elongatus			×						
47	Leuciscus neogæus					×				
48	Leuciscus milnerianus					×				

Distribution of the Fishes of the Missouri Basin—Continued.

No.	Families and species.	Missouri.	Iowa.	Kansas.	Nebraska.	South Dakota.	North Dakota.	Montana.	Wyoming.	Colorado.
	CYPRINIDÆ—continued.									
49	Abramis crysoleucas	×	×	×	×					
50	Cliola vigilax	×	×		×					
51	Cliola smithii				×	×				
52	Notropis cayuga	×	×		×	×	×			
53	Notropis heterodon		×	×						
54	Notropis blennius	×	×	×	×	×	×		×	
55	Notropis scylla	×		×	×			×		
56	Notropis topeka		×	×	×	×				
57	Notropis gilberti	×	×		×					×
58	Notropis piptolepis				×					
59	Notropis shumardi	×								
60	Notropis hudsonius		×	×		×				
61	Notropis lutrensis	×	×	×	×	×			×	×
62	Notropis macrostomus			×						
63	Notropis notatus	×								
64	Notropis whipplii	×	×							
65	Notropis cornutus	×	×	×	×	×	×		×	×
66	Notropis zonatus	×								
67	Notropis jejunus			×	×				×	
68	Notropis atherinoides		×					×		
69	Notropis dilectus	×	×	×	×	×				
70	Notropis rubrifrons	×		×						
71	Notropis umbratilis umbratilis	×	×	×						
72	Phenacobius mirabilis	×	×	×	×	×				
73	Phenacobius scopifer	×								
74	Rhinichthys cataractæ dulcis			×	×	×	×	×	×	×
75	Rhinichthys atronasus					×				
76	Hybopsis æstivalis				×					
77	Hybopsis hyostomus				×					
78	Hybopsis gelidus				×	×		×	×	
79	Hybopsis meeki	×	×							
80	Hybopsis montanus							×		
81	Hybopsis dissimilis	×								
82	Hybopsis storerianus	×		×	×					
83	Hybopsis kentuckiensis	×	×	×	×		×		×	
84	Couesius dissimilis				×	×		×	×	
85	Platygobio gracilis	×		×	×	×	×	×	×	
	ANGUILLIDÆ.									
86	Anguilla chrysypa			×						
	HIODONTIDÆ.									
87	Hiodon alosoides	×	×	×	×	×		×	×	
88	Hiodon tergisus			×		×				
	CLUPEIDÆ.									
89	Dorosoma cepedianum	×	×	×	×					
90	Pomolobus chrysochloris			×						
	SALMONIDÆ.									
91	Coregonus williamsoni cismontanus							×	×	
92	Salmo mykiss lewisi							×	×	
93	Salmo mykiss stomias			×?						×
	THYMALLIDÆ.									
94	Thymallus ontariensis montanus							×		
	LUCIDÆ.									
95	Lucius lucius		×		×		×	×		
	PŒCILIIDÆ.									
96	Fundulus diaphanus			×						
97	Fundulus zebrinus		×	×						
98	Fundulus catenatus	×								
99	Fundulus lineatus								×	
100	Fundulus macdonaldi	×								
101	Fundulus floripinnis									×
102	Fundulus sciadicus		×		×	×				

Distribution of the Fishes of the Missouri Basin—Continued.

