

2.—DESCRIPTION OF A NEW SUCKER, *PANTOSTEUS* JORDANI, FROM THE UPPER MISSOURI BASIN.

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In the following paper is given a description of a new species of sucker, *Pantosteus jordani*, together with a discussion of the distribution of the various species of the genus *Pantosteus*, it being thought advisable to publish this in advance of the completion of a report upon investigations in the Black Hills region upon which I am now engaged, and of which this is to be regarded as forming a part.

PANTOSTEUS JORDANI sp. nov.

Pantosteus virescens, Jordan, Bull. 4, vol. IV, U. S. Nat. Mus., 1878, 780 (Sweet Grass Hills, Montana).
Catostomus discobolus, Evermann, Bull. U. S. Fish Comm. 1891, pl. XVIII, fig. 1, 41 (Red Rock River, Red Rock, Mont., and Beaverhead River, Dillon, Mont.).

Head, $4\frac{1}{2}$ to $5\frac{1}{2}$; depth, $4\frac{1}{2}$ to 5; eye, $4\frac{1}{2}$ to 5; snout, 2 to $2\frac{1}{4}$; interorbital width, $2\frac{1}{4}$; D. I, 10; A. I, 7; scales, about 16-96-14, 48 before the dorsal.

Body rather stout, subterete, back gently and regularly arched from snout to origin of dorsal, thence nearly straight to base of caudal; head small, short, and conic, interorbital space broad and but little convex; snout long, about half length of head; mouth large, broad; lower lip broad, very little incised, covered with tubercles of moderate size; upper lip also broad, extending well down on sides of mouth, tubercles in about 3 or 4 rows; cartilaginous sheath of lower lip well developed; caudal peduncle stout, not much compressed; scales small and much crowded anteriorly, lateral line straight and near axis of body; dorsal small, its height $1\frac{1}{2}$ in head and a little greater than base of fin, its origin considerably nearer snout than base of caudal; pectorals long, about equal to length of head, reaching more than half way to the ventrals; ventrals short, not reaching vent; anal about $\frac{1}{2}$ longer than pectorals, reaching base of caudal; fontanelle reduced to a very narrow slit, practically obliterated in the older individuals; peritoneum very black; air-bladder small, the posterior part long and very slender.

Color, dark-greenish above, scales covered very closely down to the paired fins with innumerable fine dark or greenish specks, most numerous on back; under parts pale; in life, or immediately upon putting in alcohol, some specimens were observed to have a broad orange band along the side, this probably being a marking present during the breeding season. Young specimens 2 to 3 inches long are frequently mottled very much like the young of *Catostomus teres* and *C. nigricans*.

This interesting species is based upon the following material:

U. S. Nat. Mus. No.	No. of specimens.	Locality.	Date.	Collector.
43963	13	Red Rock River, Red Rock, Montana	July 27, 1891	B. Clapham.
43964	13	Beaverhead River, Dillon, Montana	July 27, 1891	Evermann & Jenkins.
	185	Whitewood Creek, Deadwood, South Dakota	Oct. 6, 1892	B. W. Evermann.
	45	Spearfish Creek, Spearfish, South Dakota	Oct. 7, 1892	Do.
	3	Chicken Creek, near Spearfish, South Dakota	Oct. 8, 1892	Do.
	5	Crow Creek, Gaimmon's Ranch, near Spearfish, South Dakota	Oct. 8, 1892	Do.
	3	Belle Fourche River, Belle Fourche, South Dakota	Oct. 11, 1892	Do.
	13	Rapid Creek, Rapid, South Dakota	Oct. 15, 1892	Do.
	2	Hat Creek, Ardmore, South Dakota	Oct. 21, 1892	Do.

In the report upon the explorations in Montana and Wyoming by Dr. O. P. Jenkins and myself, I hesitated to regard the specimens which we collected at Red Rock and Dillon as being new, and identified them as *Catostomus discobolus* Cope.

