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RESEARCHES UPON THE CYPRINOID FISHES

INHABITING THE

FRESH WATERS OF THE UNITED STATES,

WEST OF THE MISSISSIPPI VALLLEY,

FROM

SPECIMENS IN THE MUSEUM OF THE SMITHSONIAN INSTITUTION.

By CHARLES GIRARD, M. D.

The fishes which are the subject of the present memoir, were collected at different times and periods, by several naturalists and surgeons attached to the various surveys undertaken within the five years past.

And first of all, there is the survey of the United States and Mexican boundary, from 1851 to 1855. John H. Clark, who accompanied Col. J. D. Graham, in 1851, collected extensively in the rivers and creeks of Texas and New Mexico. Under Major W. H. Emory, now commissioner of the boundary line, numerous collections were made by Dr. C. B. Kennerly, in Texas, in the valley of the Rio Grande and provinces of Chihuahua and Sonora.

The survey of routes for a railroad to the Pacific was commenced in 1853, and continued until 1855. Lt. A. W. Whipple, under whose command the survey near the thirty-fifth parallel of latitude was effected, in securing the services of Dr. C. B. Kennerly, contributed very largely to our collections of fishes from Texas, and the numerous tributaries of the Arkansas River. H. B. Möllhausen, artist to the same expedition, showed also much zeal and industry for collecting.

The survey near the thirty-second parallel of latitude, western end, under Lt. J. G. Parke, contributed a few specimens, collected by Dr. A. L. Heermann.

The eastern end of the same thirty-second parallel was explored by Capt. John Pope, who having attached to his party Dr. Geo. G. Shumard, interesting specimens were obtained therefrom.

The survey of the partial routes on the Pacific side, under Lt. R. S. Williamson, Dr. A. L. Heermann being surgeon and naturalist to the party, a large collection of fresh water fishes, amongst which were several Cyprinoids, was made in the valley of the San Joaquin River, and the Tulare Valley.

Subsequently, the same officer explored the Sacramento Valley from San Francisco, Cal., to Astoria, Or., having Dr. John S. Newberry as naturalist, who secured many interesting members of the family of fishes now under consideration.

The survey of the route near the thirty-eighth and thirty-ninth parallels, under the late Capt. Gunnisson, and of the forty-first by Lt. E. G. Beckwith, secured many interesting specimens from the valley of the Great Salt Lake and Humboldt River.

The survey of the northern route, under Gov. I. I. Stevens, was as fruitful in many respects as both the United States and Mexican boundary survey, and the survey of the thirty-fifth parallel. Dr. George Suckley, Dr. J. G. Cooper, and Dr. John Evans, proved indefatigable in their efforts for collecting.

The upper Missouri and Yellow Stone rivers were explored by Dr. F. V. Hayden, under the protection of Col. A. Vaughan, and thus were we made acquainted with the ichthyic fauna of those remote waters.

Lt. D. N. Couch, U. S. A., explored, in the winter of 1852–3, the Mexican provinces of Tamaulipas, New-Leon, and Coahuila, thus adding materials towards an elucidation of the natural history of the country south of the Rio Grande del Norte (Rio Bravo); and but partially explored by the United States and Mexican boundary commission.

Valuable specimens from Platte or Nebraska river, the valley of the Great Salt Lake of Utah and Humboldt river, were also received from the late J. Soulé Bowman.

To John Potts, Esq., of Chihuahua, we owe some very interesting species from the hydrographic basin of Chihuahua river, and the valley of Mexico.

One species was purchased in the market of the city of Mexico by Major Wm. Rich.

The species formerly described, from the River Zuni, collected by Dr. Woodhouse, under Capt. L. Sitgreaves, are likewise included in this prodromus.

Thus the country embraced within these surveys and fields of explorations, is limited eastwardly by the valleys of the Missouri and Mississippi, and westwardly by the Pacific ocean, extending from Puget Sound and the British possessions at the North, to the valleys of the Rio Gila and Rio Grande del Norte (Rio Bravo) to the South, and even including the Mexican provinces of Tamaulipas, New Leon, Coahuila, Chihuahua and Sonora.

The investigations of such an amount of materials could not be extemporised. Indeed, even investigations upon these various collections could not have been traced each separatively in the order in which they were collected. From a preliminary examination of the first lot received in 1851, I became very soon impressed with the difficulty of the task, and foresaw the utter impossibility, at that time, to do anything like justice to the subject.

