

UC San Diego

Fish Bulletin

Title

Fish Bulletin No. 35. A Distributional List of the Species of Freshwater Fishes Known to Occur in California

Permalink

<https://escholarship.org/uc/item/5mn6v8h9>

Authors

Evermann, Barton Warren
Clark, Howard Walton

Publication Date

1931

DIVISION OF FISH AND GAME OF CALIFORNIA
FISH BULLETIN No. 35
A Distributional List of the Species of Freshwater Fishes Known to Occur in
California



By
BARTON WARREN EVERMANN, A. M., Ph. D., LL. D.
Director of the Museum and of the Aquarium,
and
HOWARD WALTON CLARK, A. B., A. M.
Assistant Curator, Department of Fishes,
California Academy of Sciences

TABLE OF CONTENTS

	Page
Introduction -----	5
Bibliography -----	6
List of Species -----	47
Species of Freshwater Fishes described as New Species from California Localities	58
Introduced Species -----	63

1. INTRODUCTION

Soon after coming to California in 1914, the senior author of this report began compiling the locality records of the freshwater fishes of the State with the ultimate object in view of preparing a distributional catalogue of the species that have been recorded from definite localities in California.

This work required a critical examination of all the literature pertaining to the freshwater fishes of the State, *as species or kinds*, in order that we might know not only what species are known to occur in California, but also the geographic distribution of each of those species within the State.

In the present publication we have given a Bibliography of all the papers of a faunistic character, that we have been able to consult dealing with the freshwater fishes of California. The titles in this Bibliography are arranged chronologically. Under each title is given a brief summary of what it contains relating to the subject in hand. Following the Bibliography is a Distributional List of all native species of freshwater fishes known to occur in California. This list is arranged systematically in accordance with the recently published Check-list of Fishes of North and Middle America by Jordan, Evermann & Clark.¹

Under each species are given all the definite localities from which it has been recorded, together with the authority for the record and the date of the record (which are usually in parenthesis), with the name under which recorded when that name is different from the present accepted name of the species.

So far as we have been able to discover, the first reference to freshwater fishes in California is contained in a letter of Alzate y Ramirez who wrote to the Royal Academy of Sciences at Paris in 1772, describing Cyprinodonts of California. The next reference that has come to our notice is in a book entitled "Oregon and California in 1848," by J. Quinn Thornton, published in 1849, in which there is said to be a reference to the fishes. We have not had access to these references, but as they evidently contain no recognizable descriptions of species, they may be said to belong to the prescientific period of history.

The scientific history of the study of freshwater fishes of California, if one makes time the measure, may be said to be brief. If it can be assigned a definite birthday, that would be May 18, 1854, when Dr. W. P. Gibbons read before a meeting of the *California Academy of Natural Sciences*, and had published in a newspaper, *The Daily Placer Times and Transcript*, a description of a remarkable fish, *Hysterochrysurus traski*, the only freshwater member of the viviparous perch family, the locality being given as the lower Sacramento River.

From the beginning of the establishment of the *California Academy of Natural Sciences* (later the *California Academy of Sciences*), and the publishing of its Proceedings, beginning in September, 1854, and with the explorations of the Pacific Railway Survey, ichthyological investigation was very active. Most, if not all, of this pioneer work, by Ayres,

¹ Check-list of the Fishes and Fishlike Vertebrates of North and Middle America North of the Northern Boundary of Venezuela and Colombia; published February 8, 1930, in the Report of United States Commissioner of Fisheries for 1928, as Appendix, Part 2, Document No. 1055, pages 1-670, by David Starr Jordan, Barton Warren Evermann, and Howard Walton Clark.

Girard, Gibbons and others, consisted in descriptions of new species, both marine and freshwater. As might have been expected, the same species has often been described, either by different authors, or by the same author at different times under different names. To reduce these names to a common denominator, a task involving a careful comparison of descriptions, study of ascertained ranges, and all other available evidence, has been one of the principal aims of our studies which have resulted in this paper.

This pioneer work was based chiefly upon a study of specimens obtained in the San Francisco market, and did not involve much, if any, collecting in the streams and other waters of the State. Actual collecting in the field began with the various Pacific Railroad Exploring Expeditions in the early fifties, particularly the expeditions under Lieut. R. S. Williamson, Capt. J. W. Gunnison, and Lieut. A. W. Whipple. The collections made on these expeditions usually went to the United States Government or to the Academy of Natural Sciences of Philadelphia, and were studied and reported on chiefly by Dr. Charles Girard.

Not until the opening of Stanford University in 1891, and the coming to California of Dr. David Starr Jordan and Dr. Charles Henry Gilbert, did the fish fauna of the State receive any serious study. Following that date Doctors Jordan and Gilbert and many of their students in ichthyology were very active for more than twenty years studying the coastal waters and the streams and lakes of the State and collecting and studying the fishes found in them. In addition to Doctors Jordan and Gilbert among those who were especially active and who have contributed greatly to our knowledge of the freshwater fishes of California, special mention should be made of Cloudsley Rutter assisted by Fred M. Chamberlain, and Professors John O. Snyder and Edwin C. Starks.

2. BIBLIOGRAPHY

Following is a bibliography of all the papers of a faunal nature that we have been able to consult dealing with the systematics of the freshwater fishes of California. The titles are arranged in chronological order. When there are two or more papers in the same year by the same author, the second will have the letter a, the third one b, etc., added to the date.

Under each title we have given a brief summary of the contents of the paper, frequently giving a list of the species recorded therein, the water from which recorded, and the present identification of each species.

1854. Gibbons, W. P. Description of four new species of viviparous fish, read before the California Academy of Natural Sciences, Monday evening, May 15, 1854. Daily Placer Times and Transcript, May 18, 1854, p. 2, col. 3. : Describes the genus *Hysterochrysurus*, with the species *H. traskii* (= *H. traskii*) with a variety A. of the same species, and three saltwater species.

1854a. Gibbons, W. P. Description of four new species of Viviparous Fishes from Sacramento River and the Bay of San Francisco. Proc. Acad. Nat. Sci. Phila., VII, 1854-55, pp. 105-106.: A republication, with slight changes, of the paper published in the Daily Placer Times and Tran-

described as new and what was in the first paper described as "Variety A" is here called "Var. B."

- 1854b. Gibbons, W. P. Description of New Species of Viviparous Marine and Freshwater Fishes from the Bay of San Francisco, and from the River and Lagoons of the Sacramento. Proc. Acad. Nat. Sci. Phila., VII, 1854–55, pp. 122–126.: Several new genera and species are described, among which is the genus *Hysterothorax*, described previously (Gibbons 1854), *Hysterothorax traski* is redescribed, the variation called "var. A" instead of "var. B," as on page 105.
1854. Girard, Charles. Descriptions of new Fishes collected by Dr. A. L. Heermann, Naturalist attached to the Survey of the Pacific Railroad Route, under Lieut. R. S. Williamson, U. S. A. Proc. Acad. Nat. Sci. Phila., VII, 1854–1855, pp. 129–140.: In this paper Girard lists 30 species, 29 of which are described as new. of the 30 species listed, 11 are freshwater forms.
- 1854a. Girard, Charles. Observations upon a collection of Fishes made on the Pacific coast of the United States, by Lieut. W. P. Trowbridge, U. S. A., for the Museum of the Smithsonian Institution. Proc. Acad. Nat. Sci. Phila., VII, 1854–1855 (August, 1854), pp. 142–156.: In his introduction to this paper, Dr. Girard says: "It is praiseworthy for officers of the government, whether military or civil, when detailed upon special duties, to devote their moments of leisure in serving the cause of science. Lieut. Trowbridge, while engaged under instructions from the U. S. Coast Survey, in making tidal observations for the use of that office, availed himself of such opportunities at his command to secure the fishes enumerated below, and we leave it to Naturalists to decide whether his labors were at all rewarded."
- In this paper Girard lists 50 species, only one of which (*Pogonichthys argyreus* = *Pogonichthys macrolepidotus*), from the Presidio, on the Bay of San Francisco, is strictly freshwater, and another (*Gasterosteus inopinatus*, misprint for *inornatus* = *Gasterosteus aculeatus*), living in salt, brackish or fresh water, is reported from a freshwater lagoon near the Presidio.
1854. Ayres, W. O. New Fishes. Daily Placer Times and Transcript, May 30, 1854.: In this article, Dr. Ayres described as new five species of freshwater fishes, the descriptions being based on specimens obtained in the San Francisco market. The species are: *Leuciscus gibbus* (*L. crassicauda*), *Leuciscus microlepidotus* (*Orthodon microlepidotus*), *Leuciscus gracilis* (*Ptychocheilus grandis*), *Leuciscus macrolepidotus* (*Pogonichthys macrolepidotus*), and *Catostomus occidentalis*.
- 1854a. Ayres, W. O. New species of California Fishes. Proc. Boston Soc. Nat. Hist., V, 1854, pp. 94–103.: In this paper, Dr. Ayres described as new *Centrarchus maculosus*, now regarded as identical with the previously described *Archoplites interruptus*, the Sacramento Perch.
- 1854–1862. Ayres, Wm. O. Notes on California fishes with Descriptions of New Species. Proc. Calif. Acad. Nat. Sci., Vol. I, Part First, September 4, 1854–December 31, 1855, pp. 1–77 (1–83 of Reprint of December 31, 1873); Part 2d, Jan. 7, 1856–June 29, 1857, pp. 79–110 (84–125 of Reprint of December 31, 1873); continued in Vol. II, February 22, 1858–November 3, 1862, pp. i–xx+3–236.: Soon after the founding of the California Academy of Natural Sciences (April 4, 1853), regular weekly meetings began to be held, at which members presented papers or brief notes on various scientific subjects. Dr. William O. Ayres, one of the first, if not *the* first, to study systematically the fishes of California, at the regular weekly meetings of the Academy, presented numerous short papers describing species of fishes from California; some from salt water, some from fresh water. The earlier papers were first published in the *Daily Placer Times and Transcript* printed in San Francisco. Beginning with the meeting of September 4, 1854, publication was in the Proceedings of the California Academy of Natural Sciences, originally

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
129	<i>Centrarchus interruptus</i>	<i>Archoplites interruptus</i>	2345	Sacramento River
129	<i>Cottopsis gulosus</i>	<i>Cottus gulosus</i>	2996	San Joaquin River
133	<i>Gasterosteus williamsoni</i>	<i>Gasterosteus aculeatus</i>	1852	Williamson's Pass
133	<i>Gasterosteus microcephalus</i>	<i>Gasterosteus aculeatus</i>	1852	Tule Lake (San Joaquin Valley)
135	<i>Gila conocephala</i>	<i>Mylopharodon conocephalus</i>	798	Rio San Joaquin
136	<i>Pogonichthys inaequilobus</i>	<i>Pogonichthys macrolepidotus</i>	829	San Joaquin River
136	<i>Pogonichthys symmetricus</i>	<i>Hesperoleucus symmetricus</i>	863	Fort Miller, San Joaquin Valley
137	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	804	Sacramento River
137	<i>Lavinia crassicauda</i>	<i>Siboma crassicauda</i>	855	Rio San Joaquin
137	<i>Lavinia conformis</i>	<i>Siboma conformis</i>	856	Poso Creek, San Joaquin Basin
137	<i>Leucosomus occidentalis</i>	<i>Lavinia exilicauda</i>	804	Poso Creek and Four Creek

|
8
|

In the following table we have included all the freshwater species described or listed in Volumes I and II of the Proceedings.

In column 1 is given the date of the meeting at which the paper was presented; in column 2, the page (and plate if there is one) of the first edition of the Proceedings on which printed; in column 3, the page of the Reprint of November–December, 1873; in column 4, the species as recorded; in column 5, the present identification; in column 6, the number which the species bears in the Check-list of Fishes and Fishlike Vertebrates of North and Middle America north of the Northern Boundary of Venezuela and Colombia, by Jordan, Evermann & Clark, published February 8, 1930; and, finally in column 7, the locality from which the species was recorded. In all, 84 names are recorded of both salt and freshwater species, some of these names later reduced to synonyms. Twenty-three are fresh-water. New names are in *italics*.

1855. Gibbons, W. P. (in record of meeting). Proc. Calif. Acad. Nat. Sci., I, 1855, 35.: In an untitled record of the meeting of March 19, 1855, of the California Academy of Natural Sciences, Dr. Gibbons read a description of a new species of Trout, *Salmo iridea* (*Salmo irideus*) from San Leandro Creek.
1855. Agassiz, Louis. Synopsis of the ichthyological fauna of the Pacific slope of North America, chiefly from the collections made by the United States Exploring Expedition under the command of Capt. C. Wilkes, with recent additions and comparison with earlier types. Am. Jour. Sci. and Arts, 1855, pp. 71–99, and 215–231.: The author makes an extensive study of the genera of suckers and minnows. He notes only two of his species, *Catostomus occidentalis* and *Ptychocheilus major*, in the Sacramento-San Joaquin Basin, and both of these he described as new. *Catostomus occidentalis*, however, had but a few weeks previously been described under the same name by Ayres. *Ptychocheilus major* (p. 229) is the present *P. grandis*. Agassiz' specimens were collected by F. G. Cary, Jr.
1856. Girard, Charles. 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. Acad. Nat. Sci. Phila., VIII, 1856, pp. 165–213.: This paper by Dr. Girard was based upon collections obtained at different times and periods by several naturalists and surgeons attached to various surveys undertaken in 1851 to 1855 by the United States. These included the survey of routes for a railroad to the Pacific coast commenced in 1853, known as the Pacific Railroad Surveys. One of these parties, under Lt. R. S. Williamson, with Dr. A. L. Heermann as surgeon and naturalist, made a large collection of freshwater fishes in the valley of the San Joaquin River, and the Tulare Valley. Subsequently, the same officers explored the Sacramento Valley from San Francisco northward and on to Astoria, Ore. Dr. John S. Newberry was the naturalist and secured many interesting

Date of meeting	Original page, Vol. I	Reprint page, Part first	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
Sept. 18, 1854	7	38	<i>Centrarchus maculosus</i>	<i>Archoplites interruptus</i>	2345	Sacramento and San Joaquin rivers
Nov. 27, 1854	14	15	<i>Acipenser acutirostris</i>	<i>Acipenser acutirostris</i>	183	? "This vicinity"
Nov. 27, 1854	15	15	<i>Acipenser medirostris</i>	<i>Acipenser acutirostris</i>	183	"Our waters"
Nov. 27, 1854	16	15	<i>Acipenser brachyrhynchus</i>	<i>Acipenser transmontanus</i>	180	San Francisco Bay; San Pablo Bay; Suisun Bay; Lower Sacramento and San Joaquin rivers
Dec. 11, 1854	18	17	<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	Sacramento and San Joaquin rivers
Dec. 11, 1854	17	17	<i>Gila grandis</i>	<i>Ptychocheilus grandis</i>	807	Not definite
Dec. 18, 1854	20	19	<i>Lavinia gibbosa</i>	<i>Siboma crassicauda</i>	855	Sacramento and San Joaquin rivers
Dec. 18, 1854	21	19	<i>Lavinia compressa</i>	<i>Lavinia exilicauda</i>	804	Sacramento and San Joaquin rivers
Dec. 25, 1854	21	20	<i>Gila microlepidota</i>	<i>Orthodon microlepidotus</i>	794	Sacramento and San Joaquin rivers
Feb. 5, 1855	28	27	<i>Petromyzon plumbeus</i>	<i>Lampetra ayresii</i>	18	Bay of San Francisco
Mar. 5, 1855	32	31	<i>Catostomus labiatus</i>	<i>Catostomus occidentalis</i>	738	Sacramento River at Stockton
Mar. 12, 1855	33	33	<i>Mylopharodon robustus</i>	<i>Mylopharodon conocephalus</i>	798	San Joaquin River
April 16, 1855	43	42	<i>Salmo Rivaularis</i>	<i>Salmo irideus</i>	357	Back of Martinez, toward the foot of Monte Diablo
April 16, 1855	44	43	<i>Petromyzon ciliatus</i>	<i>Entosphenus ciliatus</i>	17	Marshes of San Francisco Bay
April 30, 1855	47	46	<i>Gasterosteus serra'tus</i>	<i>Gasterosteus aculeatus</i>	1852	Marshes of the Bay of San Francisco
April 30, 1855	48	47	<i>Gasterosteus williamsoni</i>	<i>Gasterosteus aculeatus</i>	1852	Williamson's Pass
April 30, 1855	48	47	<i>Gasterosteus microcephalus</i>	<i>Gasterosteus aculeatus</i>	1852	Tulare Lake
April 30, 1855	48	47	<i>Gasterosteus plebius</i>	<i>Gasterosteus aculeatus</i>	1852	Marshes of San Francisco Bay
April 30, 1855	48	47	<i>Gasterosteus inopinatus</i>	<i>Gasterosteus aculeatus</i>	1852	Mountain Lake near San Francisco
Vol. II						
Feb. 3, 1862	163	.....	<i>Archoplites interruptus</i>	<i>Archoplites interruptus</i>	2345	San Francisco Bay ¹
Feb. 3, 1862	163	.....	<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	San Francisco Bay ¹
Feb. 3, 1862	163	.....	<i>Catostomus labiatus</i>	<i>Catostomus occidentalis</i>	738	San Francisco Bay ¹
Feb. 3, 1862	163	.....	<i>Orthodon microlepidotus</i>	<i>Orthodon microlepidotus</i>	794	San Francisco Bay ¹
Feb. 3, 1862	163	.....	<i>Algansea formosa</i>	<i>Siphoteles formosus</i>	874	San Francisco Bay ¹
Feb. 3, 1862	163	.....	<i>Lavinia compressa</i>	<i>Lavinia exilicauda</i>	804	San Francisco Bay ¹
Feb. 3, 1862	163	.....	<i>Ptychocheilus grandis</i>	<i>Ptychocheilus grandis</i>	807	San Francisco Bay ¹
Feb. 3, 1862	163	.....	<i>Mylopharodon robusta</i>	<i>Mylopharodon conocephalus</i>	798	San Francisco Bay ¹

¹All these 8 species of freshwater fishes common in San Francisco Bay in December and January 1861-2, following unusually heavy floods.

The following species of freshwater fishes were recorded in this paper by Dr. Girard from California localities:

Page	Plate	Species as recorded	Present identification	J. E. & C. check-list No.	Locality	Collector
169		<i>Mylocheilus fraterculus</i>	<i>Mylocheilus fraterculus</i>	797	Monterey	Lt. W. P. Trowbridge
169		<i>Mylopharodon conocephalus</i>	<i>Mylopharodon conocephalus</i>	798	San Joaquin River	Dr. Heermann
169		<i>Mylopharodon robustus</i>	<i>Mylopharodon conocephalus</i>	798	San Francisco	Dr. Newberry
174		<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	San Francisco	Dr. Newberry
182		<i>Orthodon microlepidotus</i>	<i>Orthodon microlepidotus</i>	794	San Francisco	Dr. Newberry
183		<i>Algansea formosa</i>	<i>Siphateles formosus</i>	874	Merced (Merced) River	Dr. A. L. Heermann
183		<i>Algansea formosa</i>	<i>Siphateles mohavensis</i>	877	Mohave River	Dr. A. L. Heermann
184		<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	804	Sacramento River	Dr. A. L. Heermann
184		<i>Lavinia harenus</i>	<i>Lavinia exilicauda</i>	804	Monterey	A. S. Taylor
188		<i>Pogonichthys inaequilobus</i>	<i>Pogonichthys macrolepidotus</i>	829	San Joaquin River	Dr. Heermann
188		<i>Pogonichthys symmetricus</i>	<i>Hesperoleucus symmetricus</i>	863	Petaluma	E. Sams
188		<i>Pogonichthys argyrius</i>	<i>Pogonichthys macrolepidotus</i>	829	Fort Miller, San Joaquin Valley	Dr. Heermann
206		<i>Sibonia conformis</i>	<i>Sibonia conformis</i>	856	Presidio near San Francisco	Lt. W. P. Trowbridge
207		<i>Tigoma crassa</i>	<i>Sibonia crassicauda</i>	855	Butte Creek, San Joaquin Valley	Dr. A. L. Heermann
208		<i>Sibonia crassicauda</i>	<i>Sibonia crassicauda</i>	855	Sacramento River near Fort Reading	Dr. John S. Newberry
209		<i>Psychocheilus grandis</i>	<i>Psychocheilus grandis</i>	807	San Joaquin, Merced (Merced) and Mohave rivers	Dr. A. L. Heermann
209		<i>Psychocheilus rapax</i>	<i>Psychocheilus grandis</i>	807	San Francisco	Dr. Newberry
209		<i>Psychocheilus rapax</i>	<i>Psychocheilus grandis</i>	807	Monterey	Lt. W. P. Trowbridge

TABLE

1856a. Girard, Charles. Notice upon the genus *Salmo*, of authors, observed chiefly in Oregon and California. Proc. Acad. Nat. Sci. Phila., VIII, 1856, pp. 217-220.: of the 12 species mentioned, Dr. Girard records *Salar iridea* (*Salmo irideus*) from San Matteo (San Mateo) Creek and Petaluma, California.

Mention is made of receiving specimens obtained by Dr. Ayres, under the name *Salmo rivularis*, but the place of collection is not noted.

1857. Girard, Charles. Report upon Fishes collected on the Survey. Reports of Explorations and Surveys to ascertain the most practicable and economical Route for a Railroad from the Mississippi River to the Pacific Ocean, VI, 1857, no. 1 (of the zoological report—Explorations for a Railroad Route from the Sacramento Valley to the Columbia River by Lieut. R. S. Williamson), pp. 9–34, pls. 22a, 22b, 25a, 25b, 40a, 46, 62, 66, 68, 70, and 74.: In this report Girard records the following freshwater species from California:

Page	Plate	Species as recorded	Present identification	J. E. & C. check-list No.	Locality	Collector
9	II, figs. 1-4	<i>Ambloplites interruptus</i>	<i>Ambloplites interruptus</i>	2315	Sacramento River	Dr. Newberry
10		<i>Cottopsis gulosus</i>	<i>Cottus gulosus</i>	2996	Upper Pit River	Dr. Newberry
11		<i>Cottopsis parvus</i>	<i>Cottus gulosus</i>	2996	Monterey; Presidio	Lt. Trowbridge
17		<i>Gasterosteus inopinatus</i>	<i>Gasterosteus aculeatus</i>	1852	Presidio	Lt. Trowbridge
26		<i>Hysteroecarpus traskii</i>	<i>Hysteroecarpus traskii</i>	3252	Fort Reading	Dr. Newberry Dr. Hammond
27	XLVII	<i>Mylopharodon robustus</i>	<i>Mylopharodon conocephalus</i>	798	San Francisco	Dr. Newberry
28		<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	778	San Francisco	Dr. Newberry
28	LIII, figs. 1-4	<i>Orthodon microlepidotus</i>	<i>Orthodon microlepidotus</i>	794	San Francisco	Dr. Newberry
29	LIV, figs. 1-4	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	804	San Joaquin River	Dr. Newberry
30	LXI	<i>Siloma crassa</i>	<i>Siloma crassa</i>	825	Sacramento River	Dr. Newberry
31		<i>Psychocheilus grandis</i>	<i>Psychocheilus grandis</i>	807	San Francisco	Dr. Newberry
32	LXXI, figs. 1-4	<i>Salmo gairdneri</i>	<i>Salmo gairdneri</i>	358	Klamath River	Dr. Newberry
33	LXXIV	<i>Salmo irideus</i>	<i>Salmo irideus</i>	357	China Creek; San Francisco	Dr. Ayres
34		<i>Acipenser acutirostris</i>	<i>Acipenser acutirostris</i>	183	San Francisco	Dr. Newberry
34		<i>Acipenser medirostris</i>	<i>Acipenser medirostris</i>	183	San Francisco	Dr. Newberry

TABLE

1858. Girard, Charles. General Report upon the Zoology of the Several Pacific Railroad Routes: Part IV, FISHES. Reports of Explorations and Surveys, to ascertain the most practicable and economical route for a Railroad from the Mississippi River to the Pacific Ocean, X, 1859, pp. 1–400, pls. 7, 8, 13, 14, 17, 18, 22, 26, 29, 30, 34, 37, 40, 41, 48, 53, 59, 61, 64, 65, 71.: In this General Report, Girard records the following