No.	Families and species.	Missouri.	Iowa.	Kansas.	Nebraska.	South Dakota.	North Dakota.	Montana.	Wyoming.	Colorado.
	GASTEROSTEIDÆ.									
103	Eucalia inconstans				×	×		×		
	PERCOPSIDÆ.									
104	Percopsis guttatus		×	×						
	ATHERINIDÆ.									
105	Labidesthes sicculus	×								
	CENTRARCHIDÆ.									
106	Pomoxis annularis	×		×						
107	Pomoxis sparoides		×	×						
108	Ambloplites rupestris		×	×		×				
109	Chænobryttus gulosus			×						
110	Apomotis cyanellus	×	×	×	×	×				
111	Lepomis megalotis	×	×							
112	Lepomis humilis	×	×	×	×	×				
113	Lepomis macrochirus	×								
114	Lepomis pallidus	×	×							
115	Eupomotis gibbosus		×							
116	Micropterus dolomieu	×	×	×						
117	Micropterus salmoides	×	×	×	×					
	PERCIDÆ.									
118	Stizostedion vitreum		×	×	×	×				
119	Stizostedion canadense boreum	×	×	×	×	×		×		
120	Perca flavescens		×			×	×			
121	Percina caprodes	×		×						
122	Hadropterus phoxocephalus	×		×						
123	Hadropterus aspro	×	×	×	×		×			
124	Hypohomus cymatotænia	×								
125	Hypohomus nianguæ	×								
126	Cottogaster uranidea	×								
127	Diplesion blennioides	×		×						
128	Boleosoma nigrum	×	×	×	×	×	×			×
129	Etheostoma zonale		×							
130	Etheostoma iowæ				×	×	×			
131	Etheostoma cœruleum spectabile	×		×						
132	Etheostoma lepidum			×						
133	Etheostoma punctulatum	×								
134	Etheostoma flabellare	×								
135	Boleichthys fusiformis			×						
136	Boleichthys exilis						×			
137	Microperca punctulata	×								
	SERRANIDÆ.									
138	Roccus chrysops		×	×						
139	Morone interrupta			×						
	SCIÆNIDÆ.									
140	Aplodinotus grunniens	×	×	×	×			×		
	COTTIDÆ.									
141	Cottus bairdi	×								
142	Cottus bairdi punctulatus							×	×	
	GADIDÆ.									
143	Lota lota maculosa			×		×		×		
	Total	77	59	86	59	49	23	30	26	8

RECOMMENDATIONS REGARDING THE FOOD-FISHES OF THE MISSOURI BASIN.

Of the 143 species of fishes known from the Missouri Basin at least 42 may be regarded as food-fishes of more or less importance. They are the following:

Common Sturgeon.	Common Redhorse.	Warmouth Bass.
Chuckle-head Cat.	Big-jawed Sucker.	Green Sunfish.
Channel Cat.	Creek Chub.	Long-eared Sunfish.
Common Bullhead.	River Chub.	Red-spotted Sunfish.
Black Bullhead.	Toothed Herring.	Blue-gill.
Mud Cat.	Moon-eye.	Common Sunfish.
Yellow Cat.	Rocky Mountain Whitefish.	Large-mouth Black Bass.
Common Buffalo-fish.	Yellowstone Trout.	Small-mouth Black Bass.
Small-mouth Buffalo.	Platte River Trout.	Wall-eyed Pike.
Carp Sucker.	Montana Grayling.	Sauger.
Gourd-seed Sucker.	Northern Pickerel.	Yellow Perch.
Milk River Sucker.	Crappie.	White Perch.
Long-nosed Sucker.	Calico Bass.	Freshwater Drum.
Common White Sucker.	Rock Bass	Ling.

To these may be added the following species which have been introduced into the waters of the Yellowstone National Park by the United States Fish Commission:

Rainbow Trout.	Von Behr Trout.	Eastern Brook Trout.

These three species and perhaps others, including the carp, have been introduced by several of the State fish commissions and by the United States Fish Commission in various places in these States.

The trout, whitefish, and grayling are, of course, primarily game fishes, and are of interest chiefly to the angler. Their abundance in the upper waters of this basin attracts annually a large number of anglers to that region. The supply, though yet large, is diminishing. There is no reason, however, why the supply of these species can not be greatly increased in the waters in which they are already found and plants may very properly be made in a number of suitable streams in which they are not indigenous; but the pond and river fishes are the species whose cultivation will result in the greatest good to the Missouri River States.