The narrow fontanelle and the cartilaginous sheath of the lower lip, together with the uncertainty as to the exact locality from which Prof. Cope's types came, seemed to favor this identification. Upon the suggestion of Dr. Jordan that the types of *C. discobolus* were probably the young of *C. latipinnis* and that my specimens were probably an undescribed species, I was induced to make a reëxamination of the question. This was particularly desirable in view of the fact that so much additional material had resulted from my recent explorations in the Black Hills.

Prof. Cope's types of *Catostomus discobolus* consisted of "two specimens, one certainly, the other probably, from the Green River, Wyoming,"* and can not now be found, but there are twelve specimens from the Colorado Basin in the National Museum under the name *C. discobolus*, presumably identified as such by Prof. Cope. These are quite certainly young specimens of *Pantosteus delphinus*, and I am inclined to the belief that the types of *C. discobolus* were also the young of this species rather than the young of *C. latipinnis*. Should this be the case, the species would stand as *Pantosteus discobolus* (Cope), *discobolus* having priority over *delphinus*.

While this question can not be definitely determined, Prof. Cope's description of *C. discobolus* applying equally well to *C. latipinnis* and *P. delphinus*, the probabilities are strongly in favor of this view, and I therefore adopt the name *discobolus* instead of *delphinus* for the *Pantosteus* of the Colorado River.

As remarked elsewhere in this paper, all the other specimens in the Museum which have been called *C. discobolus* (and which are from Lapwai Creek, Idaho), are undoubtedly young specimens of *C. catostomus*.

An examination of the air bladder in several species of suckers shows marked differences. In all species of *Pantosteus* examined (*P. generosus*, *plebeius*, *discobolus* and *jordani*) the air bladder is quite small, the first (anterior) compartment being quite short, while the second is very long and slender, usually $2\frac{1}{2}$ to 3 times the length of the first.

In one specimen of *P. discobolus* the air bladder was large, but this specimen had been previously cut open and examined by some one; the air bladder was detached, and may possibly belong to another fish.

*Hayden's Geological Survey of Wyoming, 4th Annual Report, 1870, 435.

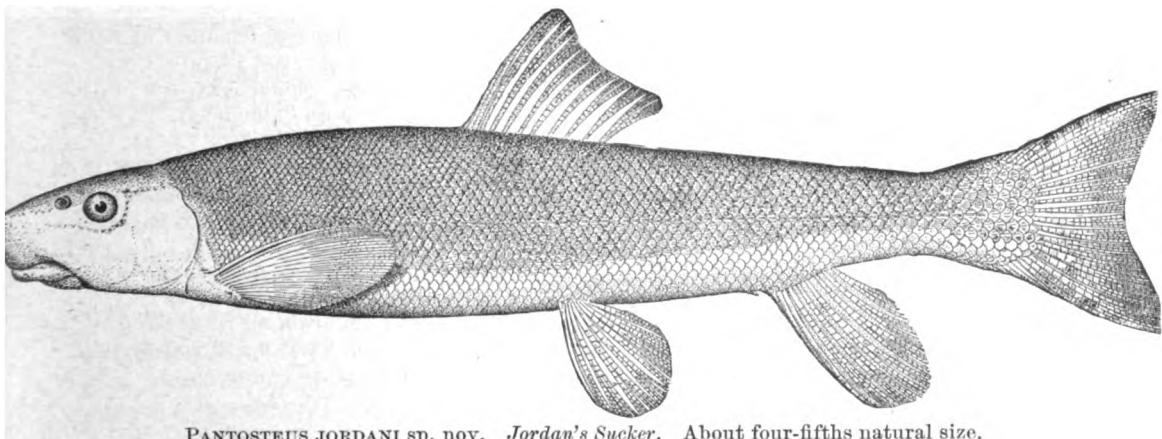
In all species of *Catostomus* examined (*C. latipinnis*, *catostomus*, *ardens*, and *griseus*), the air bladder is large, very much larger than in any *Pantosteus* and very different in appearance except in *C. latipinnis*, in which the air bladder greatly resembles that of *Pantosteus*.