Page	Plate	Species as recorded	Present identification	J. E. & C. check-list No.	Locality	Collector
10	II, figs. 1-4	Ambloplites interruptus	Archoplites interruptus	2345	San Joaquin River Sacramento River San Francisco	Dr. Heermann Dr. Newberry Dr. Kennerly
54		Cottopsis parvus	Cottus gulosus	2996	Monterey Presidio Fort Reading Petaluma	Lt. Trowbridge Lt. Trowbridge Dr. J. F. Hammond E. Samuels
86		Gasterosteus plebeius	Gasterosteus aculeatus	1852	San Francisco San Francisco San Jose Petaluma	Lt. Trowbridge Dr. Newberry A. G. Grayson E. Samuels
90		Gasterosteus inopinatus	Gasterosteus aculeatus	1852	Presidio	Lt. Trowbridge
93		Gasterosteus williamsoni	Gasterosteus aculeatus	1852	Williamson's Pass	Dr. Heermann
190	XXVI, fig. 14	Hysteroecarpus traskii	Hysteroecarpus traski	3252	Fort Reading Fort Reading	Dr. Newberry Dr. Hammond
216	XLVI, figs. 5-8	Mylopharodon conocephalus	Mylopharodon conocephalus	798	Rio San Joaquin	Dr. A. L. Heermann
216	XLVII	Mylopharodon robustus	Mylopharodon conocephalus	798	San Francisco San Francisco	Dr. John S. Newberry Dr. W. O. Ayres
224		Catostomus occidentalis	Catostomus occidentalis	738	San Francisco	Dr. John S. Newberry
237	LIII, figs. 1-4	Orthodon microlepidotus	Orthodon microlepidotus	794	San Francisco	Dr. John S. Newberry
239		Algansea formosa	Siphateles formosus	874	Mercede (Merced) River Mohave River	Dr. A. L. Heermann Dr. A. L. Heermann
241	LIV, figs. 1-4	Lavinia exilicauda	Lavinia exilicauda	804	Sacramento River Poso Creek San Joaquin River	Dr. A. L. Heermann Dr. A. L. Heermann Dr. John S. Newberry
242		Lavinia harengus	Lavinia exilicauda	804	Monterey Plains	A. S. Taylor, Esq.
245	LIV, figs. 1-4	Pogonichthys inaequilobus	Pogonichthys macrolepidotus	829	San Joaquin River Petaluma Sacramento River near Fort Reading	Dr. A. L. Heermann E. Samuels Dr. John S. Newberry
246		Pogonichthys symmetricus	Hesperoleucus symmetricus	863	Fort Miller, San Joaquin Valley	Dr. A. L. Heermann
246		Pogonichthys argyreus	Pogonichthys macrolepidotus	829	Presidio	Lt. W. P. Trowbridge
280		Luxilus occidentalis	Lavinia exilicauda	894	Poso, or O-co-ya Creek Four Creeks, Tulare Valley	Dr. A. L. Heermann Dr. A. L. Heermann
289		Tigoma conformis	Siboma conformis	856	Poso or O-co-ya Creek, Tulare Valley	Dr. A. L. Heermann
293	LXII	Tigoma crassa	Siboma crassicauda	855	Sacramento River near Fort Reading	Dr. J. S. Newberry
296	LXIV, figs. 1-4	Siboma crassicauda	Siboma crassicauda	855	Rio San Joaquin	Dr. A. L. Heermann
299		Ptychocheilus grandis	Ptychocheilus grandis	807	San Francisco San Francisco	Dr. John S. Newberry Dr. W. O. Ayres
300		Ptychocheilus rapax	Not in check-list=(Ptychocheilus grandis)	807	Monterey	Lt. Trowbridge
321	LXXXIII, fig. 5	Salar iridea	Salmo irideus	357	Chico Creek San Francisco	Dr. John S. Newberry Dr. W. O. Ayres
355	LXXXIV	Acipenser acutirostris	Acipenser acutirostris	183	San Francisco San Francisco	Dr. John S. Newberry Dr. W. O. Ayres
356		Acipenser medirostris	Acipenser acutirostris	183	San Francisco	Dr. John S. Newberry
377		Petromyzon tridentatus	Entosphenus tridentatus	16	Sacramento River	Dr. Hammond

1859. Girard, Charles. Report upon Fishes collected on the Survey. Reports of Explorations and Surveys to ascertain the most practicable and economical Route for a Railroad from the Mississippi River to the Pacific Ocean, X, 1859, no. 4 (of the Zoological Report—Explorations in California for Railroad Routes to Connect with the Routes near the 35th and 32d Parallels of North Latitude, by Lieut. R. S. Williamson), pp. 83–91, pls. 2, 12, 22, 27, 31, 38, 39, and 47.: In this report Girard lists 43 species, all but one (*Pomoxis nitidus*) from California localities; 14 of them are freshwater species:

Page	Plate	Species as recorded	Present identification	J. E. & C. check-list No.	Locality	Collector
83	II, figs. 1-4.....	<i>Ambloplites interruptus</i>	<i>Archoplites interruptus</i>	2345	San Joaquin River.....	Dr. A. L. Heermann
84	.....	<i>Cottopsis gulosus</i>	<i>Cottus gulosus</i>	2996	San Joaquin River.....	Dr. A. L. Heermann
85	.....	<i>Gasterosteus microcephalus</i>	<i>Gasterosteus aculeatus</i>	1832	Four Creeks, Tulare Valley.....	Dr. A. L. Heermann
86	.....	<i>Gasterosteus williamsoni</i>	<i>Gasterosteus aculeatus</i>	1832	Williamson's Pass.....	Dr. A. L. Heermann
88	.....	<i>Mylopharodon robustus</i>	<i>Mylopharodon conocephalus</i>	789	San Francisco.....	Dr. John S. Newberry
88	XLVI, fig. 508.....	<i>Mylopharodon conocephalus</i>	<i>Mylopharodon conocephalus</i>	789	San Joaquin River.....	Dr. A. L. Heermann
88	.....	<i>Siphiaesa formosa</i>	<i>Siphiaesa formosa</i>	874	Merced (Mered) River.....	Dr. A. L. Heermann
89	LIV, figs. 1-4.....	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	801	Sacramento River.....	Dr. A. L. Heermann
89	.....	<i>Pogonichthys inaequilobus</i>	<i>Pogonichthys macrolepidotus</i>	829	Paso Creek.....	Dr. A. L. Heermann
89	LVI, figs. 1-4.....	<i>Pogonichthys symmetricus</i>	<i>Hesperoleucus symmetricus</i>	863	San Joaquin River.....	Dr. A. L. Heermann
89	.....	<i>Luxilus occidentalis</i>	<i>Luxilus exilicauda</i>	804	Fort Miller, San Joaquin Valley.....	Dr. A. L. Heermann
90	.....	<i>Tigoma conformis</i>	<i>Siboma conformis</i>	856	Paso, or O-co-ya Creek.....	Dr. A. L. Heermann
90	LXII.....	<i>Tigoma crassa</i>	<i>Siboma crassa</i>	855	Four Creeks, Tulare Valley.....	Dr. A. L. Heermann
90	LXIV, figs. 1-4.....	<i>Siboma crassicauda</i>	<i>Siboma crassicauda</i>	855	Rio San Joaquin.....	Dr. John S. Newberry
						Dr. A. L. Heermann

TABLE

1859a. Girard, Charles. Report upon Fishes collected on the Survey. Reports of Explorations and Surveys, to ascertain the most practicable and economical Route for a Railroad from the Mississippi River to the Pacific Ocean, X, 1859, no. 4 (of the Zoological Report—Explorations near the 38th and 39th Parallels of North Latitude by Captain J. W. Gunnison), pp. 21–27, pls. 23, 49, 54, 56, 73, and 75.: In this paper Girard records 32 species of fishes, only five of which are freshwater species from California localities.

Page	Plate	Species as recorded	Present identification	J. E. & C. checklist No.	Locality	Collector
22		<i>Algansea obesa</i>	<i>Siphateles obesus</i>	872	Humboldt River	J. S. Bowman Mr. Kreuzfeld
23	LIV, figs. 1-4	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	804	Sacramento River	Dr. A. L. Heermann
23	LVI, figs. 1-4	<i>Pozonichthys maculobus</i>	<i>Pozonichthys maculopidatus</i>	829	Sacramento River	Dr. A. L. Heermann
25		<i>Tisoma humboldti</i>	<i>Cheomda humboldti</i>	846	Humboldt River	J. S. Bowman
27	LXXIV	<i>Salmo trideus</i>	<i>Salmo trideus</i>	857	Humboldt Bay	J. S. Bowman Lt. W. P. Trowbridge

TABLE

- 1859b. Girard, Charles. Report upon Fishes collected on the Survey. Reports of Explorations and Surveys, to ascertain the most practicable and economical Route for a Railroad from the Mississippi River to the Pacific Ocean, X, 1859, no. 5 (of the Zoological Report—Explorations near the 35th Parallel of North Latitude by Lieut. A. W. Whipple, assisted by Lieut. J. C. Ives), pp. 47–59, pls. 3, 4, 5, 6, 9, 10, 21, 24, 25, 35, 40, 52, 57, and 58.: In this paper Girard records 64 species of which only 13 are from California localities, and of these 13 only one is a fresh-water species, *Ambloplites interruptus* (*Archoplites interruptus*).
- 1859c. Girard, Charles. Ichthyological Notices. Proc. Acad. Nat. Sci. Phila., XI, 1859 (1860), pp. 157–161 (May 31).
 Descriptions of fishes from various parts of the country, only one from California, *Cyprinodon californiensis* (*C. macularius*), from near San Diego, California.
1861. Agassiz, Alexander. Notes on the described species of Holconoti found on the western coast of North America. Proc. Boston Soc. Nat. Hist., VIII, 1861–62, pp. 122–133.: In this paper *Hysteroecarpus traski* and *Sargosomus fluviatilis* (*Hysteroecarpus traski*) are recorded from the Sacramento River.
1862. Gill, Theodore. Notes on some Genera of Fishes of Western North America. Proc. Acad. Nat. Sci. Phila., XIV, 1862, pp. 329–332.: This paper is merely a list of names without localities. An additional synonym of *Entosphenus tridentatus* (*Entosphenus epihexodon*) is given.
1868. Cooper, J. G. Some Recent Additions to the Fauna of California. Proc. Calif. Acad. Nat. Sci., IV, 1868, p. 3, and in *The Natural Wealth of California* by Titus Fey Cronise, p. 487, 1868.: In the first reference it is simply stated that the number of California species of fishes known is 196 in 1868, against 133 known in 1862. In the reference the bare names, without localities, of the 196 species are given, of which a considerable number of names has passed into synonymy; and there is a list with brief notes as to food value, mostly of marine species.
1870. Caton, John Dean. Trout Fishing in the Yosemite Valley. Am. Nat., III, 1870, pp. 519–522.: This paper records but one species, *Salmo iridea* Gibbons (*Salmo henshawi*) from the Merced River.
1873. Throckmorton, R. S. The first Shad (*Alosa praestabilis* = *Alosa sapidissima*) caught in California, and On the Introduction of exotic Food Fishes into the waters of California. Proc. Calif. Acad. Sci., V, pp. 85, and 86–88, May 5, 1873.: Records the first shad caught in the waters of California, which was presented to the Museum of the Academy, and gives the history of the introduction of 15,000 young fish transported from the Hudson, and placed in the Sacramento above Tehama, June 27, 1871. Whitefish were planted in Clear Lake, the date not given, but a large number had been brought across the continent, hatched, and about 25,000 planted. Apparently none survived.
1876. Gibbons, W. P. Description of a new species of Trout from Mendocino County. Proc. Calif. Acad. Sci., Ser. 1, VI, 1875 (1876), pp. 142–144.: In this paper *Salmo mendocinensis* (*Salmo gairdneri*) is described as new and recorded from streams of Mendocino County.
1878. Jordan, David S. and Henshaw, H. W. Report upon the Fishes collected during the years 1875, 1876, and 1877, in California and Nevada. Report of the Chief of Engineers, U. S. Army, for 1878, App. K. in App. NN., pp. 1609–1622, pls. I–IV.: In this report 34 species of fishes are

Page	Plate	Species as recorded	Present identification	J. E. & C. check-list No.	Locality	Collector
1609		Lampetra, sp. uncert.	Probably Entosphenus ciliatus	17	Goose Lake, Modoc County	H. W. Henshaw Sept., 1877
1610	I, III	Catostomus tahoensis	Catostomus tahoensis	751	Lake Tahoe; Eagle Lake	Dr. J. Cooper, H. W. Henshaw, 1876-1877
1613	III	Catostomus araeopus	Catostomus occidentalis	738	South Fork Kern River	H. W. Henshaw, 1877
1613		Apocoeo carringtoni	Apocoeo carringtoni	1053	Camp Bidwell, Modoc County; Spring near Smoke Creek, Lassen County	H. W. Henshaw, 1877
1613		Apocoeo vulneata	Apocoeo carringtoni	1053	Horse Lake, Modoc County	Henshaw, July 9, 1877
1614		Apocoeo ventricosa	Apocoeo carringtoni	1053	Lake Tahoe; Shinn's Ranch, Modoc Co.	Henshaw, 1876-7
1614		Leucis obsus	Siphateles obsus	872	Lake Tahoe; Eagle Lake, Lassen County	Henshaw, 1876-7
1615		Leucis formosus	Siphateles formosus	874	Smoke Creek, Modoc County	Henshaw, 1876-7
1615		Coregonus williamsoni	Prosopium williamsoni	420	Kern Lake	Henshaw
1616		Salmo gibelii	Salmo gilberti	357	Lake Tahoe; Truckee River, Front C.	H. W. Henshaw
1616		Salmo irideus	Salmo irideus	357	Near Mount Whitney	H. W. Henshaw
1618		Salmo tsuppiteli	Salmo gilberti	342	Ojai Creek, Ventura County	H. W. Henshaw
1619		Salmo henahawi	Salmo henahawi	343	Tributary of Pit River, Modoc County;	Henshaw, 1875-1877
1619		Salmo henahawi	Salmo shasta	359	Lake Tahoe; Kern River	Henshaw
1620		Salmo pleuriticus	Salmo shasta	364	McCloud River	Livingston Stone
1621		Ambloplites interruptus	Salmo agassizii	2345	South Fork of Kern River	Henshaw, 1875
1621		Uranidea gulosus	Ambloplites interruptus	2345	Kern Lake (probably an error)	Henshaw, 1875
			Cottus gulosus	2996	Jesse's Valley, Modoc County	Henshaw August 9, 1877

TABLE

1878. Jordan, David Starr. A synopsis of the Family Catostomidae. Bull. U. S. Nat. Mus., no. 12, pp. 97-237, 1878.: In this paper Dr. Jordan records the following species from California fresh waters:

Catostomus occidentalis from "Streams west of Rocky Mountains"; "brought to market in San Francisco and is said to be common in the Sacramento and San Joaquin rivers," and McCloud River; Catostomus araeopus Jordan, new species,

Kern River (*Catostomus occidentalis*); *Pantosteus generosus*, Mohave Desert, (*Notolepidomyzon generosus*); and *Pantosteus plebeius*, Basin of the Colorado River (*Notolepidomyzon plebeius*).

1879. Lockington, W. N. Report upon the Food Fishes of San Francisco. Report Calif. Fish. Comm., 1878-79, pp. 17-58.: Discusses fishes of the markets, both salt and freshwater, from whatever locality derived. The following are the freshwater species mentioned:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
21	<i>Archoplites interruptus</i> (Sacramento River Perch)	<i>Archoplites interruptus</i>	2345	Sacramento River; Pajaro River; Clear Lake (on authority of Stone)
29	<i>Heterocarpus traskii</i>	<i>Heterocarpus traskii</i>	2252	"Freshwaters of our State"
50	<i>Gila grandis</i>	<i>Psychocheilus grandis</i>	807	Market, from freshwater
50	<i>Pozoniichthys inaequilibrium</i> (Splittail).....	<i>Pozoniichthys macrolepidotus</i>	829	Market in Spring, with other minnows or suckers
50	<i>Catostomus occidentalis</i> (Western Sucker).....	<i>Catostomus occidentalis</i>	738	Market, from the Sacramento and its tributaries
50	<i>Orthodon microlepidotus</i> (Fan-tail).....	<i>Orthodon microlepidotus</i>	794	Abundant, in markets
50	<i>Siloma crassicauda</i> (Thick-tail).....	<i>Siloma crassicauda</i>	855	Occasional, in markets
50	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	804	Occasional, in markets
51	<i>Acipenser brachyrhynchus</i> (Sturgeon).....	<i>Acipenser transmontanus</i>	180	Market, in abundance
51	<i>Acipenser acutirostris</i> (Long-nosed or Green Sturgeon).....	<i>Acipenser acutirostris</i>	183	Abundant in the Bay and rivers and creeks flowing into it, not on the market, as fishermen regard it poisonous

TABLE

1880. Bean, Tarleton H. Check-list of duplicates of North American fishes distributed by the Smithsonian Institution in behalf of the United States National Museum, 1877-1880. Proc. U. S. Nat. Mus., III, 1880, pp. 75-116.: In this list Dr. Bean records specimens of three species of freshwater fishes from California, as follows:

Salmo irideus, *Oncorhynchus quinnat* (*Oncorhynchus tshawytscha*), and *Salvelinus bairdii* (*Salvelinus malma spectabilis*) from McCloud River.

1881. Jordan, David Starr and Gilbert, Chas. H. Notes on the Fishes of the Pacific Coast of the United States. Proc. U. S. Nat. Mus., IV, 1881, pp. 29–70.: This paper records the following species from California fresh waters:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
30	<i>Ammocoetes plumbeus</i>	<i>Lampetra ayresi</i>	18	San Francisco northward "doubtless ascends most of the coast streams in the spring"
30	<i>Entosphenus tridentatus</i>	<i>Entosphenus tridentatus</i>	16	Montrey Bay to Puget Sound, ascending the fresh waters to spawn
36	<i>Aspenser transmontanus</i>	<i>Aspenser transmontanus</i>	180	Sacramento River
38	<i>Salvelinus malma</i>	<i>Salvelinus malma spectabilis</i>	380	Lakes and streams of the Cascade Range from Mount Shasta northward to Alaska
38	<i>Salmo irideus</i>	<i>Salmo irideus</i> and <i>Salmo shasta</i> , each in part	337	From Mount Shasta to San Luis Rey River, in streams of the Coast Range and west slope of the Sierra Nevada, and McCloud River
38	<i>Salmo gairdneri</i>	<i>Salmo gairdneri</i>	358	Sacramento River
39	<i>Oncorhynchus kisutch</i>	<i>Oncorhynchus kisutch</i>	329	Sacramento River
39	<i>Oncorhynchus cloncha</i>	<i>Oncorhynchus tshawytscha</i>	331	Sacramento and Ventura rivers
40	<i>Oncorhynchus keta</i>	<i>Oncorhynchus keta</i>	328	All streams from San Francisco to Bering Straits
41	<i>Oncorhynchus zorbatscha</i>	<i>Oncorhynchus zorbatscha</i>	327	Sacramento River
51	<i>Heterocarpus traski</i>	<i>Heterocarpus traski</i>	3252	Sacramento and San Joaquin rivers, and streams southward to San Luis Obispo
66	<i>Gasterosteus microcephalus</i>	<i>Gasterosteus aculeatus</i>	1852	In rivers and brackish waters from Los Angeles River to Puget Sound
66	<i>Gasterosteus aculeatus californicus</i>	<i>Gasterosteus aculeatus</i>	1852	Rivers from San Francisco to Alaska

TABLE

1881a. Jordan, David Starr and Gilbert, Chas. H. Description of a new species of *Ptychochilus* (*Ptychochilus harfordi*), from Sacramento River. Proc. U. S. Nat. Mus., IV, 1881, pp. 72–73.: This paper records two species of freshwater fishes, as follows: *Ptychochilus harfordi* Jordan & Gilbert, new species, from the Sacramento River, and *Ptychochilus oregonensis*, also from the Sacramento River. (The present identification of these two nominal species is *Ptychocheilus grandis*.)

1881. Jordan, David Starr and Jouy, Piere L. Check-list of duplicates of fishes from the Pacific Coast of North America, distributed by the Smithsonian Institution in behalf of the United States National Museum. Proc. U. S. Nat. Mus., IV, pp. 1–18.: In this paper freshwater fishes are recorded from California localities as follows:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
5	<i>Cottopsis gulosus</i>	<i>Cottus gulosus</i>	2996	McCloud River
5	<i>Cottopsis asper</i>	<i>Cottus asper</i>	2997	Sacramento River
10	<i>Hysteroecarpus traski</i>	<i>Hysteroecarpus traski</i>	3252	Sacramento River
12	<i>Archoplites interruptus</i>	<i>Archoplites interruptus</i>	2345	Sacramento River
13	<i>Cyprinodon californiensis</i>	<i>Cyprinodon macularius</i>	1396	San Diego
14	<i>Salmo purpuratus henshawi</i>	<i>Salmo henshawi</i>	343	Lake Tahoe
14	<i>Salmo irideus</i>	<i>Salmo irideus</i>	357	San Luis Rey River; Sacramento River
14	<i>Oncorhynchus kisutch</i>	<i>Oncorhynchus kisutch</i>	329	Sacramento River
14	<i>Oncorhynchus keta</i>	<i>Oncorhynchus keta</i>	328	San Francisco
14	<i>Oncorhynchus chouicha</i>	<i>Oncorhynchus tshawytscha</i>	331	Sacramento River; Monterey
15	<i>Orthodon microlepidotus</i>	<i>Orthodon microlepidotus</i>	794	Sacramento River
15	<i>Squalius gibbosus</i>	<i>Siboma crassicauda</i>	855	Sacramento River
15	<i>Ptychochilus oregonensis</i>	<i>Ptychocheilus grandis</i>	807	Sacramento River
15	<i>Ptychochilus harfordi</i>	<i>Ptychocheilus grandis</i>	807	Sacramento River
16	<i>Pogonichthys macrolepidotus</i>	<i>Pogonichthys macrolepidotus</i>	829	Sacramento River
16	<i>Mylopharodon conocephalus</i>	<i>Mylopharodon conocephalus</i>	798	Sacramento River

TABLE

1882. Campbell, J. B. Notes on McCloud River, California, and some of its Fishes. Bull. U. S. Fish. Comm., I, 1881 (1882), pp. 44–46.: In this paper the following species are recorded: Riffle Pike, Whitefish (probably *Ptychocheilus grandis*), Dolly Varden or Swye-dar-deek-it (*Salvelinus malma spectabilis*), Sucker (*Catostomus occidentalis*), Red-sided Trout (*Salmo shasta*).

1883. Cope, Edward D. On the fishes of the Recent and Pliocene lakes of the Western part of the Great Basin, and of the Idaho Pliocene lake. Proc. Acad. Nat. Sci. Phila., XXXV, 1883, pp. 134–165.: In this paper the following species are recorded from California localities:

Species as recorded	Present identification	J. E. & C. check-list No.	Locality
<i>Apocope ventricosa</i>	<i>Apocope carringtoni</i>	1053	Small streams near Fort Bidwell
<i>Apocope vulnerata</i>	<i>Apocope carringtoni</i>	1053	Streams near Fort Bidwell
<i>Leucis olivaceus</i>	<i>Siphateles olivaceus</i>	871	Goose Lake

TABLE

1885. Jordan, David S. Identification of the Species of *Cyprinidae* and *Catostomidae* described by Dr. Charles Girard in the Proceedings of the Academy of Sciences of Philadelphia for 1856. Proc. U. S. Nat. Mus., VIII, 1885, 118–127.: A number of California species are included, but no localities given, the attempt being the discovery of the identities of the species in question by a comparison of types.

1888. Eigenmann, C. H. and R. S. Description of a new species of Cyprinodon. Proc. Calif. Acad. Sci., Ser. 2, I, 1888, p. 270.: Describes Cyprinodon nevadensis from a hot spring locally known as Saratoga Spring, in the south arm of Death Valley, Inyo County, California. Probably not different from Cyprinodon macularius.
1889. Eigenmann, C. H. and Eigenmann, R. S. Fishes of Aetna Springs, Napa County, California. West Am. Scientist, VI, 1889, p. 149.: The authors of this paper describe as a new species, Phoxinus clevelandi which is identical with Leuciscus egregius (Cheonda egregia). The specimens were collected by D. Cleveland. Associated with this they report Siphateles bicolor as Leucus bicolor. The locality is probably erroneous.
- 1889a. Eigenmann, C. H. and Eigenmann, R. S. Fishes of Allen Springs, Lake County, California. West Am. Scientist, VI, 1889, p. 149.: This paper records three species, viz: Ptychocheilus oregonensis (Ptychocheilus grandis), Salmo irideus, and Uranidea semiscabra centropleura, new species (Cottus gulosus).
1890. Eigenmann, Carl H. and Eigenmann, Rosa S. Additions to the Fauna of San Diego. Proc. Calif. Acad. Sci., 2d ser., III, 1890, pp. 1–24.: This paper describes as new, Phoxinus (Tigoma) orcuttii (Tigoma orcutti), from Temecula River, California.
1890. Eigenmann, Carl H. The Food Fishes of California fresh waters. Biennial Rept. Calif. Fish Comm. 1888–1890, pp. 53–65.: Gives a bare list of 47 species of freshwater fishes of California known at the time, including anadromous forms, a number of them now included in the synonymy of other names. The Klamath Lakes species are included also. The species for which localities are given are shown in the table below.