The six species of catfishes named above are all well suited to the lower and middle portions of the Missouri Basin. The same is true of the suckers and the spiny-rayed fishes. Nearly all of these species are found in abundance in the ponds and bayous along the Mississippi in Illinois, where the Commission has for several years been collecting them for distribution to various suitable waters.

No better work can be done than to make liberal shipments of buffalo, suckers, catfish, bullheads, black bass, sunfish, crappies, etc., to the suitable waters in western Iowa, Kansas, Nebraska, South Dakota, and Wyoming. The suckers, buffalo, and large catfish should be put in the streams; the bullheads, sunfishes, bass, crappies, etc., will do well in the numerous ponds and small lakes.

Catalogue of the [illegible] July 1, 1895, to June 30, 1896 GPO 1898

GP 3.6:L

Finn, John. COX, N. N. Report from Committee on Claims, favoring Senate bill 227, to authorize auditing quartermaster's vouchers belonging to Finn. Feb. 17, 1896. 1 p. (House rp. 399, 54th Cong. 1st sess. In v. 2.) Stat. L. v. 29, p. 709.

MITCHELL, J. H. Report from Committee on Claims, amending Senate bill 227, to authorize auditing quartermaster's vouchers belonging to Finn. Jan. 16, 1896. 1 p. (Senate rp. 79, 54th Cong. 1st sess. In v. 1.) Stat. L. v. 29, p. 709.

Fir. BLACK, W. J. Damage to Bavarian forests by caterpillars. (In Cons. Rp. Dec. 1895. v. 49, p. 521, 522.)

Fire. See **Forest fires.**

Fire-blight. See **Pear-blight.**

Fire Island. BARTLETT, FRANKLIN. Report from Committee on Interstate and Foreign Commerce, amending House bill 5293, for light-vessel off island. Feb. 14, 1896. 10 pp. (House rp. 378, 54th Cong. 1st sess. In v. 2.)

See also **Long Island.**

Firearms. See **Ordnance—Small arms.**

Firing. ADJUTANT-GENERAL. General orders 1 [1896, results of rifle and revolver firing of Army for target year 1895]. Jan. 7, 1896. 7 pp.

See also **Rifle—Small arms.**

Fischer, Herman F. Almeria. (In Commercial Relations, 1894 and 1895. v. 2, p. 376-380.)

Trade of Almeria. (In Cons. Rp. May, 1896. v. 51, p. 52, 53.)

Fischer, Israel F., Representative from New York. See, for reports from Committee on Indian Affairs, **Chicago, Burlington, and Quincy Railroad—Grubb & Robinson—Gulf, Colorado, and Santa Fe Railroad—Kansas City, Fort Scott, and Memphis Railroad—Moreland, Basil—Shoshone Indians.**

Fish, Edward N., & Co. PLATT, O. H. Report from Committee on Indian Affairs, favoring Senate bill 290, to execute findings of Court of Claims in cases of Edward N. Fish and others for supplies furnished Indian service. Feb. 7, 1896. 6 pp. (Senate rp. 229, 54th Cong. 1st sess. In v. 1.)

SNOVER, H. G. Report from Committee on Claims, favoring Senate bill 290, to execute findings of Court of Claims in cases of Edward N. Fish and others for supplies furnished Indian service. Apr. 23, 1896. 6 pp. (House rp. 1459, 54th Cong. 1st sess. In v. 6.)

Fish and fisheries. ALBATROSS, Fish Commission steamer. Report upon work of steamer, 1893. (In Fish Commission. Report. pt. 19, p. 305-341, 4 pl.)

—— Same, separate. 1896.

—— Same, 1894. (In Fish Commission. Report. pt. 20, p. 197-278, 2 pl. map.) [Includes description of Blish distance-finder.]

—— Same, separate. 1896.

—— Same, 1895. (In Fish Commission. Report. pt. 21, p. 125-168.) [Report for each year includes report by A. B. Alexander, fishery expert.]

—— Same, separate. 1896.

DE KAY, CHARLES. Trout farms in Bohemia. (In Cons Rp. Sept. 1895. v. 49, p. 41-47, il.)

HERDMAN, W. A. Oceanography, bionomics, and aquiculture. (In Smithsonian Institution. Annual report, 1895. p. 433-454.)

Fish and fisheries—Continued.

HERDMAN, W. A. Same, separate. 1896. ([Smithsonian publication] 1049.)

JORDAN, D. S., and EVERMANN, B. W. Check-list of fishes and fish-like vertebrates of north and middle America. (In Fish Commission. Report. pt. 21, p. 207-584.)

—— —— Same, separate. 1896.

SCUDDER, C. W. List of publications of Fish Commission, Feb. 1871-Feb. 1896. (In Fish Commission. Report. pt. 20, p. 617-706.)

—— Same, separate. 1896.

STEVENSON, C. H. Review of foreign fishery trade of United States. (In Fish Commission. Report. pt 20, p. 431-571.)

—— Same, separate. 1896.

See also **Alaska—Arkansas—Bavarian Fishery Association—Caviar—Chicago, World's Columbian Exposition, 1893—Fish Commission—Fish-nets—Fish-ponds—Great Falls, Potomac River—Kiel, International Exhibition for Navigation and Fishery, 1896—Lofoten—Marine animals—Minnesota—Neuse River—Northwest—Norway—Pacific Coast—Pacific Ocean—Salmon—Vermont.**

Fish Commission. Bulletin, 1895. 1896. v. 15, xi + 475 pp. il. 91 pl. 1 tab. 2 maps.

Same. (House doc. 79, 54th Cong. 1st sess. In v. 49.) [See also each bulletin under its author and subjects.]

Letter recommending printing of pt. 2 of Senate document 137, relating to condition of seal life on rookeries of Pribilof Islands; presented by Mr. Hale. June 5, 1896. 1 p. (Senate doc. 302, 54th Cong. 1st sess. In v. 11.)

Letter recommending printing of report of Leonhard Stejneger on Russian fur seals. June 5, 1896. 1 p. (Senate doc. 303, 54th Cong. 1st sess. In v. 11.) [Report not yet printed.]

Reply to resolution relating to efficiency of employees. Feb. 10, 1896. 1 p. (House doc. 220, 54th Cong. 1st sess. In v. 53.)

Report of commissioner, 1893 [with reports of divisions]. 1895. pt. 19, ii + 1-138 + iv pp.

Same, with reports of divisions and appended papers. 1895 [1896]. pt. 19, v + 484 pp. il. 34 pl. map.

Same. (House mis. doc. 89, 53d Cong. 3d sess. In v. 14.) → Serial set 3340

Same, 1894 [with reports of divisions]. 1896. pt. 20, 1-175 + iv pp.

Same, with reports of divisions and appended papers. 1896. pt. 20, v + 718 pp. il. 27 pl. map.

Same. (House doc. 424, 54th Cong. 1st sess. In v. 80.) → Serial set 3447

Same, 1895 [with reports of divisions]. 1896. pt. 21, 1-123 + iii pp.

Same, with reports of divisions and appended papers. 1896. pt. 21, iii + 590 pp. map. [Appended papers of each report also published separately. Report for 1894 contains list of publications of the commission, Feb. 1871-Feb. 1896. Report for 1895 will appear also as House document 104, 54th Congress, 2d session, in v. 42.]

Report of representative of commission at World's Columbian Exposition; by Tarleton H. Bean. (In Fish Commission. Report. pt. 20, p. 177-196, 5 pl.)

Same, separate. 1896.

Reports of agents of Secretary of Treasury, in relation to seal life on Pribilof Islands, and to pelagic sealing in Bering Sea and North