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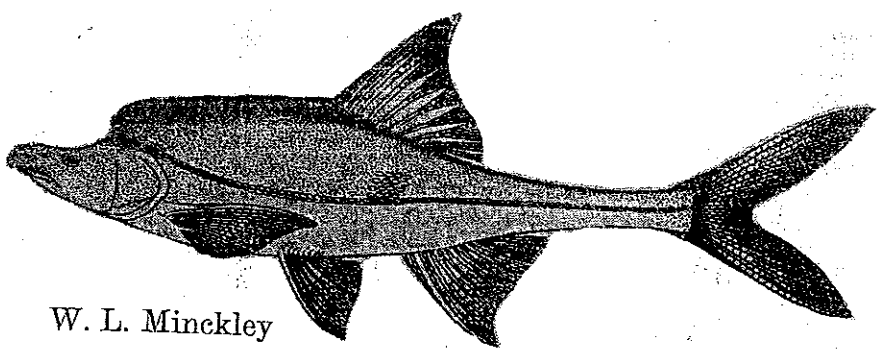
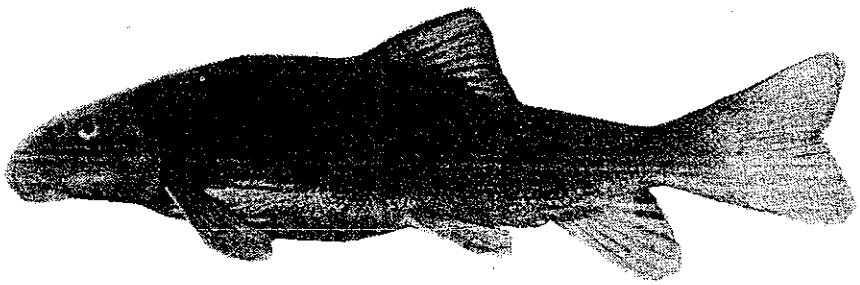
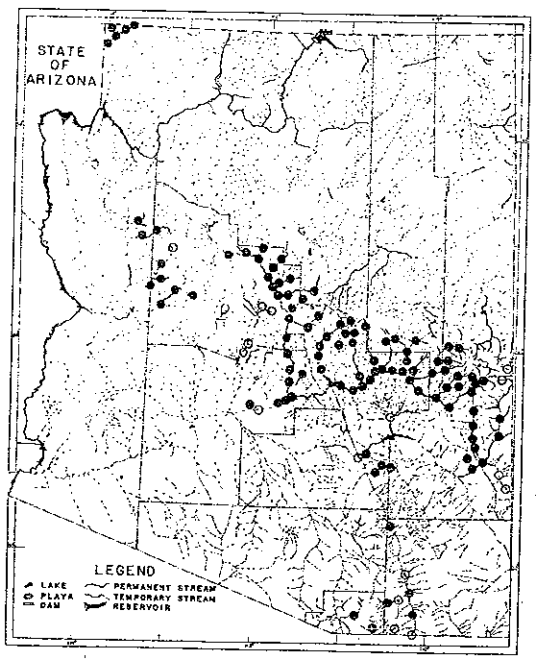


W. L. Minckley

Gila mountain-sucker, *Pantosteus clarki* (Baird and Girard)[15]

(Fig. 79; Map 27)





[15]Smith (1966) considered *Pantosteus* as a specialized subgenus of *Catostomus*, and also combined a number of nominal species and undescribed populations under the name *Catostomus (Pantosteus) clarki*. I retain the generic name *Pantosteus* for the mountain-suckers, and reluctantly discuss populations of the Colorado basin downstream from Grand Canyon as *P. clarki*. Reasons for my reservations are provided in text.

Catostomus clarkii, Baird and Girard, 1854: 27. Koehn, 1969a: 21/ 1969b: 943.

Minomus clarkii, Girard, 1856: 173.

Minomus clarki, Girard, 1859a: 38.

Catostomus clarki, Jordan, 1878: 165/ 1886: 120. Kirsch, 1889: 556. Smith, 1966: 73. Moore, 1968: 101. Amin, 1969b: 429. Koehn, 1970: 219. Smith and Koehn, 1971: 283.

Pantosteus arizonae, Gilbert, in Jordan and Evermann, 1896: 170. Evermann and Rutter, 1895: 481 *(nomen nudem)*. Gilbert and Scofield, 1898: 489.

Pantosteus clarkii, Evermann and Rutter, 1895: 481. Hubbs, *et al.*, 1942: 40.

Pantosteus clarki, Miller and Winn, 1951: 84. Winn and Miller, 1954: 274. Eddy, 1957: 75. Koster, 1957: 47. Miller, 1961b: 376/ 1964a: 7. Miller and Lowe, 1964: 143/ 1967: 143. Minckley, 1965a: 51/ 1969a: 4/ 1971: 186. Barber and Minckley, 1966: 321. Koehn, 1966: 349. Lowe, 1967: 102. Lowe, *et al.*, 1967: 1013. Minckley and Alger, 1968: 92. Minckley and Deacon, 1968: 1427. Minckley and Johnson, 1968: 10.

Notolepidomyzon arizonae, Fowler, 1913: 47.

Notolepidomyzon clarki, Snyder, 1915: 575.

Notolepidomyzon clarkii, Jordan, *et al.*, 1930. 104. Tanner, 1942: 29.

Notolepidomyzon utahensis, Tanner, 1932: 135/ 1936: 165/ 1942: 29.

Pantosteus delphinus utahensis, Hubbs, *et al.*, 1942: 60. Wallis, 1951: 87. Miller, 1952b: 27. Winn and Miller, 1954: 283. Miller and Hubbs, 1960: 20.

Pantosteus platyrhynchus, Wallis, 1951: 89 (part).

Pantosteus species, Winn and Miller, 1954: 283.

Pantosteus delphinus, Sigler and Miller, 1963: 93 (part).

Catostomus (Pantosteus) clarki, Koehn and Rasmussen, 1967: 132.

Smith's (1966) diagnosis, with some comments and clarification pertinent to this work inserted parenthetically and italicized, is as follows:

> "Medium-sized catostomid fishes, attaining adult size of 100 to 280 mm *(or more, to 325 mm)* in standard length; lips large with small papillae evenly dispersed over lower lip and oral face of upper lip, but absent from anterior face of upper lip; lateral notches at juncture of lower and upper lip well developed; median notch in lower lip shallow, separated from upper by 4 to 7 rows of papillae; ridge of lower jaw truncate, 4.1 to 8.7, usually 5 to 8 per cent of standard length; width of isthmus, 6.9 to 11.9, usually 8 to 11 per cent of standard length; gill rakers, 28-43 (usually 30-40) on external row and 38-59 on internal row of first arch in specimens over 70 mm in standard length; gill rakers with spines in two rows; frontoparietal fontanelle usually closed in adults, reduced in young specimens; peritoneum usually black, occasionally dusky; intestine long, up to 8.8 times standard length, with 6 to 16 coils anterior to liver, usually 10 or more coils in specimens over 70 mm in standard length; swimbladder reduced or not, length 15 to 30 per cent of standard length; scales in the lateral line, 61 to 104, usually 65 to 80 in the Gila drainage, 70 to 80 in the *(Pluvial)* White River drainage, *(Nevada)* 75 to 90 in the Meadow Valley Wash *(Nevada)* and Beaver

> Dam Wash *(Nevada and Arizona)*, and 80 to 100 in the Virgin River *(Nevada, Arizona, and Utah)* and Bill Williams River *(Arizona)* drainages; predorsal scale, 13 to 52, usually 15 to 30 in the Gila River drainage, 25 to 35 in the White and Bill Williams River drainages, 30 to 40 in the Meadow Valley Wash, and 30 to 45 in most of the remainder of the Virgin River drainage [except 42 to 52 in Birch Creek *(Utah)*]; post-Weberian vertebrae, 41 to 47, usually 43 to 46 in the Gila River drainage and 42 to 45 elsewhere; dorsal rays, 8 to 12, usually 10 or 11; pelvic rays, 8 to 12, usually 9 or 10; pelvic axillary *(inguinal process)* reduced to a simple fold or absent; *(the last condition in forms generally outside of Arizona)*; caudal peduncle 6.9 to 11.2, usually 8.5 to 10 per cent of standard length; coloration silvery tan to dark greenish above, silvery to yellowish below; caudal pigment dispersed over fin rays and membranes."

Variation in morphology of this complex of fishes is exceedingly difficult to interpret, and requires additional, detailed investigation. I have qualitatively examined many hundreds of large, adult specimens of the group, from throughout its range, and am convinced that more than one species is involved. The true *Pantosteus clarki*, with large scales (especially before the dorsal fin), wide, greatly expanded jaws and lips, with lower lip essentially straight across its posterior margin, occurs through the entire Gila River basin, and in the Bill Williams tributaries, and is locally sympatric with another form of *Pantosteus* in the latter system. The Bill Williams form(s) of *Pantosteus* are fine-scaled, more terete, and have their lower lips arranged in a broad "V" along their posterior margin, and seem superficially like some of the Virgin River populations.

The Virgin River basin (including Meadow Valley Wash in Nevada) is inhabited by two forms of *Pantosteus*. A swift-water kind, with large fins and a thin caudal peduncle, lives in the mainstream, and a thicker-bodied, shorter-finned form is in tributary streams. Intergradation or hybridization of these two kinds is indicated in the mouth of Beaver Dam Creek, Arizona, but the two kinds also occur together, infrequently, in the mainstream of the Virgin River near Littlefield, a kilometer or so up- and downstream from that tributary. The populations persisting in remnants of the Pluvial White River, Nevada (a Pleistocene contributor to the Virgin River basin), were formerly known as *Pantosteus intermedius* Tanner (1942). These are separated from the remainder of the "*clarki*" complex by a distinct break in a number of characters (Smith, 1966), and would best be retained as a distinct taxon until the complexities of the problem are further resolved.

Some comments on the retention of *Pantosteus* as a genus are obviously appropriate. This reflects a basic difference of opinion, which has been stated as two alternative considerations by Smith (1966):

> "On one hand is the utility of recognizing monophyletic, morphologically definable species groups. On the other hand is the utility of recognizing the evolutionary closeness of *Pantosteus* and *Catostomus* and the continuum among the borderline species of the groups. The choice is a difficult one, but the latter solution is favored here and is supported by an independent body of information."

Smith's independent body of information supporting synonymization of *Pantosteus* with *Catostomus* principally revolves about the relationships of two species, originally described as *Pantosteus columbianus* Eigenmann and Eigenmann (1893), primarily distributed in the Columbia River system, and *Catostomus plebeius* Baird and Girard (1854), from the Mimbres and Río Grande systems of the United States and many Mexican drainages.

The first form, *P. columbianus*, has had a complex, tortuous taxonomic history, being shifted from one genus to the other, described as a species of *Catostomus*, and generally causing problems in allocation (Smith, 1966). Intermediacy in external morphology of this fish, between *Pantosteus* and *Catostomus*, is evident, and a strong argument may, and has been in the past, put forward for its inclusion as a species of *Catostomus (sensu stricto)*. This is again strongly supported by recent studies of western catostomids (Koehn, 1967; 1969a; Smith & Koehn, 1971), in which *columbianus* has been demonstrated to correspond closely to other species of *Catostomus (s.s.)*, but to differ markedly from *Pantosteus* species. The habitat of *columbianus* in smaller, rapidly-flowing creeks in parts of its range is most similar to that typically inhabited by *Pantosteus*, but the importance of this fact is minimized by the presence of another, small-stream-inhabiting, *Pantosteus*-like *Catostomus (s.s.)* in northern México (see below), and by the frequent invasion by true *Catostomus* into smaller, swifter waters when a species of mountain-sucker is not present (unpublished data). New information therefore necessitates another re-evaluation of the status of *columbianus*, and indicates the possibility of a parallel evolution of *Pantosteus*-like traits in forms of *Catostomus (s.s.)* where drainage basins are sparsely populated by competitive mountain-suckers, or where they are absent.

Unlike in *Catostomus columbianus*, the features causing *Catostomus* (= *Pantosteus*, in my interpretation) *plebeius* to be considered intermediate between the two genera in question are most reminiscent of *Catostomus (s.s.)* traits superimposed on a basic *Pantosteus* morphology. To my eye, this intermediacy is most pronounced in specimens from the Mimbres River, New Mexico, and from some Mexican streams also tributary, or formerly draining into, the Guzman basin, northern Chihuahua. Fish from the Río Grande basin appear far more *Pantosteus*-like in over-all morphology. Extensive hydridization occurs between *P. plebeius* and an undescribed, mountain-stream-inhabiting species of *Catostomus* in the Río Casas Grandes, Chihuahua, México (Miller, in Koehn, 1969a; unpublished data). Intrapopulation variations in certain blood proteins of *P. plebeius* from the Mimbres River, not found in the Río Grande populations, may well reflect such past hybridization (Koehn, 1969a), and the *Catostomus*-like morphology of the Mimbres population may also result from such an introgression phenomenon in an earlier period of drainage integration.

Hybridization frequency also was cited as evidence for the close relationship of *Pantosteus* and *Catostomus*. Hybridization between species

of different genera is, however, widespread in fishes, and it is notable that known "hybrid swarms" between western catostomids typically involve intrageneric crosses (with the proposed exception of the *P. plebeius* situation just described). A few of these examples are *Catostomus commersoni* (Lacépède) and *C. macrocheilus* Girard (Nelson, 1968), *Pantosteus platyrhynchus* (Cope) and *P. "clarki"* from the Virgin River (Koehn & Rasmussen, 1967; Koehn, 1969a, 1970), and introgression of certain features into one or the other species, or between, *Catostomus columbianus* and *C. macrocheilus*, and *P. plebeius* and *P. discobolus* (Cope) (Smith, 1966). Introgression between species of the two genera is indicated by some of the blood proteins (Koehn, 1967, *et seq.*), but is not obviously reflected in the morphology of populations I have studied (other than *P. plebeius).*

Finally, the level of communication must be considered in the taxonomy of a group, an unacceptable attitude to many systematists, perhaps, but a major consideration in the practicalities of dealing with the fauna. *Pantosteus* is a compact, monophyletic group, as admirably demonstrated by Smith and Koehn, and especially when *C. columbianus* is relegated elsewhere. The generic designation therefore conveys an instant impression to persons familiar with the fauna, not only of a morphological type, but also of some probable conditions of habitat, *etc.* in the area where the fish was taken or is known to occur. Such information is suppressed when the name is synonymized with *Catostomus*. It also seems unnecessarily cumbersome to recognize close relationships through synonymization and thereby create genera that span such variation so as to be almost undefinable.

The mountain-suckers are generally similar in habits and habitats. They tend to live more in rapids than in pools, or at least move to swift areas to feed and spawn as large adults, while living in flowing pools during the day. Under most circumstances they feed upon algae and other *"aufwuchs"* that are scraped from stones by use of their cartilage-sheathed jaws. Feeding *P. clarki* have been observed to pull themselves along with the expanded, suction-cup-like mouth, and scrape not only the top of stones, but also move over the sides and feed "belly-up" on the underside of various objects. Spawning is generally in late winter and early spring, on riffles and in a manner similar to species of *Catostomus*. Young tend to congregate along the banks in quiet water in tremendous numbers, then progressively move into the mainstream as they increase in size. In the Gila River basin, *P. clarki* provides considerable sport for bow-and-arrow enthusiasts. They are rarely eaten, although their flesh is firm and fine-tasting. Extensive use of this species by Indians is indicated at sites on the Verde River (Minckley & Alger, 1968; unpublished data).