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
55	<i>Acipenser transmontanus</i> (White Sturgeon)	<i>Acipenser transmontanus</i>	180	Entering all large streams from the Sacramento to the Fraser River
55	<i>Acipenser medirostris</i> (Green Sturgeon)	<i>Acipenser acutirostris</i>	183	(San Francisco) markets
56	<i>Catostomus areaopus</i> (Kern River Sucker)	<i>Catostomus occidentalis</i>	738	Kern River (by implication)
56	<i>Catostomus rex</i>	<i>Deltistes luxatus</i>	764	Tule Lake; ascends Lost River, Oregon
56	<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	Whole Sacramento Valley; Mare Island
56	<i>Catostomus tahoensis</i> (Tahoe Sucker; Redsided Sucker; Black Sucker)	<i>Catostomus tahoensis</i>	751	Truckee Basin; Rivers and rivulets tributary to lakes Tahoe and Donner in June
56	<i>Chasmistes brevirostris</i>	<i>Chasmistes brevirostris</i>	759	Klamath Lake
56	<i>Chasmistes luxatus</i>	<i>Deltistes luxatus</i>	764	Klamath Lake
57	<i>Orthodon microlepidotus</i>	<i>Orthodon microlepidotus</i>	794	Sacramento River
57	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	804	Sacramento River
57	<i>Pogonichthys macrolepidotus</i>	<i>Pogonichthys macrolepidotus</i>	829	No Locality; "one of the commonest of the minnows"
57	<i>Mylopharodon conocephalus</i>	<i>Mylopharodon conocephalus</i>	798	"San Francisco market, rare"
57	<i>Ptychocheilus oregonensis</i>	<i>Ptychocheilus grandis</i>	807	"Markets"
57	<i>Ptychocheilus harfordi</i>	<i>Ptychocheilus grandis</i>	807	"Markets"
58	<i>Coregonus williamsoni</i>	<i>Prosopium williamsoni</i>	420	Lake Tahoe
60	<i>Oncorhynchus gorboscha</i>	<i>Oncorhynchus gorboscha</i>	327	Sacramento River (only occasionally)
60	<i>Oncorhynchus kisutch</i> (Silver Salmon)	<i>Oncorhynchus kisutch</i>	329	Sacramento, in summer and fall
60	<i>Oncorhynchus keta</i> (Dog Salmon)	<i>Oncorhynchus keta</i>	328	"Said to be abundant in the fall, from Sacramento northward"
60	<i>Oncorhynchus tshawytscha</i> (Quinnat Salmon)	<i>Oncorhynchus tshawytscha</i>	331	Sacramento River. Young taken at Mare Island
61	<i>Salmo gairdneri irideus</i> (Brook Trout, Rainbow Trout)	<i>Salmo irideus</i> , in part; <i>Salmo shasta</i> , in part	357	All mountain streams west of the Sierra Nevada from Mount Shasta to Lower California
61	<i>Salmo gairdneri</i> (Steelhead)	<i>Salmo gairdneri</i>	358	From the Sacramento northward
63	<i>Salmo purpuratus</i> (Northern Trout)	<i>Salmo irideus?</i> (not mykiss)	357?	"From Mount Shasta northward." (Also from Sierra Madre, Mexico)
61-63	<i>Salmo purpuratus henshawi</i> (Lake Tahoe Trout)	<i>Salmo henshawi</i>	343	Lake Tahoe
64	<i>Salvelinus malma</i>	<i>Salvelinus malma spectabilis</i>	380	Northern California to Alaska
64	<i>Archoplites interruptus</i> (Sacramento Perch)	<i>Archoplites interruptus</i>	2345	Sacramento and San Joaquin Valleys
64	<i>Hysteroecarpus traski</i> (Viviparous Perch)	<i>Hysteroecarpus traski</i>	3252	Throughout the Sacramento Valley

1891. Eigenmann, C. H. and R. S. In Zoology [Notes]. Am. Nat., XXV, 1891, p. 1132.: Under the heading "Cottus beldingii," sp. nov., describes the species in question from Lake Tahoe, California, and records the following:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
1132	<i>Cottus beldingii</i>	<i>Cottus beldingi</i>	3004	Lake Tahoe
1132	<i>Phoxinus montanus</i>	<i>Cheonda egregia?</i>	812?	Lake Tahoe
1132	<i>Agosia oseula</i>	<i>Apocope carringtoni?</i>	1053?	Lake Tahoe
1132	<i>Algansea obesa</i>	<i>Siphateles obesus</i>	873	Lake Tahoe
1132	<i>Coregonus williamsoni</i>	<i>Prosopium williamsoni</i>	429	Lake Tahoe
1132	<i>Catostomus tahoensis</i>	<i>Catostomus tahoensis</i>	751	Lake Tahoe
1132	<i>Salmo mykiss henshawi</i>	<i>Salmo henshawi</i>	343	Lake Tahoe
1132	<i>Algansea olivacea</i>	<i>Siphateles olivaceus</i>	871	Donner Lake

TABLE

1892. Jordan, David Starr. A Description of the Golden Trout of the Kern River, California. Proc. U. S. Nat. Mus., XV, 1892, pp. 481–483.: In this paper Dr. Jordan described three small trout which he had received from Mr. W. H. Shockley of San Francisco to whom they had been sent by Mr. George T. Mills, State Fish Commissioner of Nevada, who had received them from Mr. A. C. Harvey of Lone Pine, Inyo County, California. The memorandum accompanying the specimens when they came into Dr. Jordan's hands, stated that they had been "taken by Mr. Harvey of Lone Pine, California, in a stream called by him 'Whitney Creek' (more correctly Volcano Creek), on the west side of the Sierras near Mount Whitney." Dr. Jordan regarded these specimens as representing a new and undescribed species which he named *Salmo mykiss aguanbonita*.

It has since been learned that these specimens did not come from Whitney (or Volcano) Creek, but from Cottonwood Creek, a stream on the east side of the Sierras, and tributary to Owens Lake. Cottonwood Creek originally had no trout. It was first successfully stocked in 1876 (probably in July) by S. V. Stevens, A. C. Stevens, and Thomas George, with about 12 trout caught by them in a little stream, tributary to the South Fork of the Kern, in Mulky Meadow, about three and a half or four miles distant from the Tom Williams bridge, where the fish were liberated in Cottonwood Creek. The trout of Cottonwood Creek are therefore derived by transplanting from the South Fork of the Kern and are identical with the species found in that river rather than with that found in Volcano Creek, which is now recognized as a distinct species.¹

1892. Eigenmann, C. H. and Ulrey, Albert B. A review of the Embiotocidæ. Bull. U. S. Fish Comm., XII, 1892, pp. 382–400.: This paper gives a complete synonymy of each species of the family and records *Hysterocarpus traski* from the Sacramento River.

1893. Gilbert, Charles H. Report on the Fishes of the Death Valley Expedition collected in southern California and Nevada in 1891, with Description of new Species. North American Fauna, no. 7, 1893 (May 31), pt. II, rpt. no. 3, pp. 229–234, pls. V–VI.: This paper records 13 species of fishes obtained by the Death Valley Expedition, two of them (*Ameiurus nebulosus* and *Cyprinus carpio*) being introduced species, and only six

¹ For a full discussion of this subject see Evermann, the Golden Trout of the Southern High Sierras, in Bull. U. S. Bureau Fisheries, XXV, 1905 (May 19, 1906), pp. 23–38.

Page	Plate	Species as recorded	Present identification	J. E. & C. check-list No.	Locality	Collector
229		<i>Ameiurus nebulosus</i>	<i>Ameiurus nebulosus</i>	1164	Lone Pine on Owens River, introduced	
229		<i>Catostomus araeopus</i>	<i>Catostomus occidentalis</i>	738	Reese River, Nevada	Vernon Bailey
229	V, fig. 1	<i>Rhinichthys (Apocope) velifer</i>	<i>Apocope velifera</i>	1060	Hot Spring, Pahrana-gat Valley, Nevada	C. Hart Merriam and Vernon Bailey
230	VI, fig. 1	<i>Rhinichthys (Apocope) nevadensis</i>	<i>Apocope nevadensis</i>	1059	Warm Springs at Ash Meadow, Indian Creek and Vegas Creek, Nevada	
231		<i>Rutilus symmetricus</i>	<i>Hesperoleucus symmetricus</i>	863	Owens Lake	
231		<i>Lepidomeda vittata</i>	<i>Lepidomeda vittata</i>	1102	Pahrana-gat Valley, Nevada	
231		<i>Cyprinus carpio</i>	<i>Cyprinus carpio</i>		Owens River and Lake, Three Rivers, introduced	
231		<i>Salmo irideus</i>	<i>Salmo whitei</i> ?	365	Canon of Kings River	Dr. A. K. Fisher
232		<i>Salmo mykiss aqua-bonita</i>	<i>Salmo aqua-bonita</i>	364	Whitney Creek, South Fork of Kern River; Cottonwood Creek, introduced	
232		<i>Cyprinodon macularius</i>	<i>Cyprinodon macularius</i>	1396	Medbury Spring, Amargosa Desert, Nev., Saratoga Springs, Death Valley and Amargosa Creek.	(May 25, 1891) C. Hart Merriam and Vernon Bailey
233		<i>Cyprinodon macularius baileyi</i>	<i>Cyprinodon baileyi</i>	1398	Pahrana-gat Valley, Nevada	
234		<i>Empetrichthys merriami</i>	<i>Empetrichthys merriami</i>	1399	Ash Meadows, Amargosa Desert, on boundary between Cal. and Nev.; Ash Meadows and Pahrump Valley, Nev.	
234		<i>Gasterosteus williamsoni</i>	<i>Gasterosteus aculeatus</i>	1852	San Bernardino	Dr. A. K. Fisher and Miss Rosa Smith

1894. Jordan, David Starr. Description of a new subspecies of Trout from McCloud River, California. Proc. Acad. Nat. Sci. Phila., XLVI, 1894 (Jan. 30), p. 60.: A description of *Salmo gairdneri stonei* (*Salmo stonei*) allied to *S. irideus*, from McCloud River at Baird, California, known to the Indians as No-shee or Nissue.
- 1894a. Jordan, David Starr. Salmon and Trout of the Pacific Coast. Thirteenth Biennial Report, State Board of Fish Com. of Calif. for 1893, pp. 125-142, 8 figs.: In this paper Dr. Jordan discusses the salmon family as a whole, and gives localities only incidentally as follows: *Oncorhynchus tshawytscha*, Sacramento River; *O. kisutch* "sometimes taken in California" *O. keta*, "not often taken in California;" *Salmo irideus*; "every brook from the Mexican line northward to Mount Shasta;" *S. gairdneri shasta* (*S. shasta*), "the common trout of the upper Sacramento;" *S. gairdneri stonei* (*S. stonei*), McCloud and other tributaries of the upper Sacramento; *S. gairdneri gilberti* (*S. gilberti*), Kern River; *S. gairdneri aguabonita* (*S. agua-bonita*), upper tributaries of Kern River; *S. gairdneri* "common in the Sacramento, Klamath and Eel rivers and streams about Monterey;" *S. mykiss* (*S. henshawi*), Lake Tahoe and Feather River; *Salvelinus malma* (*Salvelinus malma spectabilis*) Upper Sacramento.
- 1894b. Jordan, David Starr. Descriptions of New Varieties of Trout. Thirteenth Biennial Report, State Board of Fish Com. of Calif. for 1893, pp. 142, 143, 3 figs.: Really a continuation and inseparable part of the preceding paper, but separated by a distinct title. Subspecies of which the distribution is given in that paper are described as new varieties here. These are the no-shee trout, called on p. 137 of the preceding article *Salmo gairdneri stonei*, here called *Salmo irideus stonei*, the *Salmo stonei* No. 360 of the Check-list, and there said to be perhaps a variant of *Salmo shasta*; the McCloud River trout or Shasta trout, *Salma gairdneri shasta* (*S. shasta*), and the Kern River trout, *Salmo gairdneri gilberti* (*S. gilberti*).
- 1894c. Jordan, David Starr. Notes on the Freshwater Fishes of San Luis Obispo County, California. Bull. U. S. Fish Comm., XIV, 1894, pp. 141-142.: On account of its isolated position very few species of fishes (only one freshwater species) have entered the streams of this county. In no other stream of the United States in which an equal amount of water flows, has so short a list been recorded. Three creeks, San Luis Creek, Corral de Piedra Creek and Arroyo Grande, are studied and described.

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
141 & 142	<i>Agosia nubila</i>	<i>Apocope carringtoni</i>	1053	San Luis Creek
141 & 142	<i>Cottus gulosus</i>	<i>Cottus gulosus</i>	2996	San Luis Creek
141 & 142	<i>Eucyclogobius newberryi</i>	<i>Eucyclogobius newberryi</i>	3573	San Luis Creek
141 & 142	<i>Gasterosteus microcephalus</i>	<i>Gasterosteus aculeatus</i>	1852	San Luis Creek
142	<i>Salmo mykiss gairdneri</i>	<i>Salmo gairdneri</i>	358	Lopez Creek
142	<i>Salmo mykiss irideus</i>	<i>Salmo irideus</i>	357	Lopez Creek
142	<i>Oncorhynchus tshawytscha</i>	<i>Oncorhynchus tshawytscha</i>	331	Lopez Creek

TABLE

1894. Jordan, David Starr and Gilbert, Chas. H. List of the fishes inhabiting Clear Lake, California. Bull. U. S. Fish Comm., XIV, 1894, pp. 139–140.: Specimens of the fishes described here were collected by the authors, and by Mr. Sanford Parrish, of Lakeport. The list is as follows:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
139	<i>Entosphenus tridentatus</i>	<i>Entosphenus tridentatus</i>	16	Clear Lake
139	<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	Clear Lake
139	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	804	Clear Lake
139	<i>Orthodon microlepidotus</i>	<i>Orthodon microlepidotus</i>	794	Clear Lake
139	<i>Leucisus crassicauda</i>	<i>Siboma crassicauda</i>	855	Clear Lake
139	<i>Ptychocheilus oregonensis</i>	<i>Ptychocheilus grandis</i>	807	Clear Lake and Kelsey Creek
139	<i>Pogonichthys macrolepidotus</i>	<i>Pogonichthys macrolepidotus</i>	829	Clear Lake
139	<i>Salmo mykiss irideus</i>	<i>Salmo irideus</i>	357	Clear Lake
140	<i>Gasterosteus microcephalus</i>	<i>Gasterosteus aculeatus</i>	1852	Clear Lake
140	<i>Archoplites interruptus</i>	<i>Archoplites interruptus</i>	2315	Clear Lake
140	<i>Cottus gulosus</i>	<i>Cottus gulosus</i>	2996	Clear Lake
140	<i>Hysteroecarpus traski</i>	<i>Hysteroecarpus traski</i>	3252	Clear Lake
140	<i>Cyprinus carpio</i>	<i>Cyprinus carpio</i>		Clear L., introduced
140	<i>Ameiurus nebulosus</i>	<i>Ameiurus nebulosus</i>	1164	Clear L., introduced
140	<i>Ameiurus catus</i>	<i>Hastor catus</i>	1156	Clear L., introduced
140	<i>Micropterus dolomieu</i>	<i>Micropterus dolomieu</i>	2315	Clear L., introduced

TABLE

1896. Jordan, David Starr. Notes on fishes, little known or new to Science. Proc. Calif. Acad. Sci., 2d ser., VI, 1896, pp. 201–244.: In this paper Dr. Jordan records but one species from California fresh waters: *Cottus shasta* Jordan & Starks, a new species from McCloud River at Baird, Shasta County.

1896–1900. Jordan, David Starr, and Evermann, Barton Warren. The Fishes of North and Middle America : A Descriptive Catalogue of the Species of Fish-like Vertebrates found in the waters of North America north of the Isthmus of Panama. U. S. Nat. Mus., Bull. 47; Part I, pp. I to LX+1 to 1240, Branchiostomidae to Lobotidae; published Oct. 3, 1896; Part II, pp. I to XXX+1241 to 2183; Lutianidae to Cephalacanthidae; published Oct. 3, 1898; Part III, pp. I to XXIV+2183a to 3136; Callionymidae to Ogocephalidae and Addenda, published Nov. 26, 1898; Part IV, pp. I to CI+3137 to 3313, pls. I to CCCXCII; published June, 1900.: * * * * *

In this monumental work only a few freshwater species were recorded from definite California localities. They are listed in the following table:

Part	Page	Serial No. of species	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
I	12	11	<i>Entosphenus tridentatus</i>	<i>Entosphenus tridentatus</i>	16	Santa Ana River, Riverside
I	178	286	<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	Sacramento and San Joaquin rivers
I	207	330	<i>Orthodon microlepidotus</i>	<i>Orthodon microlepidotus</i>	794	Sacramento and San Joaquin rivers
I	209	333	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	804	Clear Lake
I	219	351	<i>Mylopharodon conocephalus</i>	<i>Mylopharodon conocephalus</i>	798	Sacramento and San Joaquin rivers
I	223	356	<i>Pogonichthys macrolepidotus</i>	<i>Pogonichthys macrolepidotus</i>	829	Sacramento and San Joaquin rivers
I	224	357	<i>Ptychocheilus oregonensis</i>	<i>Ptychocheilus grandis</i>	806	Sacramento, San Joaquin and Salinas rivers
I	225	358	<i>Ptychocheilus harfordi</i>	<i>Ptychocheilus grandis</i>	807	Lower Sacramento River
I	231	363	<i>Leuciscus crassicauda</i>	<i>Siboma crassicauda</i>	855	Sacramento and San Joaquin rivers
I	231	364	<i>Leuciscus conformis</i>	<i>Siboma conformis</i>	856	Poso Creek, Tulare County
I	237	374	<i>Leuciscus egregius</i>	<i>Cheonda egregia</i>	842	Lake Tahoe and Truckee River
I	241	381	<i>Leuciscus oreutti</i>	<i>Tigoma oreutti</i>	854	Rio San Luis Rey, Rio San Jacinto, and Santa Ana rivers
I	245	387	<i>Rutilus symmetricus</i>	<i>Hesperoleucus symmetricus</i>	863	Tres Pinos Creek; San Joaquin and Merced rivers; Kern Lake and Salinas River
I	247	389	<i>Luxilus occidentalis</i>	<i>Lavinia exilicauda</i>	804	San Joaquin Valley
I	318	526	<i>Hybopsis cumingii</i>	<i>Oregonichthys cumingii</i>	1032	"California"
I	478	773	<i>Oncorhynchus gorbusha</i>	<i>Oncorhynchus gorbusha</i>	327	Sacramento, occasionally
I	478	774	<i>Oncorhynchus keta</i>	<i>Oncorhynchus keta</i>	328	San Francisco (to Kamchatka)
I	479	775	<i>Oncorhynchus tshawytscha</i>	<i>Oncorhynchus tshawytscha</i>	331	Sacramento and Ventura rivers
I	480	776	<i>Oncorhynchus kisutch</i>	<i>Oncorhynchus kisutch</i>	329	San Francisco, northward to Kamchatka and Japan
I	493	779a	<i>Salmo mykiss henshawi</i>	<i>Salmo henshawi</i>	343	Tahoe, Donner and Independence lakes; Truckee and Feather rivers
I	500	787	<i>Salmo irideus</i>	<i>Salmo gairdneri</i>	357	Klamath and San Luis Rey rivers; Purisima Creek
I	502	781b	<i>Salmo irideus shasta</i>	<i>Salmo shasta</i>	359	McCloud River
I	502	781c	<i>Salmo irideus gilberti</i>	<i>Salmo gilberti</i>	362	South Fork of Kern River at Soda Springs below the falls
I	503	781d	<i>Salmo irideus stonei</i>	<i>Salmo stonei</i>	369	McCloud River, 8 miles above Baird
I	503	781e	<i>Salmo irideus agua-bonita</i>	<i>Salmo agua-bonita</i>	364	South Fork of Kern River; streams about Owens Lake; Volcano Creek (by error)
I	507	784	<i>Salvelinus malma</i>	<i>Salvelinus malma spectabilis</i>	380	Upper Sacramento River
I	667	980	<i>Empetrichthys merriami</i>	<i>Empetrichthys merriami</i>	1399	Amargosa Desert
I	674	988	<i>Cyprinodon macularius</i>	<i>Cyprinodon macularius</i>	1396	Springs in San Diego County; Saratoga Springs, Inyo County
I	750	1101	<i>Gasterosteus williamsoni</i>	<i>Gasterosteus aculeatus</i>	1852	Santa Ana River at Colton; Williamson's Pass, San Bernardino
I	751	1101a	<i>Gasterosteus williamsoni microcephalus</i>	<i>Gasterosteus aculeatus</i>	1852	Four Creek (Kaweah River); San Gregorio Creek, Pilarcitos Creek, etc.
I	991	1386	<i>Archoplites interruptus</i>	<i>Archoplites interruptus</i>	2345	Sacramento and San Joaquin rivers and tributary lakes
II	1496	1879	<i>Hysteroecarpus traski</i>	<i>Hysteroecarpus traski</i>	3252	Rivers of Central California
II	1944	2315	<i>Cottus gulosus</i>	<i>Cottus gulosus</i>	2996	Streams of the Coast Range in California, south to Point Conception; San Francisco Creek
II	1947	2318	<i>Cottus shasta</i>	<i>Cottus shasta</i>	3000	McCloud River at Baird
II	1958	2330	<i>Cottus beldingii</i>	<i>Cottus beldingii</i>	3004	Lake Tahoe; Donner Lake
III	2248	2580	<i>Eucyclogobius newberryi</i>	<i>Eucyclogobius newberryi</i>	3573	Streams of California; small clear brooks near the sea; San Luis Obispo Creek
III	2870	780d	<i>Salmo clarkii tahoensis</i>	<i>Salmo tahoensis</i>	344	Lake Tahoe

1903. Rutter, Cloudsley. Notes on Fishes from Streams and Lakes of Northeastern California not tributary to the Sacramento Basin. Bull. U. S. Fish Comm., XXII, for 1902 (March 31, 1903), pp. 143-148, with 2 text figs.: This short paper was based upon collections made in Grasshopper, Eagle and Honey lake basins in 1898, by Cloudsley Rutter and Fred M. Chamberlain, and in the Truckee River basin in 1899, by Rutter and W. S. Atkinson.

Grasshopper Lake was described by Rutter as an alkaline pond without outlet, at the southern end of Grasshopper plains in Lassen County, and containing no fish. One species of minnow was found to be abundant in a spring emptying into the pond.

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
146	<i>Pantosteus lahontan</i>	<i>Pantosteus lahontan</i>	735	Susan River, Little Truckee River and Prosser Creek
147	<i>Catostomus tahoensis</i>	<i>Catostomus tahoensis</i>	751	Willow Creek, Susan River, Little Truckee River and Prosser Creek
147	<i>Chasmistes chamberlaini</i>	<i>Catostomus tahoensis</i>	751	Eagle Lake (type locality)
147	<i>Leuciscus egregius</i>	<i>Chonoma egregia</i>	812	Willow Creek and Susan River
147	<i>Rutilus olivaceus</i>	<i>Siphateles olivaceus</i>	871	Eagle Lake and Willow Creek
148	<i>Agosia robusta</i>	<i>Apocoepe robusta</i>	1052	Prosser Creek (type locality), Spring Creek, Willow Creek, Susan and Little Truckee rivers
148	<i>Coregonus williamsoni</i>	<i>Prosopium williamsoni</i>	420	Truckee River—Probably this reported from Bigler (Tahoe) and Donner lakes
148	<i>Salmo henshawi</i>	<i>Salmo henshawi</i>	343	Little Truckee River, Sage Hen Creek and Prosser Creek
148	<i>Salmo irideus</i>	(Misidentification; should have been <i>S. anachanisi</i>)	343	Susan River and Prosser Creek. "Introduced into Truckee Basin; possibly Honey Lake Basin"
148	<i>Salvelinus fontinalis</i>	<i>Salvelinus fontinalis</i>	371	Prosser Creek; introduced
148	<i>Cottus beldingii</i>	<i>Cottus beldingii</i>	3091	Susan River, Little Truckee River, Sage Hen Creek and Prosser Creek

TABLE

Eagle Lake also is without outlet. Only two species of fishes were obtained from it.

Honey Lake also has no outlet, but has two tributary streams—Willow Creek which was fished about 15 miles north of Susanville, where it passes through an extensive meadow, and Susan River which was examined in its lower course. Four species were found in this basin.

In the Truckee Basin the following waters were examined: Little Truckee River which drains Webber and Independence lakes and which was fished a short distance below Independence Lake; Sage Hen Creek, a small tributary of the Little Truckee; and Prosser Creek, a tributary of the Truckee River, was fished near Prosser Bar. Eight species were recorded from these waters.

1905. Snyder, John Otterbein. Notes on the Fishes of the streams flowing into San Francisco Bay. Report, U. S. Bur. Fish. for 1904 (July 14, 1905), 327-338, with 1 map.:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
331	<i>Entosphenus tridentatus</i>	<i>Entosphenus tridentatus</i>	16	Coyote Creek
331	<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	San Francisco, Madera, San Antonio, Stevens, Campbell, Guadalupe, Coyote, Alameda, Arroyo Honda, Smith and Isabel creeks; disappears at time of drought and returns
331	<i>Orthodon microlepidotus</i>	<i>Orthodon microlepidotus</i>	794	Coyote Creek
331	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	894	Coyote and Alameda creeks
331	<i>Pogonichthys macrolepidotus</i>	<i>Pogonichthys macrolepidotus</i>	829	Coyote Creek
331	<i>Psychocheilus grandis</i>	<i>Psychocheilus grandis</i>	807	San Francisco, Coyote and Alameda creeks
332	<i>Leuciscus crassicauda</i>	<i>Siloma crassicauda</i>	855	Coyote Creek
332	<i>Rutilus symmetricus</i>	<i>Hesperoleucus symmetricus</i>	863	San Francisco, Madera, San Antonio, Campbell, Guadalupe, Coyote, Alameda, Arroyo Honda and Isabel creeks. Not in Stevens Creek; maintains itself in Madera Creek during periods of drought when nothing remains of the stream but a few small disconnected pools

TABLE

1906. Evermann, Barton Warren. The Golden Trout of the Southern High Sierras. Bull. U. S. Bur. Fish., XXV, 1905 (May 19, 1906), pp. 1-51, pls. I-XVII, 1 map, 39 text figs.: This paper is a report on an expedition, led by the author, into the Mount Whitney region of the Southern High Sierras in 1904, for the purpose of studying the fishes found there, particularly the Golden Trout of Volcano Creek. The investigation was ordered by President Roosevelt at the suggestion of Stewart Edward White.

The species recorded are as follows: (see table on p. 30).

1907. Juday, Chancey. Notes on Lake Tahoe, its Trout and Trout-fishing. Bull. U. S. Bur. Fish., XXVI, 1906 (May 11, 1907), Doc. no. 615, pp. 133-146.: Mentions only *Salmo henshawi* and *Salmo tahoensis* as native species and *Cristivomer namaycush* as an introduced species.