Pantosteus jordani is rather intermediate in its structure between *Pantosteus* and *Catostomus*, but, on the whole, its characters indicate a closer relationship with the species of the former genus, in which it should be placed if *Pantosteus* and *Catostomus* are to be regarded as generically distinct, the propriety of which is doubtful. The high development of the cartilaginous sheath is a character possessed by all the species of *Pantosteus* and is not found among the species of *Catostomus*, except in *C. catostomus*, where it is more pronounced than in any other species of that genus.

The entire obliteration of the fontanelle, even in the most typical species of *Pantosteus*, is a question of age, the fontanelle being more or less evident as a very narrow slit in the young of all the species of which the young are known.

Pantosteus jordani is, on the one hand, most closely related to *Pantosteus virescens* Cope and *P. discobolus* (Cope), while on the other it resembles *C. catostomus* (Forst.). It is the most abundant and most generally distributed species of the family in the streams flowing from the Black Hills, and frequents the clear, colder, and swifter parts of the streams. With the exception of Hat Creek, all the streams in which it has been found are clear and cold. We did not find it at all in the South Fork of the Cheyenne nor in the Loup or Beaver Creek at Ravenna. It is apparently a fish of small size which delights in the upper reaches and colder, clearer portions of the smaller mountain streams of the Upper Missouri basin.

I name this interesting species for my teacher and friend, President David Starr Jordan, of Leland Stanford Junior University.



PANTOSTEUS JORDANI sp. nov. Jordan's Sucker. About four-fifths natural size.

In connection with my study of this species I was led to an examination of all the specimens of *Pantosteus* and the related species of *Catostomus* to be found among the collections now in the U. S. National Museum. Dr. Jordan, in his Catalogue of Fishes of North America, published in 1885, recognized but three species of *Pantosteus*, viz, *plebeius*, *generosus*, and *guzmaniensis*, and expressed the opinion that *Minomus bardus* and *M. delphinus* of Cope should be considered identical with *P. plebeius*, and further, that *P. virescens* Cope is the same as *Acomus guzmaniensis* Girard.

The collections made in 1889 in Colorado and Utah by Dr. Jordan and myself contain numerous specimens of *Pantosteus* from the Rio Grande, Colorado, and Utah basins, the study of which led Dr. Jordan to admit the three species, *P. plebeius*, *generosus*, and *delphinus*. He at this time regarded *Acomus guzmaniensis* as identical with *P. plebeius*, and *P. virescens* as being probably the same as *P. delphinus*.

These collections of 1889 suggested the strong probability of the limited distribution of each species of this genus, and that each is likely confined to a single hydrographic basin. My examination of the types of all the nominal species now to be found, and the comparison with them of all the other material obtainable, confirm this view. I can see no differences of any value among the specimens from the different places in the Rio Grande basin, and must regard them all as being identical with Baird and Girard's *Catostomus plebeius*, the types of which came from the Rio Mimbres, a tributary of Lake Guzman, which is in the Rio Grande basin. All the specimens from the Colorado basin are easily referable to *P. delphinus* (Cope), while all those from the Utah basin are with equal certainty *P. generosus* (Girard).

The only specimen from the Arkansas basin is the type of Cope's *P. virescens*, which is said to have been taken in the Arkansas River at Pueblo, Colo. This specimen is about 14 inches in total length, and is in good condition. It is most closely related to *P. discobolus*, and, like that species, has a slender caudal peduncle and very small scales, which I count as 17-103-16, and 45 before the dorsal. I am not sure that this is really distinct from *P. discobolus*, and doubt if the specimen came from the Arkansas River.

The synonymy of the species of *Pantosteus* should stand as follows:

PANTOSTEUS PLEBEIUS (B. & G.).