In the mean time, however, a *Notice upon a collection of fishes from the southern bend of the Tennessee river, in the State of Alabama, by Louis Agassiz*, was published,* containing several members of the Cyprinoid family. And some time afterwards appeared a *Synopsis of the Ichthyological Fauna of the Pacific slope of North America, chiefly from the collections made by the U. S. Expl. Exped. under the command of Capt. C. Wilkes, with recent additions and comparisons with eastern types. By the same author.*†

These two papers, though anticipating some of the following results, were greeted with a hearty welcome, and I can only regret that the second was not concluded up to the time I am writing. I have delayed entering into this subject as long as was consistent with the duties imposed upon me.

In both of them, we find the laudable desire of attempting to bring back into use, the long forgotten genera of Rafinesque, which fell into disuse because of their own imperfection; and if they have not passed into the common nomenclature of the day, it was owing to their defect, more than to the partiality of naturalists. For we may well imagine how any one would feel when rebuilding another's work, as little known to the author as to the commentators themselves.

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* Amer. Journ. of Sc., 2d. ser. xvii. 1854, pp. 297, 353.
†Amer. Jour. of Sc., 2d. ser. xix. 1855, pp. 71, 215.

And yet, for my part, I have always looked upon the restoration of Rafinesque's genera and species as highly desirable, so soon as they had once been proposed and introduced into science as names. But in order to do justice to the scheme, it was necessary to the undertaking that one should go to the very ground trodden over by Rafinesque himself, his book in hand, during all the seasons of the year, ay, even for years in succession, to enable us to discriminate between that which Rafinesque really observed, and that which is imaginary.

That the *Ichthyologia Ohiensis* has been, and still is a stumbling block, is fully evinced by the fact that Dr. J. P. Kirtland, the Ohio ichthyologist, of untiring and energetic zeal and perseverance, was baffled in many of his attempts to determine Rafinesque's genera and species.

These genera and species, thus restored by Prof. Agassiz, may therefore not be received by all ichthyologists as the final settlement of that much controverted question. Be it as it may, that is: whether the identification be right or wrong, since we must have these names, I sincerely hope they will now be adopted, once for all, as proposed.

Since circumstances have compelled me to write this memoir before the completion of Agassiz's synopsis, I have restored the balance of Rafinesque's genera in the family of Cyprinoids: such are *Plargyrus* and *Semotilus*. Once upon that field of inquiries I reverted to Heckel's genera *Argyreus* and *Leucosomus*, and shewed their claim for admission upon the same general principles and canons of scientific nomenclature.

On a former occasion the genus *Leucosomus* was altogether misunderstood by me, and from an advice of mine it thus entered into the "History of the Fishes of Massachusetts, by Dr. D. H. Storer." Prof. Agassiz was led into the same error.* Heckel by inadvertence applies the name of *Cyprinus chrysoleucus*, Mitch., to *Leuciscus pulchellus*, Storer, as shown by the figures given of its teeth and the wording of its generical diagnosis. *Leucosomus*, therefore, is identical with *Cheilonemus*, and accordingly is the name to be adopted. *Cheilonemus* was proposed for *Leuciscus pulchellus*, and allied species, when it was supposed that *Leuciscus chrysoleucus* would constitute the type of the genus *Leucosomus*. But it is now well ascertained that *Leuciscus chrysoleucus* of Mitchell belongs to Rafinesque's genus *Luxilus;* and *Luxilus* has the priority over *Leucosomus*.

Leuciscus gracilis of Richardson, referred by Heckel to *Leucosomus*, is of a different generic type.

As to the genus *Argyreus*, Heckel includes in it two species generally distinct. *Cyprinus atronasus*, Mitch., *and Cypr. rubripinnis*, Mus. Par. MS. But *Cyprinus rubripinnis* is identical with *Leuciscus cornutus*, and since *Leuciscus cornutus* is to enter the genus *Plargyrus* of Rafinesque, *Cyprinus atronasus* remains as the type of the genus *Argyreus*, which again is identical with *Rhinichthys*. It must be recollected, however, that the teeth figured by Heckel under the name of *Argyreus rubripinnis*, are those of *Plargyrus cornutus*.

All the species referred to in this memoir I have seen and examined; there is not a solitary fact here recorded that was not the result of personal researches.

On several occasions I have referred to species from the Atlantic States of the Union, and even from the northern lakes, but it will be obvious to every one that it was only on such occasions as could not well be omitted without sacrifice to the completeness of the subject.