1907. Holway, Ruliff S. Physiographic Changes bearing on the Faunal Relationships of the Russian and Sacramento rivers, California. Science, N.S., XXVI, no. 664, Sept. 20, 1907, pp. 382-383.: Two connections between headwaters of Sacramento and Russian rivers are pointed out; the most important one was the shifting of Scott's Creek, by means of a prehistoric landslide from the Russian River drainage into the Sacramento *via*

Page	Plate	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
16		<i>Pantosteus anaeopus</i>	<i>Catostomus occidentalis</i>	738	South Fork of Kern River
16		<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	Middle Fork Kaweah near Three Rivers; North Fork Kaweah at Redstone Park, Kern Lake and Kern River
16		<i>Mylopharodon conocephalus</i>	<i>Mylopharodon conocephalus</i>	793	North, Middle and South forks of Kaweah; Three Rivers
17		<i>Psychocheilus oregonensis</i>	<i>Psychocheilus grandis</i>	807	North Fork of Kaweah at Redstone Park, and Middle and South forks at Three Rivers
17		<i>Rutilus symmetricus</i>	<i>Hesperoleucus symmetricus</i>	863	South Fork of Kaweah River above Three Rivers
18	XV	<i>Salmo gilberti</i>	<i>Salmo gilberti</i>	362	Kern Lake and Kern River above the lake
20	XVI	<i>Salmo whitei</i>	<i>Salmo whitei</i>	365	Coyote Creek; South Fork of Kaweah River at South Fork Meadows; Soda Creek at Quins Horse Camp; Little Kern River at Wet Meadow Creek
23		<i>Salmo agua-bonita</i>	<i>Salmo agua-bonita</i>	3	South Fork of Kern River
26	I	<i>Salmo roosevelti</i>	<i>Salmo roosevelti</i>	366	Volcano Creek

TABLE

Clear Lake. This is regarded as the most important change and would make possible a transfer of Russian River species into the Sacramento. Snyder (1908) argues, however, that the transfer was in the other direction.

The second connection is that of Copeland Creek, which debouches over a fan spreading over the flat divide separating Russian River from the Bay, so that Copeland Creek in time of flood discharges both ways. This is regarded as unimportant, but since the common fishes are the up-stream species it would probably be the most important connection.

There is no mention of common species, or even any species of fish in the paper; the simple statement is that the faunas are similar, or have similar elements.

1907. Jordan, David Starr. The Trout and Salmon of the Pacific Coast. Rept. State Board Fish Comm. Cal., 1905–1906, pp. 77–92, with 11 text-figs.: This paper is a popular account of the Trout and Salmon of the Pacific Coast of America. It is not based upon any particular piece of fieldwork or collection of specimens; however, of the 15 species mentioned, six are associated with California waters as follows:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
78	<i>Salmo clarkii</i>	<i>Salmo clarki</i>	338	Eel River
79	<i>Salmo henshawi</i>	<i>Salmo henshawi</i>	343	Lake Tahoe, Truckee River, Donner, Webber and Independence lakes (introduced into: Feather, Stanislaus and Mokelumne rivers)
80	<i>Salmo tahoenis</i>	<i>Salmo tahoenis</i>	344	Lake Tahoe
81	<i>Salmo rivularis</i>	<i>Salmo irideus</i> (Steedhead).....	337	Sacramento River
83	<i>Salmo irideus</i>	<i>Salmo irideus</i>	357	San Leandro Creek near Alameda, San Francisquito Creek and San Luis Rey River
85	<i>Salmo gilberti</i>	<i>Salmo gilberti</i>	362	Kern, Kings and Merced rivers and Kern Lake
87	<i>Salvelinus malma</i>	<i>Salvelinus malma spectabilis</i>	380	Upper Soda Springs on Sacramento River

TABLE

1908. Jordan, David Starr, and Grinnell, Joseph. Description of a new species of trout (*Salmo evermanni*) from the upper Santa Ana River, Mount San Gregorio, southern California. Proc. Biol. Soc. Wash., 1908 (January 23), XXI, pp. 31–32, pl. 1.: In this paper *Salmo evermanni*, new species, is described and recorded from the headwaters of the South Fork of the Santa Ana River, at 8200 feet altitude, four miles northwest of San Geronio Peak, the highest mountain in southern California.

1908. Snyder, J. O. The Fauna of Russian River, California, and its Relation to that of the Sacramento. Science, N.S., Vol. XXVII, no. 685, pp. 269–271, 1 map, Feb. 14, 1908.: This article follows, and is a commentary upon, an earlier paper in *Science* by Ruliff S. Holway on certain "Physiographic changes bearing on the Faunal Relationships of the Russian and Sacramento rivers, California.

A list of the indigenous fishes of Russian River is given, as shown in the following table:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
269	<i>Entosphenus tridentatus</i>	<i>Entosphenus tridentatus</i>	16	Russian River
269	<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	Russian River
269	<i>Mylopharodon conocephalus</i>	<i>Mylopharodon conocephalus</i>	798	Russian River
269	<i>Ptychocheilus grandis</i>	<i>Ptychocheilus grandis</i>	807	Russian River
269	<i>Rutilus symmetricus</i>	<i>Hesperoleucus symmetricus</i>	863	Russian River
269	<i>Oncorhynchus tshawytscha</i>	<i>Oncorhynchus tshawytscha</i>	331	Russian River
269	<i>Salmo irideus</i>	<i>Salmo irideus</i>	357	Russian River
269	<i>Gasterosteus cataphractus</i>	<i>Gasterosteus aculeatus</i>	1852	Russian River
269	<i>Cottus asper</i>	<i>Cottus asper</i>	2997	Russian River
269	<i>Cottus gulosus</i>	<i>Cottus gulosus</i>	2996	Russian River
269	<i>Cottus aleuticus</i>	<i>Cottus aleuticus</i>	3016	Russian River
269	<i>Hysteroecarpus traski</i>	<i>Hysteroecarpus traski</i>	3252	Russian River

TABLE

of these, *E. tridentatus*, *O. tshawytscha* and *S. irideus* are anadromous forms, while *G. cataphractus*, *C. asper*, *C. gulosus* and *C. aleuticus* are able to withstand salt water. The others are strictly fluvial and are also found in the Sacramento; but the two river systems are completely isolated from each other, though the headwaters of their small tributaries rise in close proximity in the high mountains which divide their basins.

It is in this mountainous divide that Holway found evidence of a transfer of a part of a tributary from the Russian River to the Sacramento, and he assumes that the Sacramento derived its fish fauna from the Russian River.

This, however, seems highly improbable, since the Sacramento, a vastly larger and presumably older system, contains not only all the fluvial species known from the Russian River, but others not there represented.

Indications of a former connection between the two systems, necessary to explain the common members of their fauna, is furnished by Andrew C. Lawson, who in 1894 made a statement to the effect that at one time the Russian River, instead of turning abruptly westward to the ocean, continued its southward course through an uninterrupted valley to the region now occupied by San Pablo Bay.

However, there is among the Sacramento fishes, a considerable number of species not known to Russian River, of which the following may be mentioned:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
270	<i>Orthodon microlepidotus</i>	<i>Orthodon microlepidotus</i>	794	Lower Sacramento
270	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	804	Lower Sacramento
270	<i>Pogonichthys macrolepidotus</i>	<i>Pogonichthys macrolepidotus</i>	829	Lower Sacramento
270	<i>Leuciscus crassicauda</i>	<i>Siboma crassicauda</i>	855	Lower Sacramento

TABLE

The fact that these lower stream species are absent from the Russian River indicates that the transfer was by stream-robbing of the upper tributaries, like that described by Holway, but that it was in the opposite direction from which he supposed it to be, that is, from the Sacramento to Russian River.

1908. Rutter, Cloudsley. The Fishes of the Sacramento-San Joaquin Basin, with a Study of their Distribution and Variation. Bull. U. S. Bur. Fish., XXVII, 1907 (Sept. 28, 1908), pp. 103–152, pl. VI, text figs. 1–4.: The primary object of this investigation was to determine the distribution of the various species of fishes found in the Sacramento-San Joaquin Basin. The geography of the basin is discussed, and a synopsis of the streams is given with locations where collections were made, with descriptive notes concerning the character of the streams. In the biographical review a full bibliography giving all known records for the basin, including the list of species as reported and the identification accepted at the time of the publication under discussion. There is a key to the species, 36 in number. This is followed by an annotated list of the species, which includes descriptions and notes on range and variation. There is a topographical map showing the distribution of the Catostomidæ in the region under discussion. There is also a summary of the most noteworthy variations.

The following is the list of species noted:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
119	<i>Entosphenus tridentatus</i>	<i>Entosphenus tridentatus</i>	16	Goose Lake; Sullaway Creek at Sisson; and Stanislaus River at Parrot Ferry. Also reported (as <i>Lampetra cibaria</i>) from mouth of Feather River
120	<i>Pantosteus lahontan</i>	<i>Pantosteus lahontan</i>	735	Headwaters of North Fork of Feather River; Warner Creek at Johnson's; and North Fork of Feather River at Big Meadows
120	<i>Catostomus microps</i>	<i>Catostomus microps</i>	741	Rush Creek near Adin, Modoc County
121	<i>Catostomus tahoensis</i>	<i>Catostomus tahoensis</i>	751	Warner Creek at Johnson's Ranch; North Fork Feather River at Beckwith; Duck Lake; Miller Creek at Miller Pass
122	<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	Goose Lake, North Fork of Pit River at mouth of Joseph Creek and near Alturas; South Fork of Pit River at South Fork Post Office, Pit River at Canby, Ash Creek at Adin, McCloud River at Baird, Sacramento River at Chico; Jacinto; Wilson's Farm, twenty miles below Grimes, and at Knights Landing; and Sacramento River at Redding; Clear Creek at Redding; Battle Creek at U. S. Hatchery; Sacramento River at Red Bluff; Thomas Creek at Tehama; Deer Creek at Vina; Feather River at Oroville; Indian Creek at Crescent Mills; Wolf Creek at Greenville; Clover Creek at Genesee; Squaw Queen Creek at Genesee; Middle Fork Feather River (Lahontan Basin) at Beckwith; and the same stream at Nelson Point; North Fork Yuba River at Bullards Bar; Rubicon River at Gerle (Lahontan Basin); South Fork American River at Placerville; Silver Creek near Orelli (Lahontan Basin); North Fork Cosumnes River; Pleasant Valley; Stanislaus River at Parrot Ferry; Tuolumne River at Bakers Ford; South Fork Tuolumne River near mouth; Merced River at Benton Mill and Livingston; Mariposa Creek at Mariposa; Chowchilla River and Fresno River at Raymond; San Joaquin River at Pollasky; Kings River at Centerville; Kaweah River at St. John Channel at Lemoncove; Tule River at Porterville, and Kern River at Bakersfield
125	<i>Orthodon microlepidotus</i>	<i>Orthodon microlepidotus</i>	794	Sacramento River at Butte City, and Colusa; Arcade Creek at Arcade; Sacramento River at Ryde, and Rio Vista; Suisun Bay at Black Diamond; China Slough and Kings River at Centerville
125	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	804	Battle Creek at U. S. Fish Hatchery; Sacramento River at Red Bluff, Chico Bridge, Jacinto, Wilson's Farm, twenty miles below Grimes; mouth of Feather River; Sacramento; Rio Vista, and Collinsville; Feather River at Marysville and Oroville; Antelope Creek at Grass Valley; American River at Folsom; Suisun Bay at Black Diamond; San Joaquin River at Antioch and Pollasky; Stanislaus River at Parrot Ferry; Merced River at Livingstone; Fresno River at Raymond; China Slough at Centerville; Kings River at Centerville; Kaweah River at St. John's Channel; and Tule River at Porterville
128	<i>Mylopharodon conocephalus</i>	<i>Mylopharodon conocephalus</i>	798	North Fork of Pit River at Alturas; Pit River at Canby, Bieber, and Pittville; Ash Creek at Adin; Sacramento River at Redding; at mouth of Clear Creek, at Red Bluff, six miles below Red Bluff; at Tehama, at Chico, at Jacinto, at Grimes, twenty miles below Grimes, at mouth of

			Feather River, at Sacramento; and at Collinsville; Battle Creek at U. S. Fish Hatchery; Thomas Creek at Tehama; Feather River at Oroville; Indian Creek at Crescent Mills; Squaw Queen Creek at Genesee; American River at Folsom; South Fork of American River at Placerville; Tuolumne River at Wards Ferry; South Fork of Tuolumne River near its mouth; Merced River at Livingston and Benton Mill; Fresno River at Raymond; San Joaquin River at Pollasky; China Slough and Kings River at Centerville; Kaweah River at St. John's Channel; Tule River at Porterville; and Kern River at Bakersfield
130	<i>Pogonichthys macrolepidotus</i>	<i>Pogonichthys macrolepidotus</i>	829 Sacramento River at Redding, Red Bluff, six miles below Red Bluff, Telama, Chico Bridge, Jacinto, Grimes, Wilson's Farm, twenty miles below Grimes, Knights Landing, mouth of Feather River, Sacramento, Ryde, Rio Vista, and Collinsville; Battle Creek at U. S. Fish Hatchery; Feather River at Oroville; American River at Folsom; Carquinez Straits at Benicia; Suisun Bay at Black Diamond; San Joaquin River at Antioch and Pollasky; and Merced River at Livingston
131	<i>Ptychocheilus grandis</i>	<i>Ptychocheilus grandis</i>	807 Joseph Creek; North Fork of Pit River at Alturas; Pit River at Canby, Bieber, and Pittville; Ash Creek at Adin; Fall River at Fall River Mills; Sacramento River at Redding, Red Bluff, six miles below Red Bluff, Tehama, Vina, Chico Bridge, Jacinto, Grimes, Knights Landing, mouth of Feather River, Sacramento, Walnut Grove, and Rio Vista; Clear Creek at mouth; Battle Creek at U. S. Fish Hatchery; Thomas Creek at mouth; Feather River at Marysville and Oroville; Indian Creek at Crescent Mills; Wolf Creek at Greenville; Squaw Queen Creek at Genesee; North Fork of Yuba River at Bullards Bar; American River at Placerville; Carquinez Straits at Benicia; San Joaquin River at Antioch and Pollasky; Tuolumne River at Modesto; South Fork of Tuolumne River at mouth; Stanislaus River at Parrot Ferry; Merced River at Livingston and Benton Mill; Chowchilla River at Raymond; Fresno River at Raymond; China Slough and Kings River at Centerville; Kaweah River at St. John's Channel; Tule River at Porterville; and Kern River at Bakersfield
134	<i>Leuciscus crassicauda</i>	<i>Siboma crassicauda</i>	855 Mouth of Feather River; Kaweah River at St. John's Channel
134	<i>Leuciscus conformis</i>	<i>Siboma conformis</i>	856 Sacramento River twenty miles below Grimes and Kaweah River at St. John's Channel
135	<i>Leuciscus egregius</i>	<i>Cheonda egregia</i>	842 Warner Creek at Johnson's Ranch
135	<i>Rutilus bicolor</i>	<i>Siphateles bicolor</i>	873 Goose Lake, Calif.; South Fork of Pit River at South Fork Post Office; Pit River at Canby and Pittville; Ash Creek at Adin, Fall River at Dana; Hat Creek at Cassel; and Wolf Creek at Greenville, Indian Valley
137	<i>Ruttilus symmetricus</i>	<i>Hesperoleucus symmetricus</i>	863 North Fork of Pit River at mouth of Joseph Creek and near Alturas; Sacramento River at Redding; Clear Creek at mouth, Battle Creek at U. S. Fish Hatchery; Thomas Creek at mouth; North Fork of Cosumnes River at Pleasant Valley; Tuolumne River at Bakers Ford; South Fork of Tuolumne River near mouth; Stanislaus River at Parrot Ferry; North Fork of Merced River at Bower Cave; Merced River at Benton Mill and Livingston; Mariposa Creek at Mariposa; Chowchilla River at Raymond; San Joaquin River at Pollasky and Fort Miller; Kings River at Centerville; Kaweah River at St. John's Channel; and Tule River at Porterville

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
139	<i>Agosia robusta</i>	<i>Apocope robusta</i>	1052	Goose Lake, Calif.; Davis Creek at Davis Creek Post Office; Joseph Creek; North Fork of Pit River at Alturas; South Fork of Pit River at South Fork Post Office; Pit River at Canby; Ash Creek at Adin; Fall River at Dana and Fall River Mills; Burney Creek at Burneyville; Sacramento River at Sims; Battle Creek at U. S. Fish Hatchery; Feather River at Oroville; Warner Creek at Johnson's; Duck Lake; North Fork of Feather River at Big Meadows; Spanish Creek at Quincy; Wolf Creek at Greenville; Clover Creek at Clover Valley; Middle Fork of Feather River at Beekwith; American River at Placerville; and Kings River at Centerville
139	<i>Salmo irideus</i>	<i>Salmo shasta?</i>	357	Gumboot Lake and other lakes in same vicinity; Sacramento River at Sisson, Sims, Jacinto, and Princeton; Sullaway Creek at Sisson, McCloud River at Bartle, Big Bend, and Lower Falls; Goose Lake, Calif.; Davis Creek at Davis Creek Post Office; North Fork of Pit River near source and near Alturas; South Fork of Pit River at South Fork Post Office; Rush Creek near Adin; Hat Creek at Cassel; Fall River at Dana and Fall River Mills; Bear Creek near Bartle; Burney Creek at Burneyville; Battle Creek at Battle Creek Meadows, Long's Ranch, and U. S. Fish Hatchery; Mill Creek at Morgan Springs; North Fork of Feather River near source; Warner Creek at Johnson's; Duck Lake at Big Meadows; Spanish Creek at Quincy; Wolf Creek at Greenville and Clover Creek at Genesee Valley and Clover Valley; Middle Fork of Feather River at Nelson Point; Gold Lake; Cole Creek at Sierraville; Three Salmon Lakes near Sierra City; Bassett Creek at Bassett Hotel; Rattlesnake Creek near Grass Valley; Rubicon River at Gele; Big Silver Creek at Orelli; Little Silver Creek at Jones Ranch; North Fork of Cosumnes River at Pleasant Valley; Middle Fork of Mokelumne River at West Point; Licking Creek at Railroad Flat; South Fork of Mokelumne River; San Antonio Creek at Calaveras Grove; South Fork of Tuolumne River at mouth; and North Fork of Merced River at Bower Cave
143	<i>Gasterosteus cataphractus</i>	<i>Gasterosteus aculeatus</i>	1852	Battle Creek at U. S. Fish Hatchery, and Kings River at Centerville
143	<i>Archoplites interruptus</i>	<i>Archoplites interruptus</i>	2345	Battle Creek at U. S. Fish Hatchery; Sacramento River at Sacramento and Rio Vista; and Arcade Creek at Arcade
144	<i>Hysterocarpus traski</i>	<i>Hysterocarpus traski</i>	3252	Pit River at Pittville; Battle Creek at U. S. Fish Hatchery; Sacramento River at Red Bluff, Vina, Chico Bridge, Jacinto, and Wilson's Farm; Feather River at Marysville; San Joaquin River at Polasky; and China Slough and Kings River at Centerville
144	<i>Cottus asper</i>	<i>Cottus asper</i>	2997	Fall River at Dana (type locality); and Fall River at Fall River Mills
145	<i>Cottus asper</i>	<i>Cottus asper</i>	2997	Sacramento River at Redding, Red Bluff, Jacinto, and Chico Bridge; Feather River at Marysville; and Arcade Creek at Arcade
146	<i>Cottus gulosus</i>	<i>Cottus gulosus</i>	2996	Joseph Creek at mouth; South Fork of Pit River at South Fork Post Office; Pit River at Canby; Rush Creek near Adin; Fall River at Fall River Mills and Dana; Hat Creek at Cassel; Burney Creek at Burneyville; Sullaway Creek at Sisson; Sacramento River at Sisson and Sims; McCloud River at Baird; Battle Creek at U. S. Fish Hatchery; Feather River at Oroville; Warner Creek at Johnson's; American River at Placerville; and Stanislaus River at Parrot Ferry
146	<i>Cottus macrops</i>	<i>Cottus macrops</i>	3008	Fall River at Dana, type locality; Fall River Mills
147	<i>Cottus beldingi</i>	<i>Cottus beldingi</i>	3004	Cole Creek near Sierraville

1908a. Snyder, John Otterbein. The Fishes of the coastal streams of Oregon and Northern California. Bull. U. S. Bur. Fish., XXVII, 1907 (1908), 153-189. (Oct. 21, 1908.): Gives an account of the fish fauna of the smaller coastal streams of Oregon and northern California which have their origin west of the Sierra-Cascade Mountain System, and includes all of the streams reaching the ocean between the Columbia and Sacramento except the Klamath. The general conditions of the region are described. There are numerous tables of measurements of fishes and of their distribution, and a map showing the river systems involved. Half the area considered is in Oregon.

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
157	<i>Entosphenus tridentatus</i>	<i>Entosphenus tridentatus</i>	16, 17	Klamath River near mouth South Fork Eel River near and at Garberville; South Fork Big River; Garcia River; Russian River, Healdsburg; Napa River, Calistoga
158	<i>Entosphenus tridentatus</i>	<i>Entosphenus tridentatus</i>		
157	<i>Acipenser medirostris</i>	<i>Acipenser acutirostris</i>	183	Klamath River near mouth Klamath River near mouth; Shasta River, Montague and Yreka Russian River system: Roberts Creek; Russian River, Ukiah and Healdsburg; Warm Springs Creek; Dry Creek, Skaggs Springs; Dry Creek, Healdsburg; and Knights Valley Creek, also Napa River, Rutherford and Calistoga, and Conn. Creek Klamath River near mouth Napa River, Rutherford Klamath River near mouth Warm Springs Creek; Dry Creek, Skaggs Springs and Healdsburg; Russian River, Healdsburg, and Knights Valley Creek
157	<i>Catostomus rimieulus</i>	<i>Catostomus rimieulus</i>	*751b	
158	<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	
157	<i>Catostomus snyderi</i>	<i>Catostomus snyderi</i>	740	Klamath River near mouth Napa River, Rutherford Klamath River near mouth Warm Springs Creek; Dry Creek, Skaggs Springs and Healdsburg; Russian River, Healdsburg, and Knights Valley Creek
158	<i>Lavinia exilicauda</i>	<i>Lavinia exilicauda</i>	804	
157	<i>Leuciscus birolori</i>	<i>Trisoma birolori</i>	852	
158	<i>Mylopharodon conocephalus</i>	<i>Mylopharodon conocephalus</i>	798	

* Omitted from the check-list. The number shows its proper place.

TABLE

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
158	<i>Ptychocheilus grandis</i>	<i>Ptychocheilus grandis</i>	807	Roberts Creek; Russian River, Ukiah and Healdsburg; Warm Springs Creek; Dry Creek, Healdsburg; Knights Valley Creek; Napa River, Calistoga; and Conn Creek
159	<i>Rutilus bicolor</i>	<i>Siphateles bicolor</i>	873	Klamath River near mouth; Shasta River, Montague and Yreka
160	<i>Rutilus symmetricus</i>	<i>Hesperoleucus navarroensis</i>	864	Navarro River near mouth, near Philo and near Boonville
160	<i>Rutilus symmetricus</i>	<i>Hesperoleucus parvipinnis</i>	865	Gualala River at North Fork, and Wheatfield Fork; Wheatfield Fork, Gualala
160	<i>Rutilus symmetricus</i>	<i>Hesperoleucus venustus</i>	866	Roberts Creek; Russian River, Ukiah and Healdsburg; Warm Springs Creek; Dry Creek, Skaggs Springs and Healdsburg; Knights Valley Creek; Napa River, Rutherford and Calistoga, and Conn Creek
159	<i>Agosia klamathensis</i>	<i>Apocope klamathensis</i>	1058	Klamath River near mouth; Shasta River, Montague and Yreka
159	<i>Gasterosteus cataphractus</i>	<i>Gasterosteus aculeatus</i>	1852	Klamath River near mouth; Redwood Creek, Orick; Mad River; Maple Creek; Elk River; Van Duzen Creek; South Fork Eel River near Garberville; Bear River, Capetown; Mattole River near mouth and at White Thorn; Usal Creek; Ten Mile River; Noyo River; Big River; South Fork Big River; Albion River; Navarro River near mouth, near Philo and near Boonville; Alder Creek; Garcia River near mouth, and 5 and 10 miles from mouth; Gualala River at North Fork, and Wheatfield Fork and Wheatfield Fork, Gualala; Roberts Creek; Russian River, Ukiah and Healdsburg; Dry Creek, Skaggs Springs and Healdsburg; Napa River, Rutherford and Calistoga; Conn Creek
160	<i>Hysteroecarpus traski</i>	<i>Hysteroecarpus traski</i>	3252	Russian River, Ukiah; Dry Creek, Healdsburg; Knights Valley Creek; Napa River, Calistoga; Conn Creek
159	<i>Cottus asper</i>	<i>Cottus asper</i>	2997	Klamath River near mouth; Redwood Creek, Orick; Mad River; Maple Creek; Little River; Elk River; Van Duzen Creek; South Fork Eel River near Garberville; Usal Creek; Ten Mile River; Noyo River; South Fork Big River; Albion River; Navarro River near mouth; Alder Creek; Garcia River near mouth, and 5 miles from mouth; Gualala River at North Fork and Wheatfield Fork; Dry Creek, Healdsburg
160	<i>Cottus gulosus</i>	<i>Cottus gulosus</i>	2996	Noyo River; South Fork Big River; Navarro River near Boonville; Warm Springs Creek; Knights Valley Creek; Napa River, Rutherford and Calistoga
159	<i>Cottus klamathensis</i>	<i>Cottus klamathensis</i>	3007	Shasta River, Montague and Yreka
160	<i>Cottus aleuticus</i>	<i>Cottus aleuticus</i>	3016	Maple Creek; Usal Creek; Albion River; Navarro River near mouth; Alder Creek; Garcia River near mouth and 5 miles from mouth; Gualala River at Wheatfield Fork

1910. Evermann, Barton Warren, and Latimer, Homer Baker. On a collection of Fishes from the Olympic Peninsula, together with notes on other West Coast Species. Proc. Biol. Soc. Wash., XXIII, 1910, pp. 131-140.: The following California records for freshwater species are given in this paper:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
132	<i>Entsephemus tridentatus</i>	<i>Entsephemus tridentatus</i>	16	San Pablo Bay
133	<i>Ameiurus catus</i>	<i>Hausior catus</i>	1156	Mare Island (introduced)
133	<i>Pogonichthys macrolepidotum</i>	<i>Pogonichthys macrolepidotus</i>	829	Mare Island
133	<i>Psychocheilus harrfordi</i>	<i>Psychocheilus grandis</i>	867	Mare Island
133	<i>Rutilus bicolor</i>	Probably <i>Hesperoleucus venustus</i>	866	Walker Creek
133	<i>Rutilus symmetricus</i>	Probably <i>Hesperoleucus venustus</i>	866	Deep pond 1 mile from mouth of Olema Creek, but connected with it; Mouth of Papermill Creek; Bear Valley Creek, below flood gate
134	<i>Alosa sapidissima</i>	<i>Alosa sapidissima</i>	213	Mare Island (introduced)
134	<i>Oncorhynchus tshawytscha</i>	<i>Oncorhynchus tshawytscha</i>	331	Pond, Olema Creek and Bear Valley Creek
133	<i>Salmo gairdneri</i>	<i>Salmo gairdneri</i>	358	Junction, Nicasio and Papermill creeks
135	<i>Salmo irideus</i>	<i>Salmo irideus</i>	357	Bear Valley Creek
136	<i>Gasterosteus williamsoni</i>	<i>Gasterosteus aculeatus</i>	1852	Papermill, Olema, and Bear Valley creeks
137	<i>Archoplites interruptus</i>	<i>Archoplites interruptus</i>	2345	Mare Island
138	<i>Cottus asper</i>	<i>Cottus asper</i>	2997	Bear Valley, Papermill and Walker creeks
138	<i>Cottus gulosus</i>	<i>Cottus gulosus</i>	2996	Junction Nicasio and Papermill creeks
138	<i>Ilypnus gilberti</i>	<i>Ilypnus gilberti</i>	3579	Tomas Bay; Papermill creek and Walker creek

TABLE

1912. Snyder, John Otterbein. A New Species of Trout from Lake Tahoe. Bull. U. S. Bur. Fish., XXXII, 1912, Doc. 768, pp. 25-28, December 31, 1912.: In this paper is described a supposed new species of trout, *Salmo regalis*, from Lake Tahoe. The type specimen, 323 millimeters long, was secured near Brockway, Lake Tahoe, August 23, 1912, by W. P. Lyon. It is deposited in the U. S. National Museum. Another specimen which Professor Snyder identifies as belonging to that species was taken by F. K. Pomeroy, a Stanford student, and a third was caught by

All three were taken near Brockway on the north side of Lake Tahoe. Still a fourth specimen taken near Tahoe City was sent by Charles A. Vogelsang to Stanford University.

1913. Snyder, John Otterbein. The Fishes of the Streams tributary to Monterey Bay, California. Bull. U. S. Bur. Fish., XXXII, 1912 (July 24, 1913), 49-72, pls. XIX-XXIV, figs. 1-3.:

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
56	<i>Entosphenus tridentatus</i>	<i>Entosphenus tridentatus</i>	16	San Lorenzo, Pajaro, and Salinas rivers
56	<i>Catostomus mitchilli</i>	<i>Catostomus mitchilli</i>	73a	Arroyo Seco Creek; Pajaro River, Watsonville
58	<i>Ortholen microplectus</i>	<i>Ortholen microplectus</i>	794	Salinas River at San Miguel; Pajaro River, Watsonville
58	<i>Lavinia ardesiaca</i>	<i>Lavinia ardesiaca</i>	801a	Salinas River at Salinas; Pajaro River, Watsonville
(59)	(<i>Lavinia exilisoides</i>)	(<i>Lavinia exilisoides</i>)	(804)	(Caché Creek and Putah Creek)
62	<i>Psychocheilus grandis</i>	<i>Psychocheilus grandis</i>	807	Monterey
64	<i>Hesperoleucus venustus</i>	<i>Hesperoleucus venustus</i>	865	Coyote Creek, Gilroy
(65)	(<i>Hesperoleucus navarroensis</i>)	(<i>Hesperoleucus navarroensis</i>)	(864)	(Navarro River near Philo)
(66)	(<i>Hesperoleucus parvipinnis</i>)	(<i>Hesperoleucus parvipinnis</i>)	(865)	(Gualala River, Sonoma County)
67	<i>Hesperoleucus subditus</i>	<i>Hesperoleucus subditus</i>	868	Uvas Creek, Salinas River, Arroyo Seco Creek; Pajaro River at Sargent; San Lorenzo River
70	<i>Agosia carringtoni</i>	<i>Apocope carringtoni</i>	1053	Pajaro River (Sacramento River)?
70	<i>Salmo trilevis</i>	<i>Salmo trilevis</i>	257	San Antonio and Nacimiento creeks ¹
70	<i>Oncorhynchus tshawytscha</i>	<i>Oncorhynchus tshawytscha</i>	331	San Lorenzo and Pajaro rivers
70	<i>Oncorhynchus kisutch</i>	<i>Oncorhynchus kisutch</i>	329	San Lorenzo River at Santa Cruz
71	<i>Gasterosteus californicus</i>	<i>Gasterosteus aculeatus</i>	1852	All streams tributary to Monterey Bay
71	<i>Archoplites interruptus</i>	<i>Archoplites interruptus</i>	2345	Pajaro River at Sargent (not in Coyote Creek)
71	<i>Heterocarpus traski</i>	<i>Heterocarpus traski</i>	2252	Pajaro and Salinas rivers
72	<i>Cottus asper</i>	<i>Cottus asper</i>	2997	Pajaro River
72	<i>Cottus aleuticus</i>	<i>Cottus aleuticus</i>	3016	"With <i>C. asper</i> "
72	<i>Cottus gulosus</i>	<i>Cottus gulosus</i>	2996	"Upper courses of the creeks"

¹ Species and localities in parentheses lie out of the region under discussion, but are introduced for comparison.
² Statement indefinite; species not certain.

TABLE

A list of both the anadromous and freshwater species is given, and the relationship of the species of the latter group is discussed. These are related to, and apparently derived from, the Sacramento fauna, through shifts in drainage basins in the past. The similarity of the freshwater fish faunas of the different streams, the mouths of which are now widely separated by barriers of salt water, is accounted for by the streams having a common lower course, now obliterated by subsidence of shore, but evidenced by drowned valleys or channels in the sea bottom. This is illustrated by a map.

1914. Grinnell, Joseph. An account of the Mammals and Birds of the lower Colorado Valley. Univ. Calif. Pub. Zool., Vol. 12, no. 4, pp. 51-294, pls. 3-13, 9 text-figs.: One species of freshwater fish taken in the backwater on the California side opposite Cibola is referred to by Dr. Grinnell in the following words: "A huge minnow, *Ptychocheilus lucius*, called locally Colorado Salmon, caught with hook and line in backwater," etc.

1915. Snyder, John Otterbein. Notes on a Collection of Fishes made by Dr. Edgar A. Mearns from Rivers tributary to the Gulf of California. Proc. U. S. Nat. Mus., XLIX, 1915, pp. 573-586, pls. 76-77.: In this paper Professor Snyder records two species of freshwater fishes from the larger streams of southern California : *Notolepidomyzon santa-ance* Snyder, new species, and *Richardsonius orcutti* (*Tigoma orcutti*).

1916. Snyder, John Otterbein. The Fishes of the Streams tributary to Tomales Bay, California. Bull. U. S. Bur. Fish., XXXIV, 1914, Doc. 825, pp. 375-381, June 2, 1916.: Under the direction of the Bureau of Fisheries, Professor Snyder assisted by Lee R. Dice, visited the creeks tributary to Tomales Bay in the latter part of October, 1910, and, while searching for young salmon, made the collection of fishes upon which this report was based.

Professor Snyder states that "only two streams flow into Tomales Bay which are large enough to support fishes, Papermill Creek, with Olima and Bear Valley creeks as tributaries, which enters the southern end of the bay, and Walker Creek, which flows into the northern part. A recent examination of these streams shows that the fishes living there are specifically identical with those of near-by basins."

Following is a list of the species recorded :

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
378	<i>Catostomus occidentalis</i>	<i>Catostomus occidentalis</i>	738	Olima Creek. Papermill Creek, Sacramento River and Russian River
379	<i>Hesperoleucus venustus</i>	<i>Hesperoleucus venustus</i>	866	Olima, Bear Valley, Papermill, and Walker creeks and Russian River
380	<i>Salmo irideus</i>	<i>Salmo irideus</i>	357	Papermill, Olima, and Walker creeks
380	<i>Gasterosteus cataphractus</i>	<i>Gasterosteus aculeatus</i>	1852	Papermill, Olima, and Walker creeks
381	<i>Cottus asper</i>	<i>Cottus asper</i>	2997	Papermill, Olima, and Walker creeks
381	<i>Cottus gulosus</i>	<i>Cottus gulosus</i>	2996	Papermill Creek above Tocaloma

1916. Evermann, Barton Warren. Fishes of the Salton Sea. Copeia, no. 34, pp. 61–63, August 24, 1916.: This short paper is a brief report on observations made and species seen by the writer when on a visit to Salton Sea, May 7–14, 1916.

The species recorded are as follows: Carp (*Cyprinus carpio*); Bony-tail (*Gila elegans*); Humpback Sucker (*Xyrauchen cypo* = *taxanus*); Colorado River Trout (*Salmo pleuriticus*); Common Mullet (*Mugil cephalus*); Desert Minnow (*Cyprinodon macularius*). This last species was recorded in this paper also from Saratoga Springs, whence specimens were received through the kindness of Mr. Samuel Hubbard of Oakland. The Saratoga Springs species had been described as *Cyprinodon nevadensis*.

In 1924 numerous specimens of the Desert Minnow were obtained in the water flowing from an artesian well at Mecca, and others from Fish Springs on the west side of Salton Sea below Figtree John's Spring which was then dry. In 1926, Mr. Wallace Adams, while collecting fishes for the Steinhart Aquarium, found this fish in large numbers in the brackish waters of the Salton Sea.

1917. Snyder, John Otterbein. The Fishes of the Lahontan System of Nevada and Northeastern California. Bull. U. S. Bur. Fish., XXXV, 1915–16, Sept. 28, 1917, pp. 33–86, pls. III–V, text figs. 1–9.: One of a series of publications relating to the fishes of the Great Basin, which are of unusual interest, as they occupy basins which are without exterior drainage. Owens Valley, California, which has been discussed elsewhere, is of the same nature. Only a small portion of the Lahontan System, including such waters as Eagle Lake, Honey Lake, most of Lake Tahoe, and mere tips of certain rivers, as the Truckee, Carson, and branches of the Walker, extends into California. As the different drainage systems are isolated, only a few of the species mentioned in the publication belong to the California fauna. For purposes of comparison a num-

Page	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
42	<i>Catostomus tahoensis</i>	<i>Catostomus tahoensis</i>	751	Walker River, Truckee River and as <i>Chasmistes chamberlaini</i> Rutter, from Eagle Lake
47, fig. 1	<i>Catostomus arenarius</i>	<i>Catostomus arenarius</i>	751a (not in C-L.)	Fallen Leaf Creek near Lake Tahoe; and Lake Tahoe (spm. collected by Henshaw)
49	<i>Pantosteus lahontan</i>	<i>Pantosteus lahontan</i>	735	Pine Creek (Piney Creek?), Calif., (reported but not seen); Long Valley Creek
54	<i>Richardsonius egregius</i>	<i>Cheonda egregia</i>	842	"Almost universally distributed throughout the brooks, rivers and lakes of the region (Lahontan System) Humboldt River (U. S. Nat. Mus.) Fallen Leaf Creek; Truckee River near Pyramid Lake; Carson and Walker rivers; Lake Tahoe." Lake Tahoe is probably the only California locality; all other records from that state such as the Sacramento System, etc., being doubtful
58	<i>Richardsonius microdon</i>	<i>Cheonda microdon</i>	841	Lake Tahoe, near Tahoe City (type)
64	<i>Leucidius pectinifer</i>	<i>Leucidius pectinifer</i>	878	The Willows; Lake Tahoe, at Tahoe City (type locality)
67	<i>Agosia robusta</i> *.....	<i>Apocope robusta</i>	1052	Susan Creek; Fallen Leaf Creek
69	<i>Coregonus williamsoni</i>	<i>Prosopium williamsoni</i>	420	Lake Tahoe; Fallen Leaf Creek
70	<i>Salmo henshawi</i>	<i>Salmo henshawi</i>	343	Lake Tahoe; Truckee River
77	<i>Salmo aquilarum</i>	<i>Salmo aquilarum</i>	356	Eagle Lake (type locality)

* A California species, described first from Prosser Creek, California. According to Snyder *not* in the Sacramento Basin, but only in the Lahontan System, in tributaries of the Truckee and Susan rivers. In another paper he reports it from Owens River, California

Species in this paper not recorded for California, such as *Salmo regalis*, east side of Lake Tahoe, *Salmo smaragdus*, *Cottus beldingi*, *Chasmistes cujus* and the like, have been omitted.

In making comparisons of species, the following are listed from the Sacramento Basin : *Catostomus microps*; *C. occidentalis*, *Siphateles formosus*, *Apocope carringtoni* (as *Agosia carringtoni*) and *Cottus gulosus* and the following from the Klamath Basin : *Catostomus rimiculus*, *C. snyderi*, *Siphateles bicolor*, and *Cottus gulosus*.

Toward the end of the paper (p. 84) is a table giving in detail localities where specimens were collected, both in California and Nevada, and a list of introduced species, 10 in number, found in one state or the other.

1918. Snyder, John Otterbein. The Fishes of Mohave River, California. Proc. U. S. Nat. Mus., LIV, 1919, pp. 297–299 (March 15, 1918).: Description of *Siphateles mohavensis*, new species, Mohave River near Victor, California, Aug. 14, 1913. Clarence H. Kennedy, collector.

It had been previously recorded by Girard in 1856 as *Algansea formosa*. It is the only species found in the river, and is illustrated in an unnumbered text-figure (p. 299).

1919. Evermann, Barton Warren, and Bryant, Harold C. California Trout. California Fish and Game, Vol. 5, no. 3, pp. 105–135.: Following a general discussion, this paper gives a running list of both scientific and common names, key, descriptions, and a number of figures, some of them colored, of the trout of California, both native and introduced. There is a page of bibliography. Only the native species are recorded in the

Page	Figure	Species as recorded	Present identification	J. E. & C. check-list No.	Locality
108, 127	36	<i>Salmo clarkii</i> (Cutthroat Trout).....	<i>Salmo clarki</i>	338	Pit River, Eel River and other streams in Humboldt and Del Norte counties
108, 127	37	<i>Salmo henshawi</i> (Tahoe Trout).....	<i>Salmo henshawi</i>	343	Lake Tahoe, Donner, Webber, and Independence lakes and tributary streams
108, 129	-----	<i>Salmo regalis</i> (Royal Silver Trout).....	<i>Salmo regalis</i>	337	Lake Tahoe
108, 129	-----	<i>Salvelinus parkei</i> (Dolly Varden).....	<i>Salvelinus malma spectabilis</i>	380	McCloud River
108, 115	-----	<i>Salmo shasta</i> (Shasta Rainbow).....	<i>Salmo shasta</i>	359	Upper Sacramento and McCloud rivers
108, 116	-----	<i>Salmo stonei</i> (Noshee or Stone Trout).....	<i>Salmo stonei</i>	360	McCloud River
108, 118	-----	<i>Salmo gilberti</i> (Gilbert Rainbow, Kern River Trout).....	<i>Salmo gilberti</i>	362	Kings and Kern rivers
108, 123	-----	<i>Salmo agua-bonita</i> (South Fork of Kern Golden Trout).....	<i>Salmo agua-bonita</i>	364	South Fork of Kern River, Cottonwood Creek and Cottonwood lakes (introduced)
108, 124	Col. plate	<i>Salmo roosevelti</i> (Golden Trout; Roosevelt Trout).....	<i>Salmo roosevelti</i>	366	Volcano Creek
108, 121	-----	<i>Salmo whitei</i> (Soda Creek or Little Kern Trout).....	<i>Salmo whitei</i>	365	Little Kern and other western tributaries of Kern River
109	41	<i>Salmo evermanni</i> (San Gorgonio Trout).....	<i>Salmo evermanni</i>	367	Streams about San Gorgonio Peak, Southern California
111, 112	Two col. plates, fig. 38	<i>Salmo irideus</i> (Rainbow Trout).....	<i>Salmo irideus</i>	357	(Or <i>Salmo gairdneri</i>). Enters Coastwise streams from Ventura River northward to spawn, then returns to the sea
116	42	<i>Salmo aquilarum</i> (Eagle Lake Trout).....	<i>Salmo aquilarum</i>	356	Eagle Lake and tributary streams

1919. Snyder, John Otterbein. An Account of Some Fishes from Owens River, California. Proc. U. S. Nat. Mus., LIV, 1919 (Dec. 13), pp. 201–205.: On account of its isolation, the fish fauna of Owens River is of unusual interest. The tributaries of this stream obtain their waters from the mountain slopes on each side, and the river flows into Owens Lake, which has no outlet, except through evaporation, and in consequence the waters of the lake are strongly impregnated by mineral salts. The river valley may be properly included within the Great Basin. The report is based on a collection made by Mr. Clarence Kennedy, who collected in the vicinity of Laws. Four native species are represented, which possibly do not represent the entire fauna of the basin.

The fauna has been largely derived from the Lahontan System, two of its members possibly by stream capture, the other two being more difficult to account for. The following species were obtained : *Catostomus arenarius*, *Siphateles obesus*, *Agosia robusta*, and *Cyprinodon macularius*.

The *Catostomus arenarius* of Owens River has somewhat smaller scales and larger fins than those of the Lahontan system. The *Agosia robusta* has barbels *usually* present but sometimes absent on one or both sides, and lateral line complete or interrupted. *Cyprinodon macularius* is indicated as possibly an effective destroyer of mosquitoes.

Common names given : *Catostomus arenarius* = Sand-bar sucker; *S. obesus* = Lake Chub; *A. robusta* = Black Minnow; *C. macularius* = Spotted Pury Minnow.

1924. Jordan, David Starr, and McGregor, Ernest Alexander. Description of a new species of Trout (*Salmo rosei*) from Lake Culver in the High Sierras of California. Proc. Acad. Nat. Sci. Phila., LXXVI, 1924, p. 19, pl. II.: This paper gives a description of *Salmo rosei*, an ally or derivation of the Kern River trout, *Salmo gilberti*, from Lake Culver and neighboring lakes of the high Sierra.

3. LIST OF SPECIES

Following is a systematic distributional list, so far as the writers have been able to determine, of all the species of fishes recorded from, or known to occur in, the fresh waters of California. Under each species are given in chronological order, the various records of the occurrence of the species in California, and the particular waters from which recorded.

These records show a total of 77 species of freshwater fishes as known from California, belonging to families as follows:

Petromyzonidae, 2; Acipenseridae, 2; Salmonidae, 22; Catostomidae, 9; Cyprinidae, 27; Cyprinodontidae, 2; Empetrichthyidae, 1; Gasterosteidae, 1; Centrarchidae, 1; Cottidae, 8; Embiotocidae, 1; Gobiidae, 1.

The sequence of species is that of the 1930 Check-list by Jordan, Evermann, and Clark. The numbers in parentheses are the serial numbers of the same species in that Check-list.

PETROMYZONIDAE

1. (16, 17). *Entosphenus tridentatus* (Gairdner). Three-toothed Lamprey; Western Lamprey.

San Francisco (Ayres 1854–1862, as *Petromyzon ciliatus*); Sacramento River (Girard 1858); Fort Redding, Calif., (Gill 1862, as *Entosphenus epihexodon*, no description and as of "Girard, not Richardson"); Clear Lake (Jordan & Gilbert 1894); Santa Ana River, Riverside (Jordan & Evermann 1896–1900). Klamath River near mouth; South Fork Eel River near and at Garberville; South Fork Big River; Garcia River; Russian River, Healdsburg; Napa River, Calistoga (Snyder 1908a). In the Museum of the California Academy of Sciences are 2 specimens of 4 obtained in Mokelumne River, just below the dam at Woodbridge, among rocks, July 6, 1928, Hibbard, Coll, and 2 from the mouth of San Lorenzo River, collected Mar. 29, 1929.

Pacific coast of America from southern California northward to Unalaska, ascending streams even as far as the headwaters of the Sacramento, Columbia and Fraser rivers for spawning purposes. After spawning once they die. The young descend to salt water, where they remain until mature.

2. (18). *Lampetra ayresi* Günther. Western Brook Lamprey.
San Francisco (Ayres 1854–1862, as *Petromyzon plumbeus*; the name preoccupied).
- ACIPENSERIDAE
3. (180). *Acipenser transmontanus* Richardson. White Sturgeon; Oregon Sturgeon; Sacramento Sturgeon.
San Francisco Bay; San Pablo Bay; Suisun Bay; Lower Sacramento and San Joaquin rivers (Ayres 1854–1862, as *A. brachyrhynchus*); Sacramento River (Jordan & Gilbert 1881); entering all large streams from the Sacramento to the Fraser River (Eigenmann 1890).
4. (183). *Acipenser acutirostris* Ayres. Green Sturgeon.
San Francisco (Ayres 1854–1862, as *A. acutirostris* and *A. medirostris*); (Girard 1857 and 1858, as *A. acutirostris* and *A. medirostris*); (Eigenmann 1890); Pacific Coast, ascending the rivers from San Francisco northward (Jordan & Evermann 1896–1900); Klamath River, near mouth (Snyder 1908a); Collinsville, near Pittsburg, Sacramento River, 1926 (Calif. Acad. Sci. Collection).
- SALMONIDAE
5. (327). *Oncorhynchus gorbuscha* (Walbaum). Humpback Salmon.
Sacramento River (Jordan & Gilbert 1881; Eigenmann 1890 "only occasionally"; Jordan & Evermann 1896–1900 "occasionally").
6. (328). *Oncorhynchus keta* (Walbaum). Dog Salmon; Hayko; Le Kai Salmon; Calico Salmon; Chum.
All streams from San Francisco to Bering Straits (Jordan & Gilbert 1881); San Francisco (Jordan & Jouy 1881); said to be abundant in the fall from the Sacramento northward (Eigenmann 1890); San Francisco to Kamchatka, ascending all streams in the fall and spawning at no great distance from the sea (Jordan & Evermann 1896–1900).
7. (329). *Oncorhynchus kisutch* (Walbaum). Silver Salmon; Kisutch; Skowitz; Hoopid Salmon; Coho Salmon; Bielaya Ryba; Quisutch; Tschaviche.
Sacramento River (Jordan & Gilbert 1881; Jordan & Jouy 1881); Sacramento in summer and fall (Eigenmann 1890); from San Francisco northward, ascending streams in the fall to no great distance (Jordan & Evermann 1896–1900); San Lorenzo River at Santa Cruz (Snyder 1913).
8. (331). *Oncorhynchus tshawytscha* (Walbaum). Chinook Salmon; Quinnot Salmon; Tchaviche; King Salmon; Columbia River Salmon; Spring Salmon; Sacramento Salmon, Tyee Salmon; Tschawytsche.
California (Bean 1880, as *O. quinnat*); Sacramento and Ventura rivers (Jordan & Gilbert 1881, as *O. chouicha*); Sacramento River and Monterey (Jordan & Jouy 1881, as *O. chouicha*); Sacramento River, young taken at Mare Island (Eigenmann 1890); Lopez Creek (Jordan 1894c); Alaska, Oregon and California, south to Ventura River, and to northern China, ascending all large streams; especially abundant in the Columbia and Sacramento rivers (Jordan & Evermann 1896–1900); Russian River (Snyder 1908); Pond, Olima Creek; Bear Valley Creek (Evermann & Latimer 1910); San Lorenzo and Pajaro rivers (Snyder 1913).
9. (337). *Salmo regalis* Snyder. Royal Silver Trout.
Lake Tahoe (Snyder 1912, type).
10. (338). *Salmo clarki* Richardson. Columbia River Trout; Cut-throat Trout. Eel River (Jordan 1907).
11. (343). *Salmo henshawi* Gill & Jordan. Lake Tahoe Trout; Silver Trout; Truckee Trout; Pyramid Lake Trout.
Lake Tahoe (Jordan & Henshaw 1878); (Jordan & Jouy 1881, as *S. purpurata henshawi*, type); Lake Tahoe (Eigenmann & Eigenmann 1891, as *S. mykiss henshawi*); Lake Tahoe and Feather River (Jordan 1894a, as *S. mykiss*); Tahoe, Donner, and Independence lakes; Truckee and Feather rivers (Jordan & Evermann 1896–1900, as *S. mykiss henshawi*); Truckee River, Tahoe, Donner, Webber and

Independence lakes, introduced into the Feather, Stanislaus and Mokelumne rivers (Jordan 1907); Lake Tahoe (Juday 1907); Lake Tahoe; Truckee River (Snyder 1917).

12. (344). *Salmo tahoensis* (Jordan & Evermann). Great Trout of Lake Tahoe.

Lake Tahoe (Jordan & Evermann 1896–1900 (1898) as *Salmo clarkii tahoensis*, type); (Jordan 1907; Juday 1907).

13. (348). *Salmo pleuriticus* Cope. Colorado River Trout.

Salton Sea (Evermann 1916).

14. (356). *Salmo aquilarum* Snyder. Eagle Lake Trout.

Eagle Lake near mouth of Pine Creek, Lassen Co. (Snyder 1917, type).

15. (357). *Salmo irideus* Gibbons. Rainbow Trout; Coast Range Trout.

Back of Martinez, toward the foot of Monte Diablo (Ayres 1854–1862, as *Salmo rivularis*); San Leandro Creek (Gibbons 1855 as *S. iridea*, type); Humboldt Bay (Girard 1859a, as *Salar irideus*); San Mateo Creek; Petaluma (Girard 1856a); Chico Creek, San Francisco (Girard 1857); Chico Creek; San Francisco; Humboldt Bay; Head of San Mateo Creek; Petaluma Creek (Girard 1858, as *Salar iridea*); Merced River (Caton, J. D., 1870, as *Salmo iridea*); Ojai Creek, Ventura County (Jordan & Henshaw 1878); tributary of Pit River, Modoc County; Lake Tahoe; California (Bean 1880); San Luis Rey River and Sacramento River (Jordan & Jouy 1881); Allen Springs, Lake County (Eigenmann & Eigenmann 1889a); Clear Lake (Jordan & Gilbert 1894, *S. mykiss irideus*); Lopez Creek (Jordan 1894c, as *S. mykiss irideus*); Susan River; Prosser Creek (Rutter 1903); Sacramento River (Jordan 1970, as *S. rivularis*); San Leandro Creek; San Francisquito Creek; San Luis Rey River (Jordan 1907); Russian River (Snyder 1908); Bear Valley Creek (Evermann & Latimer 1910); San Antonio Creek (Snyder 1913); Papermill, Olima and Walker creeks (Snyder 1916).

16. (358). *Salmo gairdneri* Richardson. Brook Trout of Western Oregon to southern Alaska; Steelhead; Salmon Trout; Stit-tse.

Klamath River (Girard 1857, as *Fario gairdneri*); Sacramento River (Jordan & Gilbert 1881); Sacramento, Klamath, and Eel rivers, and streams near Monterey (Jordan 1894a); Lopez Creek (Jordan 1894c, as *S. mykiss gairdneri*); Klamath and San Luis Rey rivers; Purissima Creek (Jordan & Evermann 1896–1990, as *Salmo irideus*); Junction Nicasio and Papermill creeks (Evermann & Latimer 1910); entering practically all coastal streams of California from Ventura County on the South to the Oregon Line for spawning purposes, then returning to the sea (Evermann & Bryant 1919).

17. (359). *Salmo shasta* (Jordan). McCloud River Rainbow Trout; Shasta Trout. Rainbow Trout of fish culturists.

McCloud River (Jordan & Henshaw 1878, as *S. henshawi*); McCloud River (Campbell 1882, "Red-sided Trout"); Upper Sacramento (Jordan 1894a, as *S. gairdneri shasta*); McCloud River (Jordan & Evermann 1896–1900, as *S. irideus shasta*); Upper Sacramento and McCloud rivers (Evermann & Bryant 1919).

18. (360). *Salmo stonei* (Jordan). Nissuee Trout; No-shee Trout; Stone's Trout.

McCloud River (Jordan 1894, as *S. gairdneri stonei*); McCloud River and upper tributaries of the Sacramento (Jordan 1894a, as *S. gairdneri stonei*); McCloud River (Jordan & Evermann (1896–1900 as *S. irideus stonei*); McCloud River (Evermann & Bryant 1919).

19. (362). *Salmo gilberti* (Jordan). Gilbert Trout; Kern River Trout.

Kern River (Jordan 1894a, as *S. gairdneri gilberti*); South Fork of Kern River at Soda Springs (Jordan & Evermann 1896_1900, as *S. irideus gilberti*); Kern Lake and Kern River above the lake (Evermann 1906); Kern, Kings, and Merced rivers, Kern Lake (Jordan 1907); Kings and Kern rivers (Evermann & Bryant 1919).

20. (363). *Salmo rosei* Jordan & McGregor. Rose's Trout.
Lake Culver (type) and neighboring lakes of the High Sierras (Jordan & McGregor 1924).
21. (364). *Salmo agua-bonita* (Jordan). Golden Trout (of South Fork of Kern River).
South Fork of Kern River (Jordan & Henshaw 1878, as *Salmo pleuriticus*; not Cope); "Volcano or Whitney Creek, California" (by error, =Cottonwood lakes to which it had been transplanted from the south fork of the Kern (Jordan 1892, as *S. mykiss agua-bonita*); Whitney Creek, South Fork of Kern River, Cottonwood Creek, introduced (Gilbert 1893, as *S. mykiss agua-bonita*); Upper tributaries of Kern River (Jordan 1894a, as *Salmo gairdneri agua-bonita*); South Fork of Kern River; streams about Owens Lake (Jordan & Evermann 1896–1900, as *Salmo irideus agua-bonita*); South Fork of Kern River (Evermann 1906); South Fork of the Kern; Cottonwood Creek and Cottonwood Lakes (introduced) (Evermann & Bryant 1919).
22. (365). *Salmo whitei* Evermann. Stewart White Trout.
Cañon of Kings River (Gilbert 1893, as *S. irideus*); Coyote Creek, South Fork of Kaweah River; Soda Creek; Little Kern River (Evermann 1906, *S. whitei*); Native to Little Kern and other western tributaries of Kern River (Evermann & Bryant 1919).
23. (366). *Salmo roosevelti* Evermann. Roosevelt Trout; Volcano Creek Trout.
Volcano Creek (Evermann 1906, type); Native only to Volcano Creek (Evermann & Bryant 1919); Golden Trout Creek, Inyo County, July 31, 1923 (Calif. Acad. Sci. Coll.). Introduced from Volcano Creek into Rock Creek and other eastern tributaries of Kern River.
24. (367). *Salmo evermanni* Jordan & Grinnell. San Bernardino Trout; Evermann Trout.
Santa Ana River, headwaters above the falls (Jordan & Grinnell 1908, type); streams about San Gorgonio Peak, southern California (Evermann & Bryant 1919).
25. (380). *Salvelinus malma spectabilis* (Girard). Dolly Varden Trout; Oregon Charr; Bull Trout; Red-spotted Trout; Golet.
McCloud River (Bean 1880, as *S. bairdi*); lakes and streams of the Cascade Range from Mount Shasta northward to Alaska (Jordan & Gilbert 1881, as *S. malma*); McCloud River (Campbell 1882, as "Dolly Varden"); Upper Sacramento (Jordan 1894a, as *S. malma*); Upper Sacramento (Jordan & Evermann 1896–1900, as *S. malma*); Upper Soda Springs on Sacramento (Jordan 1907, as *S. malma*).
26. (420). *Prosopium williamsoni* (Girard). Rocky Mountain Whitefish.
Lake Tahoe; Truckee River; Trout Creek (Jordan & Henshaw 1878, as *Coregonus williamsoni*); Lake Tahoe (Eigenmann & Eigenmann 1891, as *Coregonus williamsoni*); Truckee River, Donner Lake (Rutter 1903, as *Coregonus williamsoni*). Lake Tahoe; Fallen Leaf Creek (Snyder 1917, as *Coregonus williamsoni*).
- CATOSTOMIDAE
27. (728). *Notolepidomyzon santa-anae* (Snyder). Santa Ana Sucker.
Larger streams of southern California (Snyder 1915, as *Pantosteus santaanae*).
28. (735). *Pantosteus lahontan* Rutter.
Susan River (type); Little Truckee River; Prosser Creek (Rutter 1903); Warner Creek; North Fork Feather River and Warner Creek (Rutter 1908); Pine Creek; Carson and Humboldt rivers; Long Valley Creek (Snyder 1917).
29. (738). *Catostomus occidentalis* Ayres. Western Sucker.
San Francisco Markets (Ayres 1854); Sacramento and San Joaquin rivers and San Francisco Bay (Ayres 1854–1862); San Joaquin River at Stockton (Ayres 1854–1862, as *C. labiatus*); San Francisco Bay (Ayres 1854–1862, as *C. labiatus*); Sacramento-San Joaquin Basin (L. Agassiz 1855); San Francisco

(Girard 1856); Klamath Lake (Girard 1856, as *C. labiatus*); San Francisco (Girard 1857); San Francisco (Girard 1858); Klamath Lake (Girard 1858, as *C. labiatus*); South Fork Kern River (Jordan & Henshaw 1878, as *C. arceopus*); Sacramento, San Joaquin, McCloud River (Jordan 1878); Kern River (Jordan 1878, as *C. arceopus*); McCloud River (Campbell 1882, "Sucker"); Clear Lake (Jordan & Gilbert 1894); Sacramento and San Joaquin rivers (Jordan & Evermann 1896–1900); South Fork Kern River (Evermann 1906, as *Pantosteus arceopus*); North and Middle Fork Kaweah; Kern River and Kern Lake (Evermann 1906); San Francisquito, Madera, San Antonio, Stevens, Campbell, Guadalupe, Coyote, Alameda, Arroyo Honda, Smith and Isabel creeks, disappears at time of drouth and returns (Snyder 1905); Goose Lake; North Fork of Pit River at mouth of Joseph Creek and near Alturas; South Fork of Pit River at South Fork Post office; Pit River at Canby; Ash Creek at Adin; McCloud River at Baird; Sacramento River at Chico; Jacinto; Wilson's Farm, twenty miles below Grimes, and at Knights Landing; Stony Creek; Feather River at Oroville; Indian Creek at Crescent Mills; Wolf Creek at Greenville; Clover Creek and Squaw Queen Creek at Genesee; Middle Fork of Feather River at Beckwith and Nelson Point; North Fork of Yuba River at Bullard's Bar; Rubicon River at Gerle; South Fork of American River at Placerville; Silver Creek at Orelli; North Fork of Cosumnes River, Pleasant Valley; Stanislaus River at Parrot Ferry; Tuolumne River at Baker Ford; South Fork of Tuolumne River near mouth; Merced River at Benton Mill and Livingston; Mariposa Creek at Mariposa; Chowchilla and Fresno rivers at Raymond; San Joaquin River at Pollasky; Kings River at Centerville; St. John's Channel of Kaweah River at Lemoncove; Tule River at Porterville; and Kern River at Bakersfield (Rutter 1908); Russian River (Snyder 1908); Roberts Creek; Russian River at Ukiah and Healdsburg; Warm Springs Creek; Dry Creek, Skaggs Springs and Healdsburg; Knights Valley Creek; Napa River at Rutherford and Calistoga; Conn Creek (Snyder 1908a); Olema, Papermill Creek, Sacramento and Russian rivers (Snyder 1916); Sacramento River at Willows (Calif. Acad. Collection).

30. (738a). *Catostomus mniotiltus* Snyder. Pajaro Sucker.

Arroyo Seco Creek (type), Pajaro River, Watsonville (Snyder 1913).

31. (741). *Catostomus microps* Rutter.

Rush Creek, a tributary of Ash Creek, near Aden, Modoc Co., Calif. (type) (Rutter 1908).

32. (751). *Catostomus tahoensis* Gill & Jordan. Tahoe Sucker.

Lake Tahoe; Eagle Lake (Jordan & Henshaw 1873); Lake Tahoe (Eigenmann & Eigenmann 1891, *tahoensis*, C.); Willow Creek, Susan River, Little Truckee River, Prosser Creek (Rutter 1903); Eagle Lake (Rutter 1903, as *Chasmistes chamberlaini*); Warner Creek; North Fork Feather River; Duck Lake; Miller Creek at Miller Pass (Rutter 1908); Fallen Leaf Creek; Walker River; Truckee River; Star Creek; Deeth; and Eagle Lake (Snyder 1917).

33. (751a). *Catostomus arenarius* Snyder. Sand-bar Sucker.

Fallen Leaf Creek near Lake Tahoe; Lake Tahoe (Snyder 1917); Owens River (Snyder 1919).

34. (751b). *Catostomus rimiculus* Gilbert & Snyder.

Klamath River near mouth; Shasta River, Montague and Yreka (Snyder 1908a).

35. (765). *Xyrauchen texanus* (Abbott). Razor-back Sucker; Humpback Sucker.

Salton Sea (Evermann 1916, as *Xyrauchen cypho*).

CYPRINIDAE

36. (794). *Orthodon microlepidotus* (Ayres).

San Francisco Markets (Ayres 1854, as *Leuciscus microlepidotus*); Sacramento and San Joaquin rivers (Ayres 1854–1862, as *Gila microlepidotus*); San Francisco Bay (Ayres 1854–1862, as *Gila microlepidotus*); San Francisco (Girard 1856, 1857, 1858); Sacramento River (Jordan & Jouy 1881); Clear Lake (Jordan & Gilbert 1894); Sacramento, San Joaquin rivers (Jordan & Evermann 1896–1900); Coyote Creek (Snyder 1905); Sacramento River at Butte City, Colusa,

Ryde, and Rio Vista; Arcade Creek at Arcade; Suisun Bay at Black Diamond; and China Slough and Kings River at Centerville (Rutter 1908); Lower Sacramento (Snyder 1908); Salinas River; Pajaro River (Snyder 1913); Pajaro River, Watsonville (Calif. Acad. Collection).

37. (798). *Mylopharodon conocephalus* (Baird & Girard). Kaweah Chub.

San Joaquin River (Ayres 1854–1862, as *M. robusta*); San Francisco Bay (Ayres 1854–1862, as *M. robusta*); San Joaquin River (Girard 1854, *Gila conocephala*); San Joaquin River (Girard 1856); San Francisco (Girard 1856, as *M. robusta*); San Francisco (Girard 1857, as *M. robustus*); Rio San Joaquin (Girard 1858); San Francisco (Girard 1858, as *M. robustus*); San Francisco (Girard 1859, as *M. robustus*); San Joaquin River (Girard 1859, as *M. conocephalus*); Sacramento River (Jordan & Jouy 1881); Sacramento and San Joaquin rivers (Jordan & Evermann 1896–1900); North, Middle and South forks Kaweah River; Threerivers (Evermann 1906); North Fork of Pit River at Alturas; Pit River at Canby, Bieber and Pittville; Ash Creek at Adin; Sacramento River at Redding; at mouth of Clear Creek, at Red Bluff, six miles below Red Bluff, at Tehama, at Chico, at Jacinto, at Grimes, twenty miles below Grimes; at mouth of Feather River; at Sacramento; and at Collinsville; Battle Creek at U. S. Fish Hatchery; Thomas Creek at Tehama; Feather River at Oroville; Indian Creek at Crescent Mills; Squaw Queen Creek at Genesee; American River at Folsom; South Fork of American River at Placerville; Tuolumne River at Ward's Ferry; South Fork of Tuolumne River near its mouth; Merced River at Livingston and Benton Mill; Fresno River at Raymond; San Joaquin River at Pollasky; China Slough and Kings River at Centerville; Kaweah River at St. John's Channel; Tule River at Porterville, and Kern River at Bakersfield (Rutter 1908); Russian River (Snyder 1908); Warm Springs Creek; Dry Creek, Skaggs Springs and Healdsburg; Russian River, Healdsburg; Knights Valley Creek (Snyder 1908a).

38. (804). *Lavinia exilicauda* Baird & Girard. Hitch; Chigh.

Sacramento and San Joaquin rivers (Ayres 1854–1862, as *Lavinia compressa*); Sacramento River (Girard 1854); Poso Creek and Four Creeks (Girard 1854, as *Leucosomus occidentalis*); Sacramento River (Girard 1856); Monterey (Girard 1856, as *Lavinia harengus*); San Joaquin River (Girard 1857); Sacramento River; Poso Creek; San Joaquin River (Girard 1858); Monterey Plains (Girard 1858, as *L. harengus*); Poso, Four Creeks, Tulare Valley (Girard 1858, *Luxilus occidentalis*); Sacramento River (Girard 1859a); Clear Lake (Jordan & Evermann 1896–1900, as *Luxilinus occidentalis*); Clear Lake (Jordan & Evermann 1896–1900); Coyote and Alameda creeks (Snyder 1905); Battle Creek at U. S. Fish Hatchery; Sacramento River at Red Bluff; Chico Bridge; Jacinto; Wilson's Farm twenty miles below Grimes; mouth of Feather River; Sacramento River; Rio Vista and Collinsville; Feather River at Marysville and Oroville; Antelope Creek at Grass Valley; American River at Folsom; Suisun Bay at Black Diamond; San Joaquin River at Antioch and Pollasky; Stanislaus River at Parrot Ferry; Merced River at Livingston; Fresno River at Raymond; China Slough at Centerville; Kings River at Centerville; Kaweah River at St. John's Channel; and Tule River at Porterville (Rutter 1908); Lower Sacramento (Snyder 1908); Napa River, Rutherford (Snyder 1908a).

39. (804a). *Lavinia ardesiaca* Snyder. Silvery Minnow.

Pajaro River near Watsonville (type); Salinas River (Snyder 1913).

40. (807). *Ptychocheilus grandis* (Ayres). Sacramento Pike; Sacramento Squawfish.

San Francisco Market (Ayres 1854, as *Leuciscus gracilis*); "No definite locality" (Ayres 1854–1862, as *Gila grandis*); San Francisco Bay (Ayres 1854–1862); Sacramento-San Joaquin Basin (*L. Agassiz* 1855, *P. major*); San Francisco (Girard 1856); Monterey (Girard 1856, as *P. rapax*); San Francisco (Girard 1857, 1858); Monterey (Girard 1859, *P. rapax*); Sacramento River, (Jordan & Gilbert 1881a, as *P. harfordi* and *P. oregonensis*); Sacramento (Jordan & Jouy 1881, as *P. harfordi* and *P. oregonensis*); McCloud River (Campbell 1882, as "Whitefish"); Allen Springs, Lake County (Eigenmann & Eigenmann 1889a, as *P. oregonensis*); Clear Lake and Kelsey Creek (Jordan & Gilbert 1894, as *P. oregonensis*); Lower Sacramento River (Jordan & Evermann 1896–1900, as *P. harfordi*); Sacramento, San

Joaquin and Salinas rivers (Jordan & Evermann 1896–1900, as *P. oregonensis*); San Francisquito, Coyote, Alameda creeks (Snyder 1905); North, Middle and South forks of Kaweah River (Evermann 1906, *P. oregonensis*); Joseph Creek; North Fork of Pit River at Alturas; Pit River at Canby, Bieber, and Pittville; Ash Creek at Adin; Fall River at Fall River Mills; Sacramento River at Redding; Red Bluff; Six miles below Red Bluff; Tehama; Vina; Chico Bridge; Jacinto; Grimes; Knights Landing; Mouth of Feather River; Sacramento; Walnut Grove; Rio Vista; Clear Creek at mouth; Battle Creek at U. S. Fish Hatchery; Thomas Creek at mouth; Feather River at Marysville and Oroville; Indian Creek at Crescent Mills; Wolf Creek at Greenville; Squaw Queen Creek at Genesee; North Fork of Yuba River at Bullard's Bar; American River at Placerville; Carquinez Straits at Benicia; San Joaquin River at Antioch and Pollasky; Tuolumne River at Modesto; South Fork of Tuolumne River at mouth; Stanislaus River at Parrot Ferry; Merced River at Livingston and Benton Mill; Chowchilla River at Raymond; Fresno River at Raymond; China Slough and Kings River at Centerville; Kaweah River at St. John's Channel; Tule River at Porterville, and Kern River at Bakersfield (Rutter 1908); Russian River (Snyder 1908); Roberts Creek; Russian River, Ukiah and Healdsburg; Warm Spring Creek, Dry Creek, Healdsburg; Knights Valley Creek; Napa River, Calistoga; Conn Creek (Snyder 1908a); Mare Island (Evermann & Latimer 1910, as *P. harfordi*); Monterey (Snyder 1913).

41. (808). *Ptychocheilus lucius* Girard. White Salmon of the Colorado; Colorado River Squawfish.

Colorado River backwater, California side of the channel opposite Cibola (Grinnell 1914).

42. (810). *Gila elegans* Baird & Girard. Bony-tail; Gila Trout; Verde Trout. Salton Sea (Evermann 1916).

43. (829). *Pogonichthys macrolepidotus* (Ayres). Split-tail.

San Francisco markets (Ayres 1854, as *Leuciscus macrolepidotus*); San Joaquin River (Girard 1854, as *P. inaequilobus*); San Joaquin River and Petaluma (Girard 1856, as *P. inaequilobus*); Presidio, near San Francisco (Girard 1856, as *P. argyreus*); San Joaquin River; Petaluma; Sacramento near Fort Reading (Girard 1858, as *P. inaequilobus*); Presidio (Girard 1858, as *P. argyreus*); San Joaquin River (Girard 1859) and Sacramento River (Girard 1859a, as *P. inaequilobus*); Sacramento River (Jordan & Jouy 1881); Clear Lake (Jordan & Gilbert 1894); Sacramento and San Joaquin (Jordan & Evermann 1896–1900); Coyote Creek (Snyder 1905); Throughout the Sacramento River; Feather River; American River; San Joaquin River (Rutter 1908); Lower Sacramento (Snyder 1908); Mare Island (Evermann & Latimer 1910).

44. (841). *Cheonda microdon* (Snyder).

Lake Tahoe near Tahoe City (type) (Snyder 1917, as *Richardsonius microdon*).

45. (842). *Cheonda egregia* (Girard).

Aetna Springs, Napa County (locality probably erroneous) (Eigenmann & Eigenmann 1889, as *Phoxinus clevelandi*); Lake Tahoe (Eigenmann & Eigenmann 1891, as *Phoxinus montanus*); Lake Tahoe; Truckee River (Jordan & Evermann 1896–1900, as *Leuciscus egregius*); Willow Creek; Susan River (Rutter 1903, as *Leuciscus egregius*); Warner Creek (Rutter 1908, as *Leuciscus egregius*); "Almost universally distributed throughout the brooks, rivers and lakes of the region (Lahontan System), Humboldt River; Fallen Leaf Creek; Carson and Walker rivers; Lake Tahoe"; Lake Tahoe is probably the only California locality, all other records from that State, such as the Sacramento System, etc., being doubtful (Snyder 1917, as *Richardsonius egregius*).

46. (852). *Tigoma bicolor* Girard.

Klamath River, near mouth (Snyder 1908a, as *Leuciscus bicolor*).

47. (854). *Tigoma orcutti* (Eigenmann & Eigenmann).

Temecula River (Eigenmann & Eigenmann 1890, as *Phoxinus orcutti*); Rio San Luis Rey, Rio San Jacinto and Santa Ana River (Jordan & Evermann 1896–1900,

as *Leuciscus orcutti*); larger streams of southern California (Snyder 1915, as *Richardsonius orcutti*); Crystal Lake of San Gabriel River System July 25, 1930, Berry Campbell, collector, and small permanent stream, Coyote Pass Hills, Los Angeles County, February 2, 1831, Roland Case Ross, collector (Calif. Acad. Sci. Collection).

48. (855). *Siboma crassicauda* (Baird & Girard). Sacramento Chub.

San Francisco Market (Ayres 1854, as *Leuciscus gibbus*); Sacramento and San Joaquin Rivers (Ayres 1854–1862, as *Lavinia gibbosa*); Rio San Joaquin Girard 1854, as *Lavinia crassicauda*); San Joaquin, Mercede [Merced], and Mohave rivers (Girard 1856); Sacramento near Fort Reading (Girard 1856, as *Tigoma crassa*); Sacramento (Girard 1857, as *Tigoma crassa*); Sacramento River (Girard 1857, as *Tigoma crassa*); Rio San Joaquin (Girard 1858); Sacramento River (Girard 1859, as *Tigoma crassa*); Rio San Joaquin (Girard 1859); Sacramento River (Jordan & Jouy 1881, as *Squalius gibbosus*); Clear Lake (Jordan & Gilbert 1894, as *Leuciscus crassicauda*); Sacramento and San Joaquin rivers (Jordan & Evermann 1896–1900, as *Leuciscus crassicauda*); Coyote Creek (Snyder 1905, as *Leuciscus crassicauda*); Mouth of Feather River; Kaweah River (Rutter 1908, as *Leuciscus crassicauda*); Lower Sacramento (Snyder 1908, as *Leuciscus crassicauda*).

49. (856). *Siboma conformis* (Baird & Girard).

Poso Creek; San Joaquin Basin (Girard 1854, as *Lavinia conformis*); Poso Creek, San Joaquin Valley (Girard 1856, as *Tigoma conformis*); Poso Creek (Girard 1859, as *Tigoma conformis*); Poso Creek, Tulare County (Jordan & Evermann 1896–1900, as *Leuciscus conformis*); Sacramento River; Kaweah River (Rutter 1908, as *Leuciscus conformis*).

50. (863). *Hesperoleucus symmetricus* (Baird & Girard). California Roach.

Fort Miller, San Joaquin Valley (Girard 1854, 1856, 1858, 1859, as *Pogonichthys symmetricus*); Owens Lake (Gilbert 1893, as *Rutilus symmetricus*); Rivers of California and probably generally distributed. Originally known from the San Joaquin and Merced rivers, and Kern Lake. Very common in streams of the Coast ranges from San Francisco to Salinas River, being in the brooks of the Santa Clara Valley the most abundant fish. Owens Lake; Mohave River, etc.; Tres Pinos Creek, San Benito County (Jordan & Evermann 1896–1900, as *Rutilus symmetricus*); San Francisquito, Madera, San Antonio, Campbell, Guadalupe, Coyote, Alameda, Arroyo Honda and Isabel creeks. Not known from Stevens Creek. Able to maintain itself in Madera Creek during periods of drouth when nothing remains of the stream except a few disconnected pools; generally distributed throughout the Sacramento Basin and subject to considerable variation (Snyder 1905, as *Rutilus symmetricus*); Russian River (Snyder 1908, as *Rutilus symmetricus*); Mouth of Joseph Creek; near Alturas; Redding; Mouth of Clear Creek; U. S. Fish Hatchery at Battle Creek; Mouth of Thomas Creek; Pleasant Valley on North Fork of Cosumnes River; Baker Ford, Tuolumne River; near mouth of South Fork of Tuolumne River; Parrot Ferry, Stanislaus River; Bower Cave, North Fork Merced River; Benton Mill, Merced River; Livingston, Merced River and Mariposa, Mariposa Creek; Raymond, Chowchilla River; Pollasky, San Joaquin River; Centerville, Kings River; St. John Channel, Kaweah River; Porterville, Tule River. One of the 12 species typical of and having wide distribution in the Sacramento-San Joaquin Basin (Rutter 1908, as *Rutilus symmetricus*).

51. (864). *Hesperoleucus navarroensis* Snyder. Navarro Roach.

Navarro River near Philo, California (Snyder 1907a, as *Rutilus symmetricus*, and Snyder 1913 under the above name).

52. (865). *Hesperoleucus parvipinnis* Snyder. Short-finned Roach.

Gualala River Basin (Snyder 1907a, as *Rutilus symmetricus*, and 1913, as *Hesperoleucus parvipinnis*).

53. (866). *Hesperoleucus venustus* Snyder. Venus Roach.

Roberts Creek; Russian River at Ukiah and Healdsburg; Warm Springs Creek; Dry Creek at Skaggs Springs and Healdsburg; Knights Valley Creek; Napa River at Rutherford and Calistoga; Conn Creek (Snyder 1908a, as *Rutilus symmetricus*); Walker Creek (Evermann & Latimer 1910, as *Rutilus bicolor*); Pond in

Olema Creek, Papermill Creek, Bear Valley Creek (Evermann & Latimer 1910, as *Rutilus symmetricus*); Coyote Creek at Gilroy (type) (Snyder 1913); Olema, Bear Valley, Walker, Papermill creeks; Russian River (Snyder 1916).

54. (868). *Hesperoleucus subditus* Snyder. Monterey Roach.

Salinas River; Arroyo Seco Creek, Pajaro River; San Lorenzo River; Uvas Creek, Pajaro River Basin (type) (Snyder 1913).

55. (872). *Siphateles obesus* (Girard).

Lake Tahoe; Eagle Lake, Lassen County; Smoke Creek, Modoc County (Jordan & Henshaw 1878, as *Leucos obesus*); Donner Lake (Eigenmann & Eigenmann 1891, as *Algansea olivacea*); Eagle Lake and Willow Creek (Rutter 1903, as *Rutilus olivaceus*); Owens River (Snyder 1919).

Snyder, who has compared the types, has decided that *S. obesus* and *S. olivaceus* are the same, and that *S. oregonensis* is probably not separable from them.

56. (873). *Siphateles bicolor* (Girard). Klamath Lake Roach.

Common to Pit River drainage and to the lakes and streams of southern Oregon; widely distributed in the Pit River region; exceedingly abundant in Wolf Creek, which enters the North Fork of Feather River through Indian Creek; Goose Lake; South Fork Pit River at South Fork Post office; Pit River near Canby and Pittville; Ash Creek near Adin; Fall River at Dana; Hat Creek at Cassel; Wolf Creek at Greenville; Indian Valley (Rutter 1908, as *Rutilus bicolor*); Klamath River near mouth; Shasta River, Montague and Yreka (Snyder 1908a, as *Rutilus bicolor*); Klamath River, Klamath Lakes and tributaries (Snyder 1917).

Eigenmann & Eigenmann 1889 reported this as *Leucos bicolor* from Aetna Springs, Napa County, California, but the locality is probably erroneous.

57. (874). *Siphateles formosus* (Girard).

Merced River (Girard 1856 and 1858, as *Algansea formosa*); San Francisco Bay due to freshening of water by floods (Ayres 1854–1862, as *Algansea formosa*); Kern Lake (Jordan & Henshaw 1878, as *Leucos formosus*).

58. (878). *Leucidius pectinifer* Snyder. Lake Minnow.

Eagle Lake, and Lake Tahoe at Tahoe City (type) (Snyder 1917).

59. (1033). *Oregonichthys cumingi* (Günther).

California, exact locality unknown (Günther 1868, as *Ceraticthys cumingii*); California (Jordan & Evermann 1896–1900, as *Hybopsis cumingii*).

60. (1052). *Apocope robusta* (Rutter). Black Minnow.

Prosser Creek (type); Spring Creek; Willow Creek; Susan River; Little Truckee River, and probably to be found in Eagle Lake (Rutter 1903, as *Agosia robusta*); Susan Creek; Carson River; Fallen Leaf Creek; Star Creek; Mary's Creek; Quinn River; restricted to the Lahontan System (Snyder 1917).

61. (1058). *Apocope klamathensis* (Evermann & Meek).

Klamath River near mouth, Shasta River, Montague and Yreka (Snyder 1908a, as *Agosia klamathensis*).

62. (1053). *Apocope carringtoni* Cope.

Camp Bidwell, Modoc County; Spring near Smoke Creek, Lassen County (Jordan & Henshaw 1878); Horse Lake, Modoc County (Jordan & Henshaw 1878, as *A. vulnerata*); Lake Tahoe, Shinn's Ranch, Modoc County (Jordan & Henshaw 1878, as *A. ventricosa*); Streams near Fort Bidwell (Cope 1883, as *A. ventricosa* and *A. vulnerata*); Lake Tahoe, Eigenmann, C. H. and R. S., 1891, as *Agosia oscula*); San Luis Creek (Jordan 1894c, as *Agosia nubila*); Pajaro River; Sacramento River (Snyder 1913, as *Agosia carringtoni*).

CYPRINODONTIDAE

63. (1396). *Cyprinodon macularius* Baird & Girard. Desert Minnow.

San Diego County, California, probably from salt springs in the desert (now Imperial County) (Girard 1859c, as *Cyprinodon californiensis*); San Diego (Jordan & Jouy 1881, as *C. californiensis*); Death Valley, Amargosa Creek (Gilbert 1893);

Springs in San Diego County; Saratoga Springs, Inyo County (Jordan & Evermann 1896–1900); Figtree John Spring, near Salton Sea (Evermann 1916); small stream from artesian well at Mecca and Fish Spring on west side of Salton Sea (Evermann collection 1924); Owens River (Snyder 1919); in San Felipe Creek near its mouth, and in dense schools along the shore of Salton Sea (Steinhart Aquarium collections 1926, etc.).

64. (1397). *Cyprinodon nevadensis* Eigenmann & Eigenmann.

Saratoga Springs, Death Valley, Inyo County, California (Eigenmann & Eigenmann 1888 and Evermann 1916, as *Cyprinodon macularinus*). (Samuel Hubbard collection.)

EMPETRICHTHYIDAE

65. (1399). *Empetrichthys merriami* Gilbert.

Amargosa Desert (Gilbert 1893) (type); Death Valley in southeastern California; springs of desert about Death Valley in eastern California (Jordan & Evermann 1896–1900).

GASTEROSTEIDAE

66. (1852). *Gasterosteus aculeatus* Linnacus. Common Stickleback.

Marshes of San Francisco Bay (Ayres 1854–1862, as *G. serratus*); Williamson's Pass (Ayres 1854–1862, as *G. williamsoni*); Tulare Lake (Ayres 1854–1862, as *G. microcephalus*); marshes of San Francisco Bay (Ayres 1854–1862, as *G. plebius*); Mountain Lake near San Francisco (Ayres 1854–1862, as *G. inopinatus*); Four Creeks, Tulare Valley (Girard 1854, 1859, as *G. microcephalus*); Williamson's Pass (Girard 1854, 1859, as *G. williamsoni*); Presidio (Girard 1857, as *G. inopinatus*); San Francisco, San Jose, Petaluma (Girard 1858, as *G. plebius*); Presidio (Girard 1858, as *G. inopinatus*); Williamson's Pass (Girard 1858, as *G. williamsoni*); in rivers and brackish waters from Los Angeles River to Puget Sound (Jordan & Gilbert 1881, as *G. microcephalus*); rivers from San Francisco to Alaska (Jordan & Gilbert 1881, as *G. aculeatus cataphractus*); San Bernardino (Gilbert 1893, as *G. williamsoni*); Clear Lake (Jordan & Gilbert 1894, as *G. microcephalus*); San Luis Creek (Jordan 1894c, as *G. microcephalus*); Four Creeks, San Gregorio Creek, Pilarcitos Creek, and other streams of the west slope of the Sierra Morena, on the San Francisco peninsula (Jordan & Evermann 1896–1900, as *G. williamsoni microcephalus*); Williamson's Pass; San Bernardino (Jordan & Evermann, 1896–1900, as *G. williamsoni*); Battle Creek; Kings River (Rutter 1908, as *G. cataphractus*); Russian River (Snyder 1908, as *G. cataphractus*); Papermill, Olema and Bear Valley creeks (Evermann & Latimer 1910, as *G. williamsoni*); all streams tributary to Monterey Bay (Snyder 1913, as *G. cataphractus*); Papermill, Olema and Walker creeks (Snyder 1916, as *G. cataphractus*); Klamath River near mouth; Redwood Creek, Orick; Mad River; Maple Creek; Elk River; Van Duzen Creek; South Fork Eel River near Garberville; Bear River, Capetown; Mattole River near mouth and at White Thorn; Usal Creek; Ten-mile River; Noyo River; Big River; South Fork Big River; Albion River; Navarro River near mouth, near Philo and near Boonville; Alder Creek; Garcia River near mouth and five and ten miles from mouth; Gualala River at North Fork and Wheatfield Fork; Wheatfield Fork, Gualala, Roberts Creek; Russian River at Ukiah and Healdsburg; Dry Creek at Skaggs Springs and Healdsburg; Napa River at Rutherford and Calistoga; Conn Creek (Snyder 1908a, as *Gasterosteus cataphractus*).

CENTRARCHIDAE

67. (2345). *Archoplites interruptus* (Girard). Sacramento Perch.

Sacramento River (Ayres 1854a, as *Centrarchus maculosus*); San Francisco Bay (Ayres 1854–1862); Sacramento River (Girard 1854, as *Centrarchus interruptus*); Sacramento River (Girard 1857, as *Ambloplites interruptus*); San Joaquin and Sacramento rivers; San Francisco (Girard 1858, as *Ambloplites interruptus*); San Joaquin River (Girard 1859, 1859b, as *Ambloplites interruptus*); Sacramento River (Jordan & Jouy 1881); Clear Lake (Jordan & Gilbert 1894); Sacramento, San Joaquin rivers and tributary lakes (Jordan & Evermann 1896–1900); U. S. Hatchery at Battle Creek; Arcade Creek at Arcade; and Sacramento River at Sacramento and Rio Vista (Rutter 1908).

COTTIDAE

68. (2996). *Cottus gulosus* (Girard).

San Joaquin River (Girard 1854, 1859, as *Cottopsis gulosus*); Upper Pit River (Girard 1857, *Cottopsis gulosus*); Presidio at Monterey (Girard 1857, as *Cottopsis parvus*); Monterey, Presidio, Fort Reading, Petaluma (Girard 1858, as *Cottopsis parvus*); Jesse's Valley, Modoc County (Jordan & Henshaw 1878, as *Uranidea gulosus*); McCloud River (Jordan & Jouy 1881, as *Cottopsis gulosus*); Allen Springs, Lake County (Eigenmann & Eigenmann 1889, as *Uranidea semiscabra centropleurata*); Clear Lake (Jordan & Gilbert 1894); San Luis Creek (Jordan 1894c); streams of the Coast Range in California south to Point Concepcion (Jordan & Evermann 1896–1900); throughout the Sacramento-San Joaquin Basin; Stanislaus River at Parrot Ferry; American River, Placerville; Feather River, Oroville; Warner Creek, Johnsons; Battle Creek, U. S. Hatchery; McCloud River, Baird; Sacramento River, Sims and Sisson; Sullaway Creek, Sisson; Burney Creek at Burneyville; Joseph Creek at mouth; South Fork Pit River at South Fork Post office; Pit River at Canby; Rush Creek near Adin; Fall River, Fall River Mills and Dana (Rutter 1908); Russian River (Snyder 1908); Junction Nicasio and Papermill creeks (Evermann & Latimer 1910); "Upper courses of creeks" (Snyder 1913); Papermill Creek (Snyder 1916); Noyo River; South Fork Big River; Navarro River near Boonville; Warm Springs Creek; Knights Valley Creek; Napa River at Rutherford and Calistoga (Snyder 1908a).

69. (2997). *Cottus asper* Richardson. Prickly Bullhead.

Sacramento River (Jordan & Jouy 1881, as *Cottopsis asper*); Sacramento River, Reading, Red Bluff, Chico, and Jacinto; Feather River, Marysville, Arcade Creek, Arcade (Rutter 1908); Russian River (Snyder 1908); nearly every river basin between the Columbia and Sacramento, commonly found in the lower courses of the streams, often being abundant in brackish or even salt water, in deep quiet pools and over muddy bottom; Klamath River near mouth; Redwood Creek, Orick; Mad River; Maple Creek; Little River, Elk River, Van Duzen Creek; South Fork Eel River near Garberville; Usal Creek; Ten-mile River; Noyo River; South Fork Big River; Albion River; Navarro River near mouth; Alder Creek; Garcia River near mouth and five miles from mouth; Gualala River at North Fork and Wheatfield Fork; Dry Creek, Healdsburg (Snyder 1908a); Bear Valley, Papermill and Walker creeks (Evermann & Latimer 1910); Pajaro River (Snyder 1913); Papermill, Olema and Walker creeks (Snyder 1916).

70. (3000). *Cottus shasta* Jordan & Starks.

McCloud River, Baird, California (Jordan 1896, type); Upper Sacramento Basin about Mount Shasta (Jordan & Evermann 1896–1900).

71. (3003). *Cottus asperrimus* Rutter.

Fall River at Dana, California (Rutter 1898, type); Fall River at Fall River Mills (Rutter 1908, as *Cottus asperima*).

72. (3004). *Cottus beldingi* Eigenmann & Eigenmann.

Lake Tahoe (Eigenmann & Eigenmann 1891, type); Lake Tahoe and Donner Lake (Jordan & Evermann 1896–1900); Susan River, Little Truckee River; Sage Hen Creek; Prosser Creek (Rutter 1903); Cole Creek (Rutter 1908).

73. (3007). *Cottus klamathensis* Gilbert.

Shasta River at Montague and Yreka (Snyder 1908a).

74. (3008) *Cottus macrops* Rutter.

Fall River at Dana (type) and at Fall River Mills (Rutter 1908).

75. (3016). *Cottus aleuticus* Gilbert.

Smith, Redwood, Mattole, Navarro, Alder, Garcia and Gualala rivers, in the lower courses near the sea (Snyder 1908a); Pajaro River (Snyder 1913).

Distribution in northern California is shown more in detail in the Snyder 1908a table.

EMBIOTOCIDAE

76. (3252). *Hysteroecarpus traskii* Gibbons.

Sacramento River (Gibbons 1854, 1854a and b, as *Hysteroecarpus Traskii*); Fort Reading (Girard 1857 and 1858); Sacramento River (Alexander Agassiz 1861, as *H. traskii* and *Sargosoma fluviatilis*); Sacramento and San Joaquin rivers, and streams southward to San Luis Obispo (Jordan & Gilbert 1881); Sacramento River (Jordan & Jouy 1881); Sacramento (Eigenmann & Ulrey 1892); Clear Lake (Jordan & Gilbert 1894); rivers of central California, chiefly in the Sacramento Valley, from Lake County to Santa Clara County, locally abundant (Jordan & Evermann 1896–1900); Pit River at Pittville; Sacramento River at Redding; U. S. Hatchery at Battle Creek; Sacramento River at Red Bluff; Vina, Chico Bridge; Jacinto, and Wilson Farm; Feather River at Marysville; San Joaquin River at Pol-lasky; China Slough and Kings River at Centerville (Rutter 1908); Russian River at Ukiah; Dry Creek at Healdsburg; Knights Valley Creek; Napa River, Calistoga; Conn Creek (Snyder 1908a); Pajaro and Salinas rivers (Snyder 1913).

GOBIIDAE

77. (3573). *Eucyclogobius newberryi* (Girard).

San Luis Obispo Creek (Jordan 1894c); streams of California, in small clear brooks near the sea; locally common in San Luis Obispo Creek; probably confined to fresh waters (Jordan & Evermann 1896–1900). It was however, described from Tomales Bay.

4. SPECIES OF FRESHWATER FISHES DESCRIBED AS NEW SPECIES FROM CALIFORNIA LOCALITIES

In the following table are given (1) as accurately as could be ascertained, the exact date of publication of the species listed; (2) a catalogue of the nominal species of freshwater fishes which have been described from California localities as new species, together with the authority for each; (3) the present identification of each; (4) the type locality, or particular water or place from which the type specimen was obtained; and (5) the name of the collector when known.

The names in the second column now regarded as synonyms are printed in italics.

In order to show the progress of ichthyological investigations of the freshwater fish fauna of California, the names have been arranged in chronological order.

From this list it will be seen that 90 nominal freshwater species have been described from California localities, and that 34 of these are now regarded as synonyms of species previously described, which leaves only 56 that are still regarded as good species.

Date published	Name as recorded	Present identification	Locality	Collector
1854, May 18	<i>Hysterocarpus Traskii</i> Gibbons, N.G.&N.S.	<i>Hysterocarpus traski</i>	Sacramento River	Mr. Morris
1854, May 18	<i>Leuciscus gibbosus</i> Ayres	<i>Lavinia crassicauda</i>	San Francisco market	
1854, May 18	<i>Leuciscus microlepidotus</i> Ayres	<i>Orthodon microlepidotus</i>	San Francisco market	Mr. Morris
1854, May 18	<i>Leuciscus macrolepidotus</i> Ayres	<i>Pogonichthys macrolepidotus</i>	San Francisco market	
1854, May 18	<i>Leuciscus gracilis</i> Ayres	<i>Ptychocheilus grandis</i>	San Francisco market	Mr. Morris
1854, May 18	<i>Catostomus occidentalis</i> Ayres	<i>Catostomus occidentalis</i>	San Francisco market	
1854, Sept. 18	<i>Centrarchus maculosus</i> Ayres	<i>Archoplites interruptus</i>	Market, from Sacramento and San Joaquin rivers	Mr. Morris
1854, between May 20 and Oct. 20	<i>Cottopsis parvus</i> Girard	<i>Cottus gulosus</i>	Presidio, Monterey?	
	<i>Gasterosteus plebius</i> Girard	<i>Gasterosteus aculeatus</i>	Presidio (salt marshes)	Mr. Morris
	<i>Hysterocarpus Traskii</i> Gibbons	<i>Hysterocarpus traski</i>	Sacramento River	
1854, Oct. 20	<i>Centrarchus interruptus</i> Girard	<i>Archoplites interruptus</i>	Sacramento River	Dr. L. A. Heermann
1854, Oct. 20	<i>Cottopsis gulosus</i> Girard	<i>Cottus gulosus</i>	San Joaquin River	
1854, Oct. 20	<i>Gasterosteus williamsoni</i> Girard	<i>Gasterosteus aculeatus</i>	Williamson's Pass	Dr. L. A. Heermann
1854, Oct. 20	<i>Gila conocephala</i> Baird & Girard	<i>Mylopharodon conocephalus</i>	Rio San Joaquin	
1854, Oct. 20	<i>Pogonichthys inaequilobus</i> Baird & Girard	<i>Pogonichthys macrolepidotus</i>	San Joaquin River	Dr. L. A. Heermann
1854, Oct. 20	<i>Pogonichthys symmetricus</i> Baird & Girard	<i>Hesperoleucus symmetricus</i>	Fort Miller, San Joaquin Valley	
1854, Oct. 20	<i>Lavinia exilicauda</i> Baird & Girard	<i>Lavinia exilicauda</i>	Sacramento River	Dr. L. A. Heermann
1854, Oct. 20	<i>Lavinia crassicauda</i> Baird & Girard	<i>Siboma crassicauda</i>	San Francisco: Rio San Joaquin and tributaries	
1854, Oct. 20	<i>Lavinia conformis</i> Baird & Girard	<i>Siboma conformis</i>	Poso Creek, San Joaquin Basin	Dr. L. A. Heermann
1854, Oct. 20	<i>Gasterosteus inopinatus</i> , [inornatus]	<i>Gasterosteus aculeatus</i>	Presidio, fresh water (1 mile back of)	
1854, Oct. 20	<i>Pogonichthys argyrosus</i> Girard	<i>Pogonichthys macrolepidotus</i>	Presidio	Dr. L. A. Heermann
1854, Nov. 27	<i>Acipenser medirostris</i> Ayres	<i>Acipenser acutirostris</i>	"Our waters" (San Francisco)	
1854, Nov. 27	<i>Acipenser brachyrhynchus</i> Ayres	<i>Acipenser transmontanus</i>	San Francisco Bay; San Pablo Bay; Suisun Bay; Lower Sacramento and San Joaquin rivers	Lt. W. P. Trowbridge
	<i>Acipenser acutirostris</i> Ayres	<i>Acipenser acutirostris</i>	"This vicinity" (San Francisco), rare	
1854, Dec. 11	<i>Catostomus occidentalis</i> Ayres	<i>Catostomus occidentalis</i>	Sacramento and San Joaquin rivers	Dr. L. A. Heermann
1854, Dec. 11	<i>Gila grandis</i> Ayres	<i>Ptychocheilus grandis</i>	San Francisco market	
1854, Dec. 18	<i>Lavinia gibbosa</i> Ayres	<i>Siboma crassicauda</i>	San Francisco market, from Sacramento and San Joaquin rivers	Dr. L. A. Heermann
1854, Dec. 18	<i>Lavinia compressa</i> Ayres	<i>Lavinia exilicauda</i>	San Francisco market, from lower Sacramento and San Joaquin rivers	
1854, Dec. 25	<i>Gila microlepidota</i> Ayres	<i>Orthodon microlepidotus</i>	Lower waters of Sacramento and San Joaquin	Dr. L. A. Heermann
1855, Feb.	<i>Centrarchus maculosus</i> Ayres	<i>Archoplites interruptus</i>	San Francisco market, Sacramento and San Joaquin	
1855, Feb. 5	<i>Petromyzon plumbeus</i> Ayres	<i>Lampetra ayresi</i>	San Francisco	?
1855, Mar. 5	<i>Catostomus labiatus</i> Ayres	<i>Catostomus occidentalis</i>	San Francisco market, from San Joaquin River at Stockton	
1855, Mar. 12	<i>Mylopharodon robustus</i> Ayres	<i>Mylopharodon conocephalus</i>	San Francisco market, from San Joaquin River	Mr. Nevins
1855, Mar. 19	<i>Salmo iridea</i> Gibbons	<i>Salmo irideus</i>	San Leandro Creek	
1855, April 16	<i>Salmo Rivularis</i> Ayres	<i>Salmo irideus</i>	Back of Martinez, toward foot of Mt. Diablo	Dr. Winslow
1855, April 16	<i>Petromyzon ciliatus</i> Ayres	<i>Entosphenus tidentatus</i>	San Francisco Bay	
1855, April 30	<i>Gasterosteus serratus</i> Ayres	<i>Gasterosteus aculeatus</i>	Marshes of Bay of San Francisco	T. G. Carey
1855, May	<i>Catostomus occidentalis</i> Agassiz	<i>Catostomus occidentalis</i>	San Francisco	
1855, May	<i>Ptychocheilus major</i> Agassiz	<i>Ptychocheilus grandis</i>	San Francisco	T. G. Carey
1857, April 25	<i>Mylocheilus fraterculus</i> Girard	<i>Mylocheilus fraterculus</i>	Monterey, California?	
1857, April 25	<i>Tigoma crassa</i> Girard	<i>Siboma crassicauda</i>	Sacramento River near Fort Reading	Lt. W. P. Trowbridge
1857, April 25	<i>Alzansca formosa</i> Girard	<i>Siphateles formosus</i>	Merced River	
1857, April 25	<i>Lavinia harenus</i> Girard	<i>Lavinia exilicauda</i>	Monterey	Dr. John S. Newberry
				Dr. A. L. Heermann
				A. S. Taylor