- Catostomus plebeius* B. & G., Proc. Acad. Nat. Sci. Phila. 1854, 28 (Rio Mimbres, tributary of Lake Guzman, Chihuahua); Agassiz, Am. Jour. Sci. & Arts, 2d series, xix, 208, 1855.
Minomus plebeius, Grd., Proc. Acad. Nat. Sci. Phila. 1856, 173 (Rio Mimbres, Chihuahua); *ibid.*, U. S. and Mex. Bound. Survey, 1858, 38, pl. xxiii, figs. 6-10 (Rio Mimbres, Chihuahua).
Catostomus plebeius, Gunther, Cat. Fishes, vii, 15, 1868 (Rio Mimbres).
Pantosteus plebeius, Jordan & Gilbert, Synopsis, 122, 1883 (Lake Guzman); Jordan, Bull. U. S. F. C., ix, for 1889 (1891), 19 (Rio Conejos, Colo., and Rio Grande at Del Norte and Alamosa, Colo.).
Catostomus (Acomus) guzmaniensis Grd., Proc. Acad. Nat. Sci. Phila. 1856, 173 (Janos River, tributary of Lake Guzman, Chihuahua).
Acomus guzmaniensis Grd., U. S. and Mex. Bound. Survey, 1858, 39, pl. xxiii, figs. 6-10 (Janos River, Chihuahua).
Catostomus guzmaniensis, Gunther, Cat. Fishes, vii, 15, 1868 (Janos River, Chihuahua).
Pantosteus jarrovi, Cope and Yarrow, Zoölogy Wheeler Survey, v, 674, pl. xxix, figs. 2 and 2a, 1875, only in part (San Ildefonso and Taos, New Mexico).

Habitat: Rio Grande Basin.

PANTOSTEUS VIRESCENS (Cope).

- Pantosteus virescens* Cope, Zoöl. Wheeler Survey, 1875, 675 (Arkansas River, Pueblo, Colo.); *ibid.*, Jordan & Copeland, Check List, 1876, 156; *ibid.*, Jordan, Bull. U. S. Geol. Surv. Terr., iv, 416, 1878 (Arkansas River).

Habitat: Arkansas River.

PANTOSTEUS GENEROSUS (Grd.).

- Catostomus (Acomus) generosus* Grd., Proc. Acad. Nat. Sci. Phila. 1856, 174 (Cottonwood Creek, Utah).
Acomus generosus Grd., P. R. R. Survey, 1858, 221 (Cottonwood Creek, Utah).
Catostomus ? generosus, Cope, Plagopterinæ and Ichthyol. of Utah, 1874, 7 (Provo, Utah); *ibid.*, Jordan and Copeland, Check List, 1876, 156.
Pantosteus generosus, Jordan, Bull. XII, U. S. Nat. Mus., 1878, 183 (Great Basin of Utah); *ibid.*, Jordan and Gilbert, Synopsis, 1883, 123 (only in part); *ibid.*, Jordan, Cat. Fish. N. A., 1885, 17; *ibid.*, Bull. IX, U. S. Fish Com. for 1889 (1891), 31 and 35 (Jordan River, Sevier River, and Utah Lake).
Minomus platyrhynchus Cope, Proc. Am. Philo. Soc. Phila. 1874, 134 (Provo, Utah); *ibid.*, Plagopterinæ and Ichthyol. of Utah, 1874, 6 (Provo, Utah).
Pantosteus platyrhynchus, Cope & Yarrow, Zoöl. Wheeler Survey, 1875, 673, pl. xxix, figs. 3 and 3a (Provo River, Utah); *ibid.*, Jordan & Copeland, Check List, 156, 1876; *ibid.*, Bull. XII, U. S. Nat. Mus., 1878, 183 (Utah Lake and tributaries); *ibid.*, Jordan & Gilbert, Synopsis, 1883, 123 (Utah Lake).
Minomus jarrovii Cope, Proc. Am. Phil. Soc. Phila. 1874, v, 129-139 (Provo, Utah).
Pantosteus jarrovii, Jordan & Copeland, Check List, 1876, 156.
Catostomus guzmaniense, Cope & Yarrow, Zoöl. Wheeler Survey, 1875, 679 (Utah Lake).

