FIELD MUSEUM OF NATURAL HISTORY.

PUBLICATION 198.

ZOÖLOGICAL SERIES. VOL. XII, NO. 2.

NOTES ON FISHES FROM THE ATHI RIVER IN BRITISH EAST AFRICA.

BY

CARL L. HUBBS,
Assistant Curator, Division of Ichthyology and Herpetology.

CHARLES B. CORY,
Curator, Department of Zoölogy.

CHICAGO, U. S. A.
January, 1918.

NOTES ON FISHES FROM THE ATHI RIVER IN BRITISH EAST AFRICA

BY CARL L. HUBBS

A small collection of fishes was obtained in the Athi River by the Museum's East African Expedition of 1905–7. Among them three species of *Barbus* cannot be identified with any of the known forms and are described as new. These "Athi River fishes were all collected at one time and place, at low water (dry season) in pools at a point about 25 miles S. E. of Nairobi, and perhaps 10 miles from the Uganda Railway (north). They were taken, with a small seine, about November," 1905.[1]

In addition to these fishes an adult eel (*Anguilla bengalensis*) "was taken on a hook and line in the Tana River about 35 miles S. E. of the summit of Mt. Kenia." [1]

Labeo cylindricus Peters.

Boulenger, Cat. Fresh-water Fishes Africa, 1, 1909, pp. 331–333, text fig.

Our 32 specimens (Cat. No. 6107), varying in length from 29 to 97 mm., agree in their characters with *Tylognathus montanus* Günther, which Boulenger considers to be based upon half grown specimens of *L. cylindricus*. At this stage the species in all details closely resembles the adult of *Labeo victorianus*. In our largest specimen, however, the differential growth of the head has already proceeded in the direction of the peculiar adult physiognomy: the eye is inserted superolaterally, is located a little behind the middle of the head, and is decreased in proportionate size, being contained 6.0 times in the head; the production of the antorbital portion of the face is already in process, the suborbital having become wider than the orbit, but still remaining narrower than the interspace between the eye and the upper angle of the branchial aperture.

Scales in 5½, 6, or 6½ rows above the line, and in 6½ or 7½ rows between the lateral line series and the midabdominal line. The varia-

[1] Quoted from letter by Carl E. Akeley, who had charge of the expedition.

tion in the number of scales along the lateral line, including those on the base of the caudal rays, is expressed in the following tabulation:

Scales	36	37	38
Specimens (both sides counted)	5	19	11

Barbus athi sp. nov.

Plate I

Type specimen, a mature male 152 mm. long to end of last vertebra, Cat. No. 6108, Field Museum of Natural History. The description is based upon the type and 10 paratypes (Cat. No. 6109), which vary in length from 105 to 132 mm. Fifty-five other specimens, ranging in length from 21 to 103 mm., were secured (Cat. No. 6110).

This species is a member of the *B. hindii* group.

From *hindii*, which is recorded by Boulenger from the Athi River, it differs in the less robust form of the body, but deeper caudal peduncle, in the much shorter dorsal spine, and from the type in the lower number of scales along the lateral line.

Our species is probably most closely related to *Barbus krapfi* Boulenger,[1] from the type description of which it differs in the shorter pectoral fins (much shorter than the head), in the longer head, with shorter and blunter snout, and in the shorter barbels; the head is contained 3.2 to 3.3 times in the length, rather than from 3⅓ to 3⅘ times; the snout is contained 3.1 to 3.35 times in the head, instead of from 3⅓ to 3⅔ times; the posterior barbel at most is ⅙ longer than the eye (1⅓ to 1½ times eye in *krapfi*), and the anterior barbel is usually shorter, at most barely equal to, the diameter of the eye (1 to 1⅓ times eye in *krapfi*). As the type specimen is mature, and as the eye has attained the small relative size given by Boulenger for the adult of *krapfi*, we are unable to attribute these differences to age-variation. It is probable that the specimens which Boulenger records from the Limba River, a tributary of the Athi, as the young of his *krapfi*, are referable to *B. athi*.

Barbus ahlselli Lönnberg[2] is another closely related species; it differs, however, in its more slender form, larger eye, narrower interorbital, and higher dorsal.

Barbus mawambiensis Steindachner,[3] a West African species of the same group, has a relatively deeper caudal peduncle and higher dorsal.

[1] Cat. Fresh-water Fishes Africa, 2, 1911, p. 54, text fig.
[2] Kungl. Sv. Vet. Akad. Hand., 47, 6, 1911, p. 39.
[3] Denkschr. Akad. Wiss. Wien, 89, 1913, p. 25.

Depth of body, 3.1 (3.0 to 3.35)[1] in length of base of caudal; length of caudal peduncle, from anal base to end of last vertebra, 1.4 (1.3 to 1.5) times its depth. Extreme length of head 3.3 (3.2 to 3.3); snout, 3.2 (3.1 to 3.35)[1]; eye, 5.3 (4.4 to 5.7); bony interorbital width, 3.35 (3.5 to 3.7); upper jaw extending to between verticals from posterior nostril and eye, its length 3.4 (3.25 to 3.5) in head; lips well developed, the lower continuous across the chin, where it is produced slightly backward as a rounded lobe as long as the pupil. Anterior barbel usually shorter the eye (0.9 eye in type), at most barely as long as the eye; posterior barbel 5/6 as long as the eye in the type (shorter in some paratypes, at most 1/6 longer than the eye).

Scales sculptured with fine cross-set longitudinal striae; scale-rows in type: 26 on the left side, 24 on the right side, along the lateral line (including 2 on the base of the caudal rays); 4½ below, and 4½ above, lateral line; 2 between lateral line and the pelvic fin; 12 around caudal peduncle.

Table showing variation in number of scales along lateral line:

Scales	23	24	25	26	27
Specimens (both sides)	4	17	18	13	6

The distance from the origin of the falcate dorsal to the occiput is equal to the distance from the end of the dorsal base to the upper free base of the caudal, or one orbital length beyond. Dorsal rays, 3 simple plus 9 (20 specimens), or 8 (2), branched rays; the third simple ray is articulate along its front edge and on its soft tip, but greatly strengthened posteriorly by the deposition of bone, in which the articulations are mostly obsolescent; this third ray is grooved behind to receive the first branched ray when the fin is depressed; its posterior edges are smooth and even; the length of the bony portion of the ray is contained 1.6 (1.3 to 1.6) times in the head, reaching its proportionate maximum in specimens about 80 mm. long, in which the ray is contained from 1.2 to 1.4 times in the head. Anal rays, 3 simple and 5 divided; the longest, when depressed, reaching the base of the lowermost caudal rays. The pectoral reaches to, slightly beyond, or not quite to, the vertical from the insertion of the pelvic fin; its length is contained 1.3 (1.3 to 1.4) times in the head ("pectoral as long or slightly shorter than the head" in *B. krapfi*, "not reaching ventral"). The base of the pelvic fin lies below the origin of the dorsal.

[1] Measurements given of the ten paratypes, smaller in smaller specimens.

Color in alcohol grading from deep purplish brown along the mid-dorsal line to yellowish white below; the scales on the back and upper sides become abruptly darker basad; a number of black spots usually present along the upper sides; the head is dark above, on the opercle, and below the eye. Paired fins clear; median fins dusky on their interradial membranes.

(*athi*, named for the Athi River, in which the types were collected.)

Barbus helleri sp. nov.

Plate II

Type specimen, a mature female 51.5 mm. long to the caudal base, Cat. No. 6105. The type description is supplemented by measurements of 10 paratypes, mature males and females varying in length from 48 to 51 mm. (Cat. No. 6114). Ninety-two other specimens were examined, 26 to 48 mm. in length (Cat. No. 6115).

Barbus helleri is closely related to *Barbus longicauda* of the Zambesi River (recorded by Boulenger from the Nairobi River, a tributary of the Athi), and to *B. thikensis* of the Tana system (recorded also from Lake Victoria). From *longicauda*,[1] *helleri* is distinguishable by its pronounced lateral band coloration, by the shorter pectoral fin, and by the much lower dorsal spine, which is constantly shorter than the postrostral length of the head ("as long as or a little shorter than head" in *longicauda*). From *thikensis*, *helleri* differs in the narrower interorbital, lower dorsal spine, smaller scales, and apparently in the more distinct lateral band, and in the constant presence of the caudal spot. *B. amphigramma* is another similar species, but has a smooth dorsal spine.

Depth of body, 3.9 (3.6 to 4.1) in length to caudal base; length of caudal peduncle, from anal base to end of last vertebra, 2.1 (1.75 to 2.2) times its least depth. Extreme length of head 3.75 (3.45 to 3.85); snout in head, 4.0 (4.0 to 4.2); eye, 4.0 (4.0 to 4.2); least interorbital width, 3.0 (2.9 to 3.6); upper jaw extending to vertical from front of orbit, being about as long as the snout, and about as long as the width of the terminal or subinferior mouth; lips not conspicuously developed, the lower with a frenum. Anterior barbel as long as the pupil, or shorter; posterior barbel as long as eye, rarely a little longer, often only two-thirds as long as eye.

[1] The specimens recorded under this name by Gilchrist and Thompson (Ann. S. Afr. Mus., 11, 1913, p. 407) do not agree with the descriptions of this species, and probably represent another species. From these specimens *B. helleri* is apparently distinguished by the more robust body; smaller eye; in having usually 4 scales from the lateral line to the ventral, and usually 16 around the caudal peduncle; and in the coloration.

In the type there are 35 radially striate scales along the lateral line; from the lateral line series there are 7½ rows to the middorsal line, 6½ rows to the midventral line and 4 rows to the insertion of the pelvic fin; there are 16 series around the caudal peduncle. The variation in the paratypes is expressed in the formula: 34 to 36, $\frac{6\frac{1}{2}-7\frac{1}{2}}{5\frac{1}{2}-6\frac{1}{2}}$, 3 (rarely) to 4, 14 (rarely) to 16.

The dorsal fin is slightly falcate; its origin is equidistant from the end of the snout (or from the front of orbit), and from the end of the lateral line; the dorsal fin has 7 branched rays; the last of the simple rays is strong and serrated; its bony length is constantly a little shorter than the postrostral length of the head. Anal with 5 branched rays, the longest of which is a little lower than the dorsal spine, and fails by much to reach the caudal fin. The pectoral fin falls short of the pelvic insertion, its length being contained 1.7 (1.45 to 1.65) times in the head. The pelvic extends from a little before the vertical from the dorsal origin almost or quite to the anus.

The color in alcohol is brownish above, darkest towards the base of the scales; grading to silvery below the middle of the sides on the head and body. The axial septum of the lateral muscles is marked by an intense black streak, which gracefully curves upward above the lateral line anteriorly, and becomes faint towards the head; posteriorly a dark area diffuses outward from the black streak, forming thus a lateral band; the lateral line is more or less blackish; a black spot is always present at the caudal base. The dorsal, caudal, and pectoral fins are light dusky, while the anal and pelvic fins are clear. In the young the black streak is a little wider, but there are no important individual nor age variations in the coloration.

(*helleri*, named for the naturalist Edmund Heller, who accompanied the East African Expedition.)

Barbus akeleyi sp. nov.

Plate III

Type specimen, a female with mature eggs, 74 mm. long to caudal base, Cat. No. 6106, Field Museum of Natural History. The description of the type is supplemented by measurements of 12 paratypes (Cat. No. 6111), varying in length from 58 to 71 mm.; 48 other specimens (Cat. No. 6112), from 27 to 59 mm. long, were secured.

Barbus akeleyi is a member of a rather large group of closely related species inhabiting the southeastern waters of Africa. A brief comparison has been prepared to indicate the major characters in which *B. akeleyi* differs from the descriptions of its closest allies. It differs from *serrifer*

in the longer snout and eye, shorter barbels, and in the shorter pectoral and more falcate dorsal with lower spine; from *luazomelas* Lönnberg, in the deeper body, longer head, shorter posterior barbel, higher dorsal spine; from *lumiensis* in the longer and narrower head, longer snout and eye, shorter posterior barbel, lower dorsal spine, shorter pectoral, and more robust caudal peduncle; from *loveridgii* in the longer head, smaller eye, in the shorter pectoral, and in the falcate and lower dorsal; from *minchini* in the smaller eye, longer barbels, lower and more falcate dorsal, shorter pectoral, etc.; from *laticeps* in the narrower head, smaller eye, lower dorsal, and more robust body; from *sexradiatus* in the narrower interorbital, shorter pectoral, and in the number (7) of branched rays in the dorsal fin; from *salmo* in the narrower interorbital, lower dorsal spine, and in the position of the pelvic fin base below the origin of the dorsal; from *kerstenii* in the smaller eye, shorter pectoral, and more falcate dorsal; from *entaenia* in the same characters and in coloration; from *neumayeri* in the fewer scales along and above the lateral line, in the smaller head and in the more anterior insertion of the pelvic fin in reference to the dorsal; from *nairobiensis* (from the Athi basin) in the narrower interorbital, shorter barbels, in the insertion of the pelvic fin before the origin of the dorsal, and in the fewer scales (26 to 28, rarely 25 or 29, instead of 28 to 30); from *percivali* in the smaller eye, narrower interorbital, lower dorsal spine, and in coloration (see note in description of coloration of the young of *B. akeleyi*); from *zanzibaricus* in the much smaller eye, narrower interorbital, in the larger scales and in the insertion of the pelvic fin; from *argentatus* in the smaller eye, fewer dorsal rays, in the lower dorsal, fewer scales, etc.

Depth of body, 3.35 (3.0 to 3.35) in length to base of caudal; length of caudal peduncle from anal base to end of last vertebra, 1.6 (1.5 to 1.8) times its least depth. Extreme length of head, 3.4 (3.2 to 3.5); snout in head, 3.4 (3.4 to 3.8); eye, 5.2 (4.2 to 4.7); least interorbital width, 3.2 (2.8 to 3.2); upper jaw extending to about the vertical from the front margin of the orbit, its length 3.4 (3.2 to 3.6) in head; width of terminal mouth, 3.6 (3.2 to 4.0); lips well developed posteriorly, interrupted at the chin, anterior barbel as long as eye, ranging to one-third longer; posterior barbel 1.7 (1.5 to 1.8) times eye.

Scales radially striate, 26 to 28 (rarely 25 or 29) $\frac{4\frac{1}{2}}{4\frac{1}{2} \text{ to } 5\frac{1}{2}}$, 3 between lateral line and ventral, 12 round caudal peduncle.

Scales along lateral line	25	26	27	28	29
Specimens (both sides counted)	2	17	26	17	2

The dorsal fin is evidently but not strongly falcate; its origin is equidistant from the end of the last vertebra and from the middle of the snout; the origin is directly over the middle of the pelvic base. Dorsal with 7 branched rays (only 1 among 45 specimens counted has 8 rays); there are 3 simple rays; the first very short, sometimes concealed, the second short and slender, the third strong and bony, except at its tip; the posterior edge on each side is armed with numerous serrations; the front edge of spine is closely articulate, while the bony portion is more sparsely and less distinctly articulate; the bony portion of the spine is contained 1.4 (1.25 to 1.4) times in the head. The anal fin is composed of 3 simple and 5 branched rays (2 specimens among 45 have 6 rays); the fin has a straight margin, and when depressed falls far short of the caudal; the pectoral fin fails to reach the pelvic, being contained but 1.4 (1.35 to 1.6) times in the head; the pelvic fins reach almost to the anus.

The coloration in alcohol is brown above and silvery below; with a dark mediodorsal streak; a rather diffuse lateral band posteriorly, intensified to form a blackish line near its lower border; a dark purplish brown blotch along the region of the lateral line anteriorly, the color becoming darkest near the base of the scales; a distinct caudal spot about as large as the pupil. The top of the head and the opercle are dark. Caudal fin dusky; dorsal with a little pigment; other fins clear.

In a few very young specimens the pigment along the lateral band is concentrated more or less definitely into three spots; one above the pectoral, another above the anal origin, and the third at the caudal base. This color type, rarely developed in the young of *akeleyi*, is the typical adult color developed in the related *B. percivali*, and still more notably in other species such as *B. trispilus*.

Chiloglanis deckenii Peters.

One specimen, 50 mm. long to the caudal base (Cat. No. 6113), agrees in nearly every detail with the descriptions of this species. One difference between our specimen and Peters' figure cannot, however, be overlooked, namely the form and length of the lower labial barbels; in this respect the specimen at hand agrees closely with the type figure of *Synodontis eurystomus* Pfeffer,[1] which Boulenger regards as a synonym of *C. deckenii*. The maxillary barbel is flattened and slightly fringed along both sides. Greatest depth of body, 6.0 in length without caudal; length of caudal peduncle, from end of anal base to end of last vertebra, 1.75 times its least depth. Extreme length of head, 3.3; diameter of eye, 6.0 in head; eye in interorbital, 1.5; interspace between posterior nostril

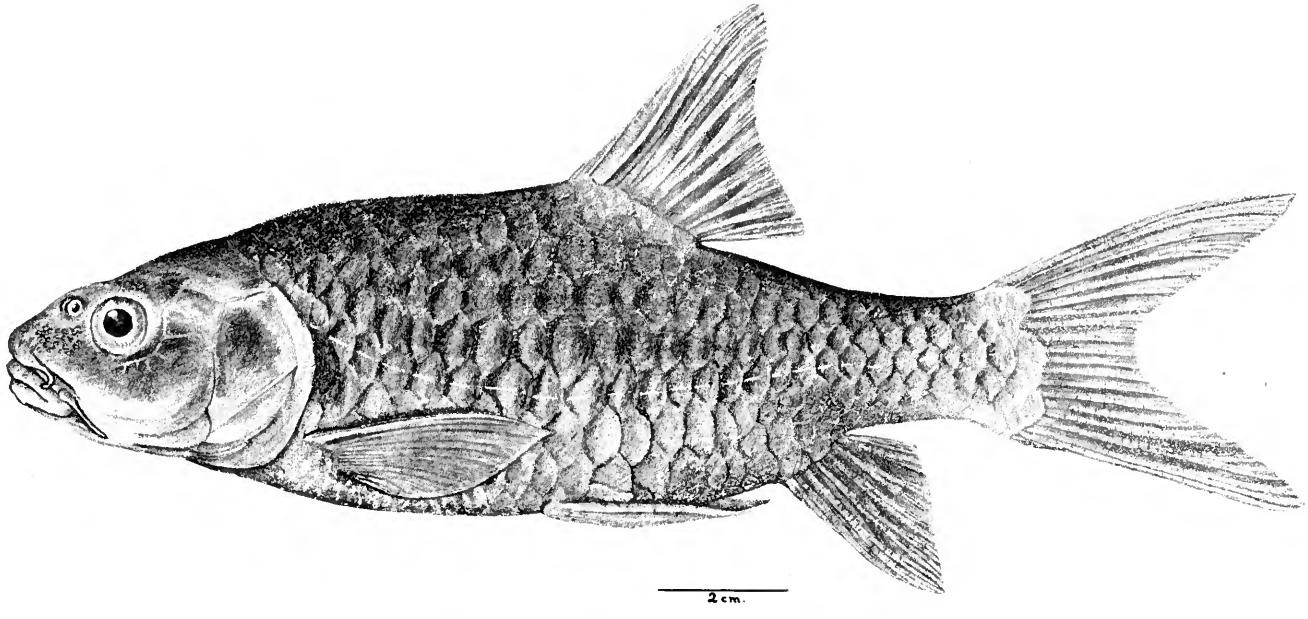
[1] Jahrb. Hamb. Wiss. Anst., 10, 1892 (1893), p. 159, pl. 1, fig. 5a, b.

and eye, 1.1 in interorbital width. Dorsal I, 5; base of adipose dorsal, 1.9 in interdorsal space; anal with 3 simple and 7 branched rays, its basal length a little shorter than either the height of the anal or the length of the adipose fin; pectoral spine in head, 1.4 (left side) or 1.6 (right); pelvic fin extending a little beyond the anal origin, its length, 2.35; caudal fin deeply forked, the upper lobe (measured from base of developed rays) 1.2 in the lower lobe, which is contained 1.2 times in the head. Coloration as described and figured for *C. deckenii*.

Tilapia athiensis Boulenger.

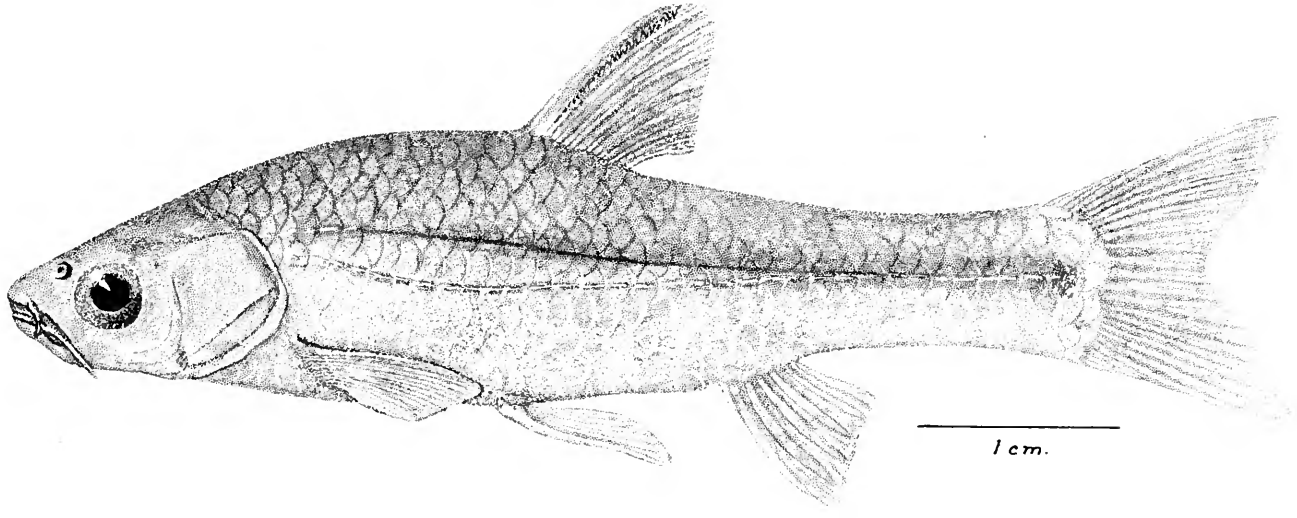
Tilapia nilotica athiensis Boulenger, Proc. Zool. Soc. London, 1916, p. 345.

Dr. Boulenger recently presented an interesting account of the variation, among Cichlids, of the number of spines in the anal fin. He described, as *Tilapia nilotica athiensis*, certain specimens from the Athi River system, which differ from *Tilapia nilotica* only in the constantly increased number of anal spines (4 or 5 instead of 3). While accepting Boulenger's general conclusions, we consider that the Athi form should be given full specific status. A single genetic character, constant in all or in the large majority of each of two non-intergrading forms, is regarded by us as sufficient grounds for specific distinction.



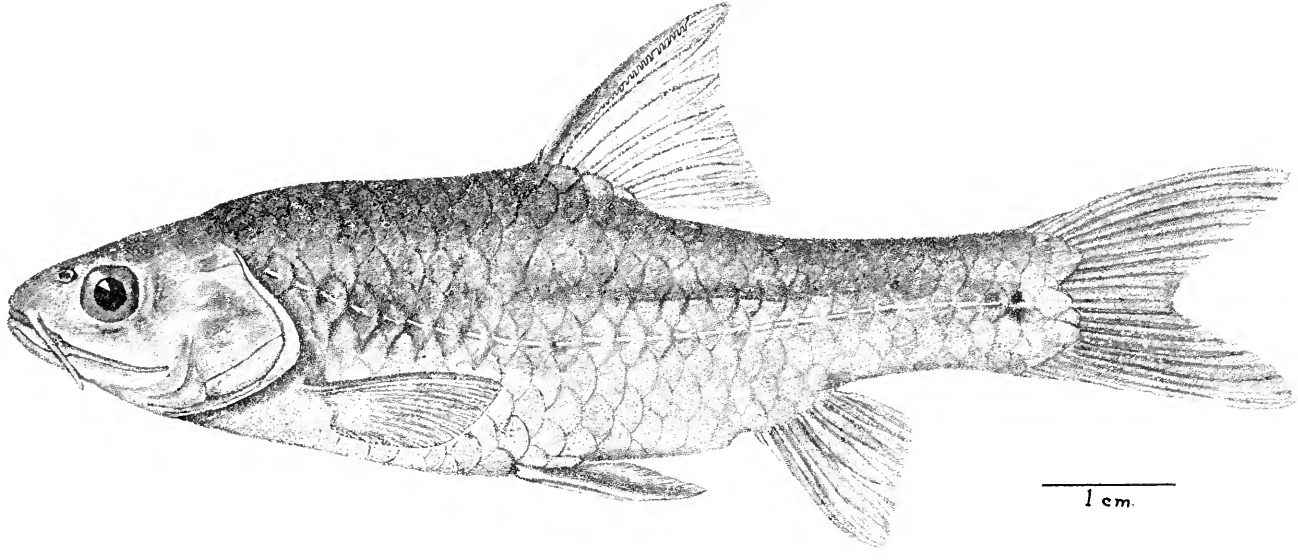
BARBUS ATHI Hubbs.

From the type specimen.



BARBUS HELLERI Hubbs.

From the type specimen.



BARBUS AKELEYI Hubbs.

From the type specimen.