1857, April 25	<i>Ptychocheilus rapax</i> Girard	<i>Ptychocheilus grandis</i>	Monterey	Lt. W. P. Trowbridge
1860, Jan. 6	<i>Cyprinodon californiensis</i> Girard	<i>Cyprinodon macularius</i>	"San Diego County," probably in part that is now Imperial County.	Dr. Thomas Webb
1861, Mar. 20	<i>Sargosomus fluviatilis</i> Agassiz	<i>Hyporocarpus traski</i>	Ms. name, no description nor locality	
1862, Oct. 28	<i>Petromyzon ephioxodon</i> Gill	<i>Entosphenus tridentatus</i>	Fort Reading; based on discovery of Girard.	
1867	<i>Acipenser caryi</i> Dumeril	<i>Acipenser transmontanus</i>	San Francisco	
1867, Oct. 28	<i>Acipenser ayresi</i> Dumeril	<i>Acipenser transmontanus</i>	San Francisco	
1867, Oct. 28	<i>Acipenser putnami</i> Dumeril	<i>Acipenser transmontanus</i>	San Francisco	
1867, Oct. 28	<i>Acipenser (Antaeus) alexandri</i> Dumeril	<i>Acipenser acutirostris</i>	San Francisco	
1867, Oct. 28	<i>Acipenser (Antaeus) oligopeltis</i> Dumeril	<i>Acipenser acutirostris</i>	San Francisco	
1876	<i>Salmo mendocinensis</i> Gibbons	<i>Salmo gairdneri</i>	Mendocino County	Joseph H. Clarke
1878	<i>Salmo henshawi</i> Gill & Jordan	<i>Salmo henshawi</i>	Lake Tahoe	Henshaw
1878	<i>Catostomus araeopus</i> Jordan	<i>Catostomus occidentalis</i>	South Fork Kern River	
1878, Dec.	<i>Bdelostoms stoutii</i> Lockington	<i>Polistotrema stouti</i>	Eel River	
1882?	<i>Ptychocheilus harfordi</i> Jordan & Gilbert	<i>Ptychocheilus grandis</i>	San Francisco market, from Sacramento River	
1889, Jan. 8	<i>Cyprinodon nevadensis</i> Eigenmann & Eigenmann	<i>Cyprinodon nevadensis</i>	Saratoga Springs, Death Valley, Inyo County	
1889	<i>Phoxinus clevelandi</i> Eigenmann & Eigenmann	<i>Cheonda egregia</i>	Aetna Springs, Napa County	
1889, Nov.	<i>Uranidea semiscabra centropleura</i> Eigenmann & Eigenmann	<i>Cottus gulosus</i>	Allen Springs, Lake County	
1891, Dec.	<i>Cottus beldingi</i> Eigenmann & Eigenmann	<i>Cottus beldingi</i>	Lake Tahoe	L. Belding
1893, May 31	<i>Empetrichthys merriami</i> Gilbert	<i>Empetrichthys merriami</i>	Death Valley in Southeast California	Merriam & Bailey?
1893	<i>Salmo mykiss aqua-bonita</i> Jordan	<i>Salmo aqua-bonita</i>	South Fork of Kern River (introduced into Cottonwood Lakes)	Mr. Harvey of Lone Pine
1893	<i>Phoxinus (Tigoma) oreutti</i> C.H. & R.S. Eigenmann	<i>Tigoma oreutti</i>	Temeculina River and tributaries	C. R. Orcutt
1894, June 5	<i>Salmo gairdneri stonei</i> Jordan	<i>Salmo stonei</i>	McCloud River at Baird	Livingstone Stone
1894, Sept.	<i>Salmo gairdneri shasta</i> Jordan	<i>Salmo shasta</i>	McCloud River at Baird	
1894, Sept.	<i>Salmo gairdneri gilberti</i> Jordan	<i>Salmo gilberti</i>	Kern River at Soda Springs	
1894, Sept.	<i>Salmo irideus stonei</i> Jordan	<i>Salmo stonei</i>	McCloud River at Baird	Livingstone Stone
1896, June 19	<i>Cottus shasta</i> Jordan & Starks	<i>Cottus shasta</i>	McCloud River at Baird	E. C. Starks
1897	<i>Catostomus rimitulus</i> Gilbert & Snyder	<i>Catostomus tahoensis</i>	Trinity River, Hoopa Valley, Humboldt County	Capt. W. E. Dougherty
1898	<i>Salmo clarkii tahoensis</i> Jordan & Evermann	<i>Salmo tahoensis</i>	Lake Tahoe, deep water	
1903, Mar. 31	<i>Pantosteus lahontan</i> Rutter	<i>Pantosteus lahontan</i>	Susan River, tributary Honey Lake	Rutter & Chamberlain
1903, Mar. 31	<i>Chasmistes chamberlaini</i> Rutter	<i>Catostomus tahoensis</i>	Eagle Lake	Rutter & Chamberlain
1903, Mar. 31	<i>Agosia robusta</i> Rutter	<i>Apoceoe robusta</i>	Prosser Creek	Rutter & Atkinson
1906, May 19	<i>Salmo whitei</i> Evermann	<i>Salmo whitei</i>	South Fork Kaweah River in South Fork Meadow	Evermann
1906, May 19	<i>Salmo roosevelti</i> Evermann	<i>Salmo roosevelti</i>	Volcano Creek	Evermann
1908, Jan. 23	<i>Salmo evermanni</i> Jordan & Grinnell	<i>Salmo evermanni</i>	Santa Ana River above Falls	Joseph Grinnell
1908, April 6	<i>Pantosteus santa-anae</i> Snyder	<i>Notolepidomyzon santa-anae</i>	Santa Ana River near Riverside	Edmund Heller
1908, Sept. 28	<i>Catostomus microps</i> Rutter	<i>Catostomus microps</i>	Ash Creek, near Adin, Modoc County	Rutter & Chamberlain
1908, Sept. 28	<i>Cottus asperima</i> Rutter	<i>Cottus asperimus</i>	Fall River at Dana	Rutter & Chamberlain
1908, Sept. 28	<i>Cottus macrops</i> Rutter	<i>Cottus macrops</i>	Fall River at Dana	Rutter & Chamberlain
1908, Oct. 21	<i>Catostomus humboldtianus</i> Snyder	<i>Catostomus humboldtianus</i>	Eel River, near Garberville, Humboldt County	
1909	<i>Gasterosteus santa-anae</i> Regan	<i>Gasterosteus aculeatus</i>	Santa Ana River	
1912, Dec. 13	<i>Salmo regalis</i> Snyder	<i>Salmo regalis</i>	Near Brockway, Lake Tahoe	W. P. Lyon
1913, July 24	<i>Catostomus mniotiltus</i> Snyder	<i>Catostomus mniotiltus</i>	Arroyo Seco Creek, Monterey County	
1913, July 24	<i>Lavinia ardesiaca</i> Snyder	<i>Lavinia ardesiaca</i>	Pajaro River, near Watsonville	
1913, July 24	<i>Hesperoleucus venustus</i> Snyder	<i>Hesperoleucus venustus</i>	Coyote Creek near Gilroy (Hot Springs)	
1913, July 24	<i>Hesperoleucus navarroensis</i> Snyder	<i>Hesperoleucus navarroensis</i>	Navarro River near Philo	
1913, July 24	<i>Hesperoleucus parvipinnis</i> Snyder	<i>Hesperoleucus parvipinnis</i>	Gualala River, Sonoma County	
1913, July 24	<i>Hesperoleucus subditus</i> Snyder	<i>Hesperoleucus subditus</i>	Uvas Creek, Pajaro River Basin, Santa Clara County	
1917, Sept. 24	<i>Richardsonius microdon</i> Snyder	<i>Cheonda microdon</i>	Lake Tahoe, near Tahoe City	Snyder?
1917, Sept. 28	<i>Salmo aquilarum</i> Snyder	<i>Salmo aquilarum</i>	Eagle Lake, near mouth of Pine Creek	
1918, Mar. 15	<i>Siphateles mohavensis</i> Snyder	<i>Siphateles mohavensis</i>	Mohave River, near Victor	C. H. Kennedy
1924, June 9	<i>Salmo rosei</i> Jordan & McGregor	<i>Salmo rosei</i>	Lake Culver, High Sierras	

CALIFORNIA FRESHWATER FISHES BY DRAINAGE BASINS

	Coastal streams	Klamath Lakes basin	Sacramento-San Joaquin drainage	Lake Lahontan basin	Colorado River drainage	Salton Sea
<i>Polistotrema stouti</i>	x					
<i>Entosphenus tridentatus</i>	x		x			
<i>Lampetra ayresi</i>			x?			
<i>Aciipenser transmontanus</i>			x			
<i>Aciipenser acutirostris</i>		x	x			
<i>Oncorhynchus gorbusha</i>			x			
<i>Oncorhynchus keta</i>	x		x			
<i>Oncorhynchus kisutch</i>	x		x			
<i>Oncorhynchus tshawytscha</i>	x		x			
<i>Salmo regalis</i>				x		
<i>Salmo clarki</i>	x					
<i>Salmo henshawi</i>			x			
<i>Salmo tahoensis</i>				x		
<i>Salmo pleuriticus</i>					x	
<i>Salmo aquilarum</i>				x		
<i>Salmo irideus</i>	x					
<i>Salmo gairdneri</i>	x	x				
<i>Salmo shasta</i>			x			
<i>Salmo stonei</i>			x			
<i>Salmo gilberti</i>			x			
<i>Salmo rosei</i>			x			
<i>Salmo agwa-bonita</i>			x			
<i>Salmo whitei</i>			x			
<i>Salmo roosevelti</i>			x			
<i>Salmo evermanni</i>	x					
<i>Salvelinus malma spectabilis</i>			x			
<i>Prosopium williamsi</i>				x		
<i>Notolepidomyzon santa-anae</i>	x					
<i>Pantosteus lahontan</i>				x		

CALIFORNIA FRESHWATER FISHES BY DRAINAGE BASINS—Continued

	Coastal streams	Klamath Lakes basin	Sacramento-San Joaquin drainage	Lake Lahontan basin	Colorado River drainage	Salton Sea	Owens River drainage
<i>Catostomus occidentalis</i>	x	x	x				
<i>Catostomus mniotiltus</i>	x						
<i>Catostomus microps</i>			x				
<i>Catostomus tahoensis</i>			x	x			
<i>Catostomus arenarius</i>				x			x
<i>Catostomus rimiculus</i>		x					
<i>Xyrauchen texanus</i>					x	x	
<i>Orthodon microlepidotus</i>	x		x				
<i>Mylopharodon conocephalus</i>	x		x				
<i>Lavinia exilicauda</i>	x		x				
<i>Lavinia ardesiaca</i>	x						
<i>Ptychocheilus grandis</i>	x		x				
<i>Ptychocheilus lucius</i>					x		
<i>Gila elegans</i>					x	x	
<i>Pogonichthys macrolepidotus</i>			x				
<i>Cheonda microdon</i>				x			
<i>Cheonda egregia</i>				x			
<i>Tigoma bicolor</i>		x					
<i>Tigoma oreutti</i>	x						
<i>Siboma crassicauda</i>			x				
<i>Siboma conformis</i>			x				
<i>Hesperoleucus symmetricus</i>	x		x				x
<i>Hesperoleucus navarroensis</i>	x						
<i>Hesperoleucus parvipinnis</i>	x						
<i>Hesperoleucus venustus</i>	x		x				
<i>Hesperoleucus subditus</i>	x						
<i>Siphateles olesus</i>				x			x
<i>Siphateles bicolor</i>		x	x				
<i>Siphateles formosus</i>			x				

CALIFORNIA FRESHWATER FISHES BY DRAINAGE BASINS

CALIFORNIA FRESHWATER FISHES BY DRAINAGE BASINS—Continued

	Coastal streams	Klamath Lakes basin	Sacramento-San Joaquin drainage	Lake Lahontan basin	Colorado River drainage	Salton Sea	Death Valley
<i>Leucidius pectinifer</i>		x					
<i>Oregonichthys cumingi</i> *							
<i>Apocope robusta</i>				x			
<i>Apocope klamathensis</i>		x					
<i>Apocope carringtoni</i>	x	x	x				
<i>Cyprinodon macularius</i>					x	x	
<i>Cyprinodon nevadensis</i>							x
<i>Empetrichthys merriami</i>							x
<i>Gasterosteus aculeatus</i>	x		x				
<i>Archoplites interruptus</i>			x				
<i>Cottus gulosus</i>	x		x				
<i>Cottus asper</i>	x	x	x				
<i>Cottus shasta</i>			x				
<i>Cottus asperimus</i>			x				
<i>Cottus beldingi</i>				x			
<i>Cottus klamathensis</i>		x					
<i>Cottus macrops</i>			x				
<i>Cottus aleuticus</i>	x						
<i>Hysteroecarpus traski</i>	x		x				
<i>Eucylogobius newberryi</i>	x						

* No locality known.

CALIFORNIA FRESHWATER FISHES BY DRAINAGE BASINS

5. INTRODUCED SPECIES

Following is an annotated list of the species of freshwater fishes whose introduction into California has been attempted. Many of these attempts were unsuccessful; others, notably, those with the Shad and the Striped Bass, have proved eminently successful, and considerable success attended the efforts with the Largemouth Black Bass and the Small-mouth Black Bass.

1. (203). *Chanos cyprinella* Cuvier & Valenciennes, Milkfish; Awa.

One hundred introduced from Hawaii into a small stream at Bridgeport, Solano County, July, 1876. Apparently none survived. A food fish of some importance, ranging from the Hawaiian Islands to the Gulf of California, occasionally entering streams.

2. (213). *Alosa sapidissima* (Wilson). Potomac Shad.

About 10,000 planted in Sacramento River at Tehama, by Seth Green, June 27, 1871. A start was made from the east coast with 15,000, but a few were lost on the way, and some planted en route. The plant was phenomenally successful. The species has continued to increase until it is now one of the most common and important food fishes in our waters.

3. (333). *Salmo salar* Linnæus. Atlantic Salmon.

Three hundred five planted June 12, 1874, in the Sacramento River at Redding, and in May, 1891, 194,000, hatched at Fort Gaston, California, were placed in a pond until the last of July when, having attained considerable size, they were liberated in Trinity River. Some of the salmon planted in 1891 did well, and some having reached full size were said to have been taken by Indians. No other reports have been received.

4. (334). *Salmo sebago* Girard. Land-locked Salmon; Sebago Salmon.

During the period from 1878 to 1896 numerous plants of this species were made in various parts of California, young fry being planted. The early reports (State Report of the Commission for 1885–1886) announce that they increased and thrived and that many large ones had been captured within those years. They do not seem to have increased of late years, however. They thrived at the Sisson hatchery, but no attempt was made to propagate them.

5. *Salmo trutta levenensis* (Walker). Loch Leven Trout.

Eggs were brought from the Northville, Michigan, Station, February, 1894, and hatched in Sisson, and in July, 1895, 250 about three inches long were planted in

Webber Lake, Nevada County. The stock has been retained in the Sisson hatchery ever since its introduction. There they have been propagated successfully, and thousands of the fry are shipped each year for distribution in the public waters of the State. The Loch Leven and German brown trout are closely allied and appear to be but different forms of the same species. They are somewhat different in their habits, but do equally well in the clear, cold lakes and streams of the Sierras, as well as in the region about Mount Shasta. The two forms have been crossed at the Sisson hatchery, and have produced a strong gamy fish.

6. *Salmo fario* Linnæus. The European Brown Trout; German Trout; Von Behr Trout.

Several plantings of this species were made in the State beginning with 1893, in Humboldt County. In 1895, 135,000 Von Behr or German brown trout eggs (*Salmo fario*) were hatched at the Sisson hatchery. Several thousand fry were placed in the ponds to be raised for breeders, and the remainder were distributed in a number of the lakes and streams of the high Sierras. As remarked in connection with the preceding species, they do well in the clear cold lakes and streams of the Sierras as well as in the region around Mount Shasta.

7. (369). *Cristivomer namaycush* (Walbaum). Great Lake Trout; Mackinaw Trout.

In November, 1894, the U. S. Fish Commission sent 100,000 eggs of this species to the California Fish Commission. They hatched well, and in May, 1895, 65,000 fry were placed in Lake Tahoe, the remainder being retained at the Sisson hatchery. They were reported to be doing well and multiplying and are said to be occasionally taken by fishermen at the lake. A number of these fish are taken each season from the waters that have been stocked, where they have thrived to a considerable extent, but not so well as was expected (Shebley). In 1922 an unusual amount was caught in Donner Lake.

8. (371). *Silvelinus fontinalis* (Mitchill). Eastern Brook Trout.

Introduced as early as 1872 by the California Fish Commission and planted in the North Fork of the American River, in the headwaters of Alameda Creek, and in the San Andreas reservoir near San Francisco. Later plantings were made in many other waters thought suitable through the State. It did not prosper in the short coast streams but has become naturalized in many of the streams in the Lake Tahoe region, in branches of the Truckee River, in Webber Lake, and elsewhere. About 1892 it was hybridized with the Dolly Varden trout at the Sisson hatchery. The crosses are said to exhibit very beautiful colors. Each year the Commission distributes thousands of this species in nearly every county having suitable waters; they are now one of our most sought after fish.

9. (413). *Coregonus clupeaformis* (Mitchill). Whitefish.

Twenty-five thousand from Lake Superior planted in Clear Lake in 1872–1873; 20,000 from Lake Michigan hatched at Berkeley and placed in Tulare Lake on March 29, 1875; 75,000 fry planted in Donner Lake, 50,000 in Sereno Lake and other lakes in Placer County; and 175,000 in Lake Tahoe in 1877. Many other plants made later. The results, however, were extremely meager, if not altogether negative.

10. (429). *Thymallus montanus* Milner. Montana Grayling.

In 1904, and again in 1905, an attempt was made to introduce the Montana Grayling into California. The eggs, obtained from Bozeman, Montana, and placed in the Sisson hatchery, hatched well, and the young thrived for a year and a half, when most of them died. The few remaining ones were lost before reaching maturity. A recent report states that grayling have been taken in Merced River, Yosemite Valley, where they had been planted.

11. (517). *Anguilla rostrata* (Le Sueur). American Eel.

Numerous attempts were made to introduce the Atlantic Eel into California. A fruitless attempt, due to the wrecking of the Fish Commission car, was made in 1873; in 1874, June 12, twelve eels from the Hudson River were placed in a slough of the Sacramento River near Sacramento and about 1500 were placed in an inlet of San Francisco Bay, near Oakland. Other plantings were made later, some of

the fish from 12 to 24 inches in length being planted in Suisun Bay at the edge of the tules. There have been occasional reports of captures up to 1880. The attempted introduction, however, was a failure.

12. *Cyprinus carpio* Linnæus. German Carp.

Introduced in 1872 by Mr. J. A. Poppe, who brought five fish from Holstein, Germany, and put them in private waters in California. Introduced later also by the U. S. Fish Commission from Japan and Germany. Now common in many waters throughout the State, and more or less of a nuisance.

13. (814). *Notemigonus crysoleucas* (Mitchill). Golden Shiner.

Reported in small creeks near San Diego by Hubbs; probably introduced with fishes brought from the east.

14. (1152). *Ictalurus punctatus* (Rafinesque). Channel Cat; Fiddler.

Ten introduced into Chico Creek, in 1895, and plants of yearlings made in Lake Cuyamaca and Feather River, in 1891, each water receiving 250 fish. Apparently unsuccessful. The most highly prized of the catfishes, preferring a lively current to stagnant water.

15. (1156). *Haustorius catus* (Linnæus). White Cat; Channel Cat of the Potomac.

Fifty-six examples from Raritan River, New Jersey, introduced by Livingston Stone, placed in the San Joaquin River near Stockton, June 12, 1874. Some were in the Steinhart Aquarium until recently, but apparently succumbed to *Lernæa*, a parasitic crustacean.

16. (1162). *Ameiurus natalis* (Le Sueur). Yellow Cat.

Two species of the common eastern catfishes, *natalis* and *nebulosus*, were probably introduced together in 1874, and they are more or less confused in the records, *A. nebulosus*, which became known as the "Sacramento Cat," entirely eclipsing the other.

17. (1164). *Ameiurus nebulosus* (Le Sueur). Common Bullhead; Horned Pout; Small Catfish; Schuylkill Cat; Sacramento Cat.

Seventy examples were brought by Livingston Stone from Lake Champlain, Vermont, and placed in ponds and sloughs near Sutterville, June 12, 1874. They later became abundant. One writer, in discussing both *nebulosus*, which he says is known in California as the yellow or mud cat, and the blue catfish (*Ameiurus natalis*) (an evident confusion of names), reports that "the introduction of catfish into California can be considered one of the great achievements of the California Fish and Game Commission and of more importance from an economic and commercial point of view, perhaps, than the introduction of the striped bass." In the year 1874, 144 were obtained from the Schuylkill River, Pennsylvania, and later others were received from the Missouri River. All of these were planted in the San Joaquin River near Lathrop. They increased to remarkable numbers. During 1900 the shipments of dressed catfish from Sacramento alone were enormous. Shipments were even made to the native home of the catfish, Missouri and Mississippi river points. They supplied the markets of Chicago, Salt Lake, Denver, Portland, and other middle and eastern points. By the year 1909, however, due to the fyke net and other methods of overfishing, the catfish was in danger of extermination in California.

18. (1320). *Esox ohiensis* Kirtland. Chautauqua Muskellunge.

In May, 1893, the New York Fish Commission furnished the California Fish Commission 100,000 fry of this species from Chautauqua Lake. 93,000 were placed in Lake Merced near San Francisco, in an attempt by the Spring Valley Water Company to clear the lake of Carp. This planting appears to have been a failure, as none of the fish was ever found.

19. (1325). *Esox vermiculatus* Le Sueur. Pickerel.

In December, 1891, a plant of 400 yearling pike from Quincy, Illinois, was made in Lake Cuyamaca near San Diego, and another 100 in Feather River in Butte County. In Lake Cuyamaca in 1926 it was reported that the fish had survived and thriven and were more numerous than any other of the eastern species,

black bass, yellow perch, catfish and crappie, which were planted in the lake at the same time. The species intended to be introduced was the pike, *Esox estor*, but a specimen secured was determined by Dr. Jordan as the pickerel. It is possible both species were included.

20. (1423). *Gambusia patruelis* (Baird & Girard). Top Minnow; Mosquito Fish.

Extensively introduced into ponds and streams in California. Abundant in creeks and irrigation ditches of the Imperial Valley and about the Salton Sea, where it assumes a rich turquoise-blue coloration and appears to be driving out the desert minnow, *Cyprinodon macularius*, which, according to Snyder, appears to be effective as a mosquito-exterator in Owens Valley (Snyder 1917a).

21. (2180). *Perca flavescens* (Mitchill). Yellow Perch.

In December, 1891, 3000 yearling yellow perch were placed in the Feather River in Butte County, and 3980 in Lake Cuyamaca near San Diego. There are no records available concerning the Feather River plant, but that in Lake Cuyamaca is reported as highly successful.

22. (2181). *Stizostedion vitreum* (Mitchill). Wall-eye; Wall-eyed Pike; Pike Perch.

In 1874 Livingston Stone transported 16 full-grown wall-eyed pike from the Missisquoi River, Vermont, and planted them on June 12 in the Sacramento River opposite Sacramento. All that is known of them is that a single specimen was caught in a slough not long afterward.

23. (2314). *Huro floridana* (Le Sueur). Straw Bass; Large-mouth Black Bass.

This species, and the small-mouthed Black Bass, *Micropterus dolomieu*, were brought to California from Lake Champlain, Vermont, and St. Joseph River, Michigan, by Livingston Stone in 1874. Some were placed in Napa Creek, and others in Alameda Creek. In 1879, 22 were put in Crystal Spring Reservoir of the Spring Valley Water Company. A sporting club also placed some in Lake Temescal, near Oakland. The large-mouth especially has flourished, and attains a size rarely if ever attained in the east except in Florida.

24. (2315). *Micropterus dolomieu* Lacépède. Small-mouth Black Bass.

The small-mouth bass was introduced earlier and in larger numbers than the large-mouth. It appears to have been brought to California in 1874 by Livingston Stone. The original lot consisted of 75 full-grown spawning bass from Lake Champlain, Vermont, and 24 small fish from St. Joseph River, Michigan. Two of the large fish and 12 of the small ones were lost in transit. The adult fish were placed in Napa Creek, where they were soon exterminated by anglers, and the immature ones were placed in Alameda Creek. The two species of black bass are not always distinguished, and appear to be generally lumped together in records and reports as "black bass." In 1895, from the landlocked overflow ponds of the Russian River 25,000 fry were collected and distributed among the various counties. The large-mouth, however, seems to be much the more common.

25. (2317). *Apomotis cyanellus* (Rafinesque). Green Sunfish.

The green sunfish was probably introduced into the State with the bluegill, *Helioperca incisor*. The two closely resemble each other when young, and are often found in the same waters. The two are usually associated in the accounts of fishes being introduced under the general term sunfishes. *A. cyanellus* does not attain a sufficient size to be of importance either for food or sport, and those brought in were probably mistaken for bluegills. A few sunfish were accidentally introduced with other fish into Lake Cuyamaca near San Diego, and sunfish obtained from that body of water were identified by Dr. Jordan as *A. cyanellus*.

26. (2331). *Helioperca incisor* (Cuvier & Valenciennes). Bluegill.

The date of introduction and number of individuals of this species is uncertain as they, along with the green sunfish, were introduced merely as sunfishes, about 1890 and 1891. Bluegills are now common and of large size and in many waters of the State.

27. (2342). *Chenobryttus gulosus* (Cuvier & Valenciennes). Warmouth Bass.

Four hundred yearling Warmouth bass from Quincy, Illinois, were placed in Lake Cuyamaca in 1921, and 100 yearlings were deposited in Feather River, in Butte County near Gridley. Nothing has been heard of them since. of 12 fish delivered to the California Fish Commission in June, 1895, six were alive in December of the same year, in a pond in Sisson. Later these are reported to have died.

28. (2343). *Ambloplites rupestris* (Rafinesque). Red-eye; Rock Bass; Goggle-eye.

A plant of four full-grown rock bass from Vermont was made in Napa Creek on June 12, 1874, by Livingston Stone. Nothing has been heard of them since.

29. (2351). *Pomoxis annularis* Rafinesque. Crappie; White Crappie.

30. (2352). *Pomoxis sparoides* (Lacépède). Black Crappie; Calico Bass.

It is reported that both of these species have been introduced. In 1891, 285 yearlings were planted in Lake Cuyamaca, near San Diego. The account from which this report is taken states that most of the fishes distributed were *annularis*, but that it is certain that the other species was included. The black Crappie is, however, the one that seems to have survived in largest numbers. It reaches an immense size, larger than usual in its native home. Both species are now well established in several places in the State.

31. (2366). *Roccus saxatilis* (Walbaum). Striped Bass.

First introduced into California waters in July, 1879, when Livingston Stone planted about 135 of this species, brought from Navesink River, New Jersey, in Carquinez Strait at Martinez.

The Striped Bass introduction was a remarkable success from the start. The second and only other plant was made in 1882, when Mr. J. G. Woodbury of the California Fish Commission carried about 300 fish five to nine inches long from Shrewsbury River, New Jersey, to Suisun Bay, where they were deposited at Army Point. "Considering the small number of fish introduced and their remarkable increase in a few years, the result obtained from the introduction of the striped bass into California is one of the greatest feats of acclimatization of new species of fish in the history of fish culture." "Unquestionably, next to trout, the striped bass is the most popular game fish of northern California." (Scofield & Bryant.)

32. (2367). *Lepibema chrysops* (Rafinesque). White Bass.

Twelve yearling fish were transported from Quincy, Illinois, to the California Fish Commission at Sisson in June, 1925, and five of these were alive in December, to be used for breeding purposes, but all died during the year.