

## AN ACCOUNT OF SOME FISHES FROM OWENS RIVER, CALIFORNIA.

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Owens River basin occupies a long, narrow valley in the most rugged part of the high Sierras of California. On the west the mountains rise in an enormous wall above which tower the peaks of Whitney, Tyndall, and Lyell. On the east are Inyo Range and the White Mountains, whose summits also reach a great elevation. Owens Valley may properly be included within the Great Basin, its western boundary being coincident with the recognized confines of the latter. It is without exterior drainage, Owens River and its tributaries receiving their water from the slopes of the neighboring mountains and discharging it into Owens Lake, from which it is carried off largely by evaporation. The water of the lake is strongly impregnated with mineral salts.

The catchment basin of Owens River is narrowly though sharply separated from that of the San Joaquin by the crest of the Sierras. On the north are Mono Lake and its tributaries, and also a few relatively small depressions which may at one time have been connected with the quaternary Lake Lahontan. Extending far to the east and south is a wide expanse of almost waterless desert.

The occurrence of fishes in Owens River has long been known, but no serious attempt has been made to establish their relationships, a matter of importance when considered in connection with the geographical position and the complete isolation of the valley. Considerable interest therefore attaches to a small collection made by Mr. Clarence Kennedy while acting as assistant to the California State Fish and Game Commission at Laws, a station on the main river. Here the current is not very rapid, and the shores are more or less marshy.

Four native species are represented in the collection, possibly not the entire fish fauna of the basin. They are a catostomid, two cyprinoids, and a poeciliid. The catostomid and cyprinoids are Lahontan species and do not appear to possess any local peculiari-

ties. The former, *Catostomus arenarius*, is abundantly represented in Owens River, while on the contrary it seems to be very rare in the Lahontan system, where specimens are seldom caught. The cyprinoids, *Siphateles obesus* and *Agosia robusta*, are common and widely distributed Lahontan species. The poeciliid, *Cyprinodon macularius*, is a form which has an irregular distribution in desert springs and small streams of southern Nevada, California, and elsewhere. Native trout have not been reported from the Owens River basin, their absence calling to mind the similar case of Eagle Lake, which has been reached by Lahontan catostomids and cyprinoids but not by the trout. The trout of Eagle Lake is related to those of the western slopes of the mountains.

The fauna of Owens River has been largely derived from the Lahontan system. Two of its species, *C. arenarius* and *A. robusta*, may have reached the river by stream capture, but the presence of *Siphateles* offers some difficulty to the acceptance of a speculation which would thus account for the invasion of the basin by Lahontan species. The known species of *Siphateles* are lake and channel forms, and none has yet been observed at a great distance up stream from a lake, a deep spring pond, or a slough-like channel.

#### CATOSTOMUS ARENARIUS Snyder.

#### SAND-BAR SUCKER.

Representatives of but one species of *Catostomus* were secured, and these belong to a form *C. arenarius* lately described from the Lahontan system. Where first discovered, the species appears to be rare, for after considerable collecting only nine specimens were obtained, not enough to furnish very definite data regarding its characteristics and distribution. Since, however, examples were taken in high mountain streams, in the lower Truckee River, and in Pyramid and Tahoe Lakes, one may be permitted to infer that its distribution is rather general in the Lahontan system, and therefore equally so in Owens River. Of its occurrence here Mr. Kennedy observes:

Suckers are common everywhere in the main river, usually lying in schools on the inflow side of the pools, with heads upstream. Some are very handsome fish, dark olive brown, with the paler areas of the sides flecked with shining gold which fades into yellowish white on the fins and ventral surface. Some are not so dark, gray and white examples often being seen.

Differences of a measurable character appear when examples from Owens River and the Lahontan system are compared, the former having somewhat smaller scales and longer fins. The differences are slight, and they may perhaps disappear with the study of a larger series of specimens.



Examples from the Lahontan system exhibit the following scale characters:

Scales in lateral series.....	50	51	52	53	54	55	56	57	58	59	60
Number of specimens.....	1	2	2	13	6	13	13	5	7	4	1
Scales before dorsal fin.....	27	28	29	30	31	32	33				
Number of specimens.....	4	9	17	16	18	3	2				
Scales above lateral line.....	12	13	14	15	16						
Number of specimens.....	8	30	25	5	1						

Measurements of *Siphateles obesus*, Owens River, Laws.

Length of body.....mm..	109	90	86	91	89	83	81	82	88	89
Length head.....	.275	.27	.29	.28	.28	.28	.27	.275	.27	.27
Depth body.....	.245	.25	.28	.26	.26	.26	.27	.28	.27	.27
Depth caudal peduncle....	.11	.13	.135	.13	.12	.13	.13	.13	.135	.13
Length caudal peduncle....	.20	.20	.22	.20	.21	.20	.20	.21	.19	.21
Length snout.....	.08	.075	.08	.08	.08	.09	.076	.08	.075	.08
Diameter eye.....	.05	.06	.06	.055	.065	.07	.065	.07	.06	.06
Interorbital width.....	.09	.10	.10	.095	.10	.10	.092	.10	.11	.11
Depth head.....	.20	.20	.20	.20	.20	.21	.20	.20	.20	.21
Snout to occiput.....	.21	.21	.21	.21	.22	.21	.22	.21	.20	.21
Snout to dorsal.....	.56	.57	.55	.53	.55	.57	.55	.55	.565	.55
Snout to ventral.....	.555	.55	.56	.55	.56	.56	.56	.56	.56	.55
Length base of dorsal.....	.11	.10	.11	.12	.125	.11	.12	.122	.12	.12
Length base of anal.....	.085	.09	.10	.08	.09	.082	.085	.09	.10	.08
Height dorsal.....	.19	.185	.18	.17	.20	.16	.20	.19	.19	.20
Height anal.....	.15	.15	.15	.13	.15	.14	.15	.15	.14	.16
Length pectoral.....	.175	.16	.18	.17	.17	.17	.16	.17	.18	.21
Length ventral.....	.155	.15	.15	.14	.16	.14	.15	.15	.15	.165
Length caudal.....	.235	.23	.23	.22	.26	.22	.25	.24	.27	.25
Dorsal rays.....	8	8	8	8	8	8	8	8	8	8
Anal rays.....	7	8	8	8	8	8	7	7	8	7
Scales lateral line.....	51	52	57	53	55	54	50	51	56	54
Scales above lateral line....	14	14	13	14	15	14	13	14	14	15
Scales below lateral line....	6	7	7	8	7	8	7	7	7	7
Scales before dorsal.....	32	32	29	29	32	33	29	31	29	31

AGOSIA ROBUSTA Rutter.

BLACK MINNOW.

Numerous specimens of this species fail to present any distinctive local characteristics when compared with a large series from the Lahontan system. The general shape is similar to Lahontan examples. The barbels, usually present, are in some cases only seen on one side or the other, or are entirely absent. The lateral line may be entirely complete or variously interrupted, but usually extends to or beyond a point beneath the origin of the dorsal fin. There is a dark lateral stripe which is indistinct anteriorly, but very prominent posteriorly, ending in a black, round spot at the base of the caudal fin. Spots of dark pigment are scattered over the body. They are irregular in outline, their boundaries not coincident with those of the included scales.

In 20 examples the scales in the lateral series number 60 to 67; between occiput and insertion of dorsal 37 to 42; above lateral line 12 to 14; below lateral line 9 or 10.

Mr. Kennedy remarks:

This species is not common. It varies much in color, often being olive brown above, occasionally more gray than olive; yellowish white below. The side stripe is in some cases very conspicuous, in others obscure. The small, yellowish eye distinguishes this fish among others.

CYPRINODON MACULARIUS Baird and Girard.

#### SPOTTED PURSY MINNOW.

This little fish occurs in the shallow pools along the river. It abounds in the bog pastures and tulle swamps, and enters the irrigation ditches in large numbers. When undisturbed it swims about after the manner of top-minnows, the mouth at the surface, the tail deeply submerged.

Mr. Kennedy reports that the swampy areas of Owens River are relatively free from mosquitoes, and suggests that their absence is probably due to the activities of this fish. The suggestion is well worth serious attention, and if investigation proves that the species aids in controlling the pest in this place, its introduction should be attempted in swampy and irrigated regions where mosquitoes abound, parts of the Sacramento Valley, and the lower Humboldt River, for example.