Habitat: Great Salt Lake Basin.

PANTOSTEUS DISCOBOLUS (Cope).

- Catostomus discobolus* Cope, Hayden's Geol. Survey of Wyo., 1870, 435 (two specimens, one certainly, the other probably, from Green River, Wyoming).
Minomus delphinus Cope, Hayden's Geol. Survey of Wyo., 1870, 435 (probably from Green River).
Pantosteus dolphinus, Jordan & Copeland, Check List, 1876, 156 (misprint for *delphinus*).
Pantosteus delphinus, Jordan & Gilbert, Synopsis, 1883, 122 (probably from Green River); *ibid.*, Jordan, Bull. IX, U. S. Fish Comm. for 1889 (1891), 27 (Eagle River, Gypsum, Colo.; Gunnison and Uncompahgre rivers, Delta, Colo.; Rio de las Animas and Rio Florida, Durango, Colo.).
? *Minomus bardus* Cope, Hayden's Geol. Survey of Wyo., 1870, 436 (probably Green River).
Pantosteus jarrovii, Cope & Yarrow, Zoöl. Wheeler Survey, 1875, 674, in part only (Zuñi River, N. M., and Tierra Amarilla, N. M. The figures, pl. xxix, 2 and 2a, are *P. plebeius*).
Catostomus discobolus Cope, Proc. Am. Philo. Soc. Phila. 1874, 138; *ibid.*, Plagopterinæ and Ichthyol. of Utah, 1874, 10 ("Zuñi River, Arizona;" "Arizona"); *ibid.*, Cope & Yarrow, Zoöl. Wheeler Survey, 1875, 677 (Zuñi River, N. M.; "Arizona").

Habitat: Basin of the Colorado River.

In the appended table is given a list of all the specimens of *Pantosteus* that can now be found in the U. S. National Museum, together with my identification of each.

All the specimens which have been called *P. jarrovii* that I have been able to find are apparently from the Rio Grande and Utah basins, those from the former being *P. plebeius* and those from the latter *P. generosus*.

Those reported by Cope and Yarrow from the Zuñi river, New Mexico, can not be found, but were most likely *P. discobolus*, which is known to occur there.

There are seven bottles of suckers in the Museum, labeled *Catostomus discobolus*. Three of these lots are from the Colorado Basin and are almost certainly young specimens of *P. discobolus*. They have been regarded by Dr. Jordan as the young of *Catostomus latipinnis*; but I find, upon comparing them with small specimens of *latipinnis* from the Uncompahgre and Sevier rivers, that the fontanelle is more nearly obliterated, the lower lip is broader and less deeply incised, and the cartilaginous sheath much more developed than in *latipinnis*. Furthermore, they are not distinguishable by me from specimens of what has been called *P. delphinus* of the same size

from the Uncompahgre River. The cartilaginous sheath is quite as well developed, the scales are equally small, and the fontanelle is as imperfect.

All the other specimens in the Museum labeled *Catostomus discobolus* were collected by Capt. Bendire, in Lapwai Creek, Idaho, which is in the Snake River Basin, and are undoubtedly the young of *Catostomus catostomus*.

The specimens collected at Amarilla, N. Mex., by Dr. Yarrow have the caudal peduncle a little deeper than in other specimens of *discobolus* with which I have compared them, but they are certainly not *generosus*; they may possibly be *plebeius*, but are most likely *discobolus*.

According to this view, Prof. Cope's types of *P. jarrovi* from the Rio Grande are *plebeius*, those from the Utah basin are *generosus*, and those (if any) from the Colorado basin are *discobolus*. All these specimens are small and some of them, particularly those said to be from Zuñi, are in such poor condition as to render certain identification impossible. It is possible that the locality labels have been confused.

In *P. discobolus* the lower lip is somewhat broader and the tubercles smaller than in *plebeius* and *generosus*. It bears a close external resemblance to *C. latipinnis*, especially in the general shape of the body, the slender caudal peduncle, and the small, subequal scales, but the eye is smaller.

List of specimens of Pantosteus now found in U. S. National Museum.

Nat. Mus. No.	No. of specimens.	When collected	Collector.	Locality.	Name under which entered in National Museum.	Identification.
20913	16	1873	Dr. H. C. Yarrow	"Amarilla, N. Mex."	Pantosteus generosus, part of the types of <i>P. jarrovi</i> .	Pantosteus discobolus.
16758	1	1874	C. E. Aiken	Arkansas River, Pueblo, Colo.	Pantosteus guzmaniensis, type of <i>P. virescens</i> .	Pantosteus virescens.
15763	4	1872	Yarrow & Henshaw	Provo, Utah	Pantosteus generosus, types of <i>P. platyrhynchus</i> .	Pantosteus generosus.
168	1	1851	J. H. Clark	Rio Mimbres, Lake Guzman, Chihuahua.	Pantosteus plebeius (type of <i>Catostomus plebeius</i>).	Pantosteus plebeius.
168	5	1851	do	Rio Mimbres, Lake Guzman.	Pantosteus plebeius, types.	Do.
27080	30	1874	Dr. H. C. Yarrow	"Rio Grande, Il de Fonso."	Pantosteus generosus, part of types of <i>P. jarrovi</i> .	Do.
18068	5	1874	Cope & Shedd	Nutrias, Colo.	Pantosteus generosus, part of types of <i>P. jarrovi</i> . (?)	Do.
18009	9	1874	Dr. H. C. Yarrow	"New Mexico"	Pantosteus generosus, part of types of <i>P. jarrovi</i> .	Do.
18011	35	1874	do	do	do	Do.
5910	1		Lieut. Beale	Ojo de Gallo, N. Mex.	Pantosteus generosus	Do.
(3029)	13	1889	Jordan & Evermann	Rio Grande, Alamosa, Colo.	Pantosteus plebeius	Do.
41645						
(3047)	13	1889	do	Rio Conejos, Alamosa, Colo.	do	Do.
41659						
15783	4	1873	H. W. Henshaw	Zuni, N. Mex.	Catostomus discobolus	Pantosteus discobolus.
12914	4	1873	Dr. C. G. Newberry	"Arizona"	do	Do.
15791	4	1873	do	do	do	Do.
12906	3	1872	Yarrow & Henshaw	Provo, Utah	Pantosteus generosus, part of the types of <i>P. jarrovi</i> .	Pantosteus generosus.
15802	1	1873	H. W. Henshaw	Zuni, N. Mex. (Locality probably wrong.)	do	Do.
30807	1	1881	P. Madsen	Utah Lake	Pantosteus generosus	Do.
30807	1	1881	Jordan & Madsen	Utah Lake, Provo, Utah.	do	Do.
260	2	1854	Dr. C. B. Kennerly	Rio Janos, Lake Guzman, Chihuahua.	Pantosteus guzmaniensis (type of <i>Acomus guzmaniensis</i>).	Pantosteus plebeius.
256	3	1854	Lieut. E. P. Beckwith	Cottonwood Creek, Utah.	Pantosteus generosus (type of <i>Acomus generosus</i>).	Pantosteus generosus.
F. C.) (3006) 41624	25	1889	Jordan & Evermann	Provo, Utah	Pantosteus generosus	Do.
(3027)						
41631	5	1889	do	Uncompahgre River, Delta, Colo.	Pantosteus delphinus	Pantosteus discobolus.
(3020)						
41627	15	1889	do	Jordan River, Utah	Pantosteus generosus	Pantosteus generosus.

WASHINGTON, January 25, 1893.