I have aimed at concision, as far as consistent with the nature of the task. It was deemed unnecessary to recall, ever and anon, the history of any particular genus, unless it happened to be intricate, for, whoever is interested in the subject, is sufficiently familiar with it. It would be different were I to write a popular work on our fishes.

In the diagnosis of the genera I have often repeated characters shared by many of them; these repetitions I am convinced are needful to their proper under-

*Amer. Jour. of Sc., 2d. ser. xix. 1855, p. 225.

standing. It may not appear so to a few ichthyologists; but I write for naturalists, for the reader who seeks after general information. Besides, the method I follow is the natural, the true method, that which has superseded the artificial method of the last century. In describing the teeth, I have adopted Heckel's phraseology, since it appears to me to answer to the present wants of Ichthyology.

The coloration, as a general rule, is described from specimens preserved in alcohol, in which the brilliancy of the hues is seldom preserved, and occasionally quite altered.

In the course of these investigations I have carefully compared the fishes of our hemisphere to those occurring in the waters of the eastern hemisphere; and when genera and species, either of fishes or reptiles, have, at any time, been described as new, it was the result of such comparative study, shunning display of loose erudition and false criticism, which too often leads into error the true observer.

I have thus added many new genera and species to the known lists. This cannot be surprising; a country so vast as North America, irrigated by so many branching streams and large bodies of waters in the shape of lakes and numerous ponds, a country comparatively little explored, was to yield many species unknown to our predecessors in the field. A superficial knowledge of the history of ichthyology in North America, would at once explain how it is that a "Synopsis of the Fishes of North America," published in 1846, should not have proved a full and complete record of all existing fishes of the country: a synopsis which, moreover, only professes to give such species as were known at that time. If we are so fortunate as to be able to add to the known catalogue of genera and species, let us not lose sight of both the time and the circumstances under which we have accomplished it. Recriminations, in that respect, are not likely to advance much our knowledge on the subject, and furthermore, it places a co-temporary exactly in the same situation towards the next coming generations as the former generations hold towards him.

Most of the new genera which I propose have been designated by words taken from the North American Indians, as being more euphonic than any one I might have framed from the Greek. The classic literature has already furnished so many names that there are but few instances in which a name might yet be coined and express what it is intended to represent. I offered this remark as a mere statement; not as an apology.

CYPRINI.

But two genera of this group or tribe, whichever called, are included in this memoir. And curious to say one is provided with a buccal barbel, and the other not. The presence or absence of barbels, therefore, does not seem of primary import here. The teeth are of the molar kind (*Dentes molares*), of the grinding type (*D. masticatorii*), without grooves or ridges, and are disposed upon two permanent—and a third, deciduous—rows: 3—2 | 5—5 | 2 | 3. The ventrals are inserted in advance of the anterior margin of the dorsal.

We had a fine opportunity of studying the genus

Mylocheilus, Agass.

thanks to the numerous specimens collected by Lt. Trowbridge. The characters of this genus are as follows: Head elongated and sub-conical, rounded upon the snout, which overlaps the lower jaw. The mouth is sub-terminal, horizontal, of medium size and provided upon its angle with a maxillary barbel. The eye is well developed. The isthmus rather narrow. The body is elongated, lanceolated, compressed, sub-fusiform in profile. Pectoral fins slenderer than the ventrals; the latter being inserted in advance of the anterior margin of the dorsal. Caudal fin furcated. Scales of medium size; lateral line following the middle of the flanks. The pharyngeal bones are stoutish, expanded upon their convexity,

with the inferior limbs very short. The teeth are inserted upon a very much inclined plan, raised from the surface of the bone itself, from below upwards. They are disposed upon two permanent rows of five and two, and a third deciduous row of three in the thickness of the gum: 3 | 2 | 5—5 | 2 | 3. They are of the molar kind of the grinding type, but without grooves and ridges.

1. MYLOCHEILUS LATERALIS, Agass. & Pick. Amer. Journ. of Sc. 2d ser. xix. 1855, 231.

Our specimens are from Fort Steilacoom, Puget Sound, W. T., and were collected by Dr. Geo. Suckley, U. S. A., under Gov. I. I. Stevens.

2. MYLOCHEILUS FRATERCULUS,—is closely allied to the preceding by the shape of its pharyngeal bones, differing from it by a more slender body, much smaller head and smaller eye. The color is too far gone to have anything said about it.

From Monterey, Cal., where specimens were collected by Lt. W. P. Trowbridge, U. S. A.

3. MYLOCHEILUS CAURINUS.—*Cyprinus* (*Leuciscus*) *caurinus*, RICH. Faun. Bor-Amer. iii. 1836, 304. Has much of the general aspect of the two preceding species, more, perhaps, of *M. fraterculus* than *M. lateralis*. The most prominent difference resides in the pharyngeal bones being less expanded upon the superior limb, which is much more developed also. The inferior limb is also more slender. The head is more elongated, more conical than in *M. lateralis*, and larger than in *M. fraterculus*. The mouth is larger than in either of the two species just referred to.

From Astoria, O. T.; numerous specimens collected by Lt. W. P. Trowbridge, U. S. A.

The genus we next introduce, and which has received the appellation of

MYLOPHARODON, Ayres,

is most closely related to *Mylocheilus*. The species which it includes are remarkable for their elongated body, their sub-conical and tapering head, their deeply cleft mouth, and, like the species of *Mylocheilus*, they have the ventrals inserted in advance of the anterior margin of the dorsal, the caudal furcated, and a narrow isthmus. But *Mylopharodon* has no barbels upon either maxillaries or the angle of the mouth. The pharyngeal bones are likewise stoutish, but the inferior limb is more elongated than in *Mylocheilus*, though a little smaller than the upper limb. We observe the same system of dentition: an external deciduous row of two or three, and two permanent rows of two and four or five: 2 | 2 | 5—5 | 2 | 2, or 3 | 2 | 4—4 | 2 | 3. But the crown is much more compressed than in *Mylocheilus*.

1. MYLOPHARODON CONOCEPHALUS.—*Gila conocephala*, B. & G. Proc. Acad. Nat. Sc. Philad. vii. 1854, 134.

From San Joaquin River, Cal.—Dr. Heermann.

2. MYLOPHARODON ROBUSTUS, Ayres, Proc. Cal. Acad. Nat. Sc. i. 1855, 33.

San Francisco, Cal.—Dr. Newberry.

CATOSTOMI.

What distinguishes the Catostomi as a peculiar group, consists, in the first place, in the structure and position of the mouth; it is surrounded with large and fleshy lips, situated under the protruding snout, and has no barbels. The pharyngeal bones are sickle-shaped, varying in the curvature of the dental portion and also in the inferior branch. The teeth are numerous, disposed upon one single series; the inferior ones being longest, the others diminishing in size upwards. To use the expression of Heckel, the teeth are pectiniform (*Dentes pectiniformis*), that is, arranged like a comb. The anterior margin of the dorsal is situated in advance of the insertion of the ventrals.

Modifications of these characters, associated with others, will furnish the means of distinguishing the genera.

The want of more materials upon which the genera *Carpiodes*, *Ictiobus*, *Bubalichthys* and *Cycleptus* are founded, has prevented us entering into the discussion of their generic value. The two following species being the only ones at our command, we introduce them without preamble.

CARPIODES DAMALIS.—I have before me a specimen of this species measuring seven inches and three-quarters in total length. The greatest depth of the body is contained about three times and a half in that length, whilst the head constitutes the fifth part of it. The dorsal is much longer than high anteriorly; its anterior margin is nearer the end of the snout than the insertion of the caudal fin, which is posteriorly concave. The origin of the ventrals is situated opposite the fifth developed ray of the dorsal, the seventh in the series. The pectorals are small. The branchiostegals are three on either side.

D 27; A 10; C 4, 1, 8, 8, 1, 3; V 10; P 16.

The anterior two rays, in both the dorsal and anal fins, are rudimentary, as also the anterior one in the ventrals.

The eye is sub-circular; its diameter being contained four times and a half in the length of the side of the head. The snout is sub-conical. A line drawn perpendicularly to the angle of the mouth would pass in advance of the pupil. The sub-opercle is largely developed, and contrasts greatly with its reduced size in *C.* (*I.*) *tumidus*.

The scales are very large; thirteen lateral rows may be counted from the anterior margin of the dorsal to the insertion of the ventrals. They are a little higher than long. The lateral line undergoes a slight fall upon the thorax, then runs straightway to the base of the caudal along the eighth row of scales under the anterior margin of the dorsal.

This species was collected by Dr. Geo. Suckley, U. S. A., in Milk river, an affluent of the Upper Missouri, along the R. R. route explored by Gov. I. I. Stevens.

We have before us half a dozen small specimens from three to three inches and a half in total length, which are closely allied to the preceding species. They were collected in the Arkansas river, near Fort Smith, by Dr. Geo. G. Shumard. A further identification could not be attempted.

ICTIOBUS TUMIDUS.—*Carpiodes tumidus*, B. & G. Proc. Acad. Nat. Sc., Philada., vii. 1854, 28.—Should all the sub-divisions of the genus *Carpiodes* be admitted, then this species, from the Rio Grande del Norte (Rio Bravo), belongs to that of *Ictiobus*.*

The genus

MOXOSTOMA, Rafin.

may be circumscribed by characters more natural than the preceding ones. And the most striking of these, it must be conceded, is the absence of that lateral line possessed by almost all fishes. The body is elongated and compressed; the head small; the mouth small also, opening obliquely forwards and downwards. The lips being small and transversally ridged; the inferior one being slightly bilobed. The anterior margin of the dorsal is situated in advance of the insertion of the ventrals. The dorsal fin itself is either higher than long, or else its length is equal to its height, varying somewhat according to the sexes, as well as the anal, which is, however, always deeper than long. The shaft of the pharyngeal bones constitutes a very open curve, the convex margin of

* There can be no question about the etymology of this name, from ἰχθύς and βοῦς, which would spell *ichthyobus*, but Rafinesque choosed to write *Ictiobus*, which is quite as tasteful, if not more so. The "Nomenclator Zoologicus" must have satisfied every one, that confusion alone would be the result of re-spelling something like thousands of names.

which is regular and entire. The teeth themselves are very much compressed, strongly curved inwardly, and much larger inferiorly than superiorly.

To this genus we add four new and very distinct species, inhabiting the South Western waters.

1. MOXOSTOMA CLAVIFORMIS.—This species has been known to us for several years. Its general outline has a club-shaped appearance, a trait though more or less generical, is especially characteristic here. The largest specimens which we have examined are four inches in total length, and in all probability not very young. The greatest depth, taken across the pectoral region, is contained four times and a half in the total length, in which the head enters five times. The eye is circular and moderate in development, contained a little over four times in the length of the side of the head. The upper margin of the dorsal fin is sub-convex; its anterior margin is nearer the tip of the snout than the insertion of the caudal fin. The caudal is concave posteriorly; the anal narrow and deep; the ventrals are inserted opposite the fifth ray (or third developed one) of the dorsal, and their tips do not extend as far back as the tips of the posterior rays of the dorsal fin when bent along the dorsal line.

D 13; A 10; C 4, 1, 8, 8, 1, 3; V 9; P 15.

The scales are sub-elliptical in general shape, presenting no grooves upon their lateral sections, but few upon the anterior section, and numerous posteriorly upon that section of the scale that is exposed.

The specimens were collected by H. B. Möllhausen, in Coal creek, a tributary of the South Fork of the Canadian river; along the R. R. route explored by Lt. A. W. Whipple, U. S. A.

2. MOXOSTOMA KENNERLII.—In its general physiognomy this species resembles *M. oblongum* more than any other of its genus. The greatest depth, taken immediately in advance of the dorsal fin, does not enter quite four times and a half in the total length. The head forms a little less than the fifth of that same length. The anterior margin of the dorsal is much nearer the tip of the snout than the insertion of the caudal; the upper margin of that fin is sub-convex and as long as high, whilst in *M. claviformis* the height is much greater than the length. The caudal is deeply concave posteriorly; the anal is deep and narrow, its extremity extending, as usual in the genus, to the base of the caudal. The ventrals have pretty much the same position as in the preceding species.

D 14; A 10; C 4, 1, 8, 8, 1, 3; V 10; P 13.

The anterior two rays, in both the dorsal and anal fins, are mere rudiments; also the anterior one in the ventral fins. The scales are not quite so long as in the preceding species. The lower lip is rather broad and very little emarginated, whilst in *M. claviformis* it is very thin and quite sub-divided.

This species was caught in Dry creek, near Victoria, Texas, by Dr. C. B. Kennerly, under Major W. H. Emory, U. S. Commissioner of the U. S. and Mexican Boundary line.

3. MOXOSTOMA VICTORIÆ.—Form elongated, fusiform, reminding us, by its general appearance, of certain species of Mullet (*Mugil*). The greatest depth is nearly equal to the length of the head, which constitutes the fifth of the entire length, the lobes of the caudal fin excepted. The dorsal fin is higher than long, and its anterior margin is situated nearer the tip of the snout than the insertion of the caudal fin. The latter is forked.

D 14; A 10; C 6, 1, 8, 8, 1, 5; V 9; P 17.

The sub-opercle is well developed; the eye is sub-circular, its diameter being contained four times and a half in the length of the side of the head. The snout is rather pointed, sub-conical, and the mouth, which is small, placed entirely in advance of the orbit. Twelve longitudinal rows of scales may be counted upon the greatest depth. The scales upon the dorsal and lateral regions are provided

with a black dot or spot upon the anterior part of the exposed portion of the scale. Greatest length of specimens observed, six inches and a half.

This species was collected with the preceding, under the same circumstances and in the same locality.

4. MOXOSTOMA CAMPBELLI.—Sub-fusiform and elongated like the preceding species, which it resembles in its general outline, and in the proportions of the head and depth of the body towards the total length. The snout is likewise pointed and sub-conical, but the eye is much larger and the sub-opercle very exiguously developed. The position and shape of the fins do not differ materially from the preceding species, with the exception of the caudal, which is concave posteriorly instead of being forked.

D 15; A 10; C 5, 1, 8, 8, 1, 5; V 9; P 15.

The scales are smaller than in *M. kennerlii*; thirteen rows instead of twelve are to be observed upon the region of greatest depth.

Specimens were collected in Live Oak creek, Texas, by Dr. C. B. Kennerly, under Major Emory, and in Devil's river, by John H. Clark, under Col. Graham. The species, therefore, belongs to the basin of the Rio Grande del Norte (Rio Bravo).

As regards the generic features of

PTYCHOSTOMUS, Agass.

it fell within our observation that the height of the dorsal may be either equal to its length or a little higher than long, and that the wing-like expansions of the pharyngeals is anything but characteristic of this genus. The transverse folds or ridges upon the lips are shared by *Moxostoma*, though in a lesser degree. The inferior lip is but slightly lobed. The mouth, however, is much more protractile and directed more downwards. The head is short and stout; the scales large and of the same size anteriorly and posteriorly. Finally, the conspicuous lateral line will at once distinguish it from *Moxostoma*.

1. PTYCHOSTOMUS CONGESTUS.—*Catostomus congestus*, B. & G. Proc. Acad. Nat. Sc. Philad. vii. 1854, 27. This species comes under this head and not of *Moxostoma*.

From the Rio Salado, Texas.—John H. Clark.

2. PTYCHOSTOMUS ALBIDUS.—The general physiognomy of this species reminds of us *P. congestus*, although the body is more slender and the head more elongated. The mouth is a great deal larger, as are also the scales. Greyish white above; greyish silver beneath.

Collected by Lt. D. N. Couch, U. S. A., in the Rio San Juan, near Monterey, New Leon.

3. PTYCHOSTOMUS HAYDENI.—The head is contained five times and a half in the total length. The body is sub-fusiform, very regular in its outline. The eye is sub-circular and moderate in its development; its diameter being contained five times in the length of the side of the head. The opercle is largely developed, whilst the sub-opercle is small, a character which is more or less generical. The anterior margin of the dorsal fin is much nearer the tip of the snout than the base of the caudal. The height of that fin is a little more than its length; its upper margin is sub-concave. The caudal is forked. The origin of the ventrals is situated in advance of the middle of the dorsal. The tips of the pectorals reach a vertical line drawn from the origin of the dorsal.

D 15; A 10; C 4, 1, 8, 8, 1, 3; V 10; P 17.

Thirteen rows of scales may be counted between the origin of the ventrals and the anterior margin of the dorsal; the lateral line running through the median row. There are two rudimentary rays at the anterior margin of both the dorsal

and the anal, and one at the exterior margin of the ventrals; these are all summed up in the formula.

Specimens of this species were collected in the Yellow Stone river, by Dr. F. V. Hayden, and in the Missouri river at Fort Pierre, by Dr. John Evans.

Now then, if the principles upon which the above generic divisions are based, be sound, the species which still remain in the genus *Catostomus* must be further revised and arranged in smaller and more restricted groups.

We propose to arrange under the head of

MINOMUS,

such species as are characterised by an elongated and fusiform body; a head longer than deep; a dorsal fin either higher than long, or with both dimensions equal. The lips being tuberculated, moderately bilobed. The pharyngeals not expanded laterally, but considerably bent inwardly. The teeth compressed, decidedly bicuspid, but the inner projection more developed than the outer. The scales being nearly of the same size, but slightly smaller anteriorly than posteriorly.

1. MINOMUS INSIGNIS.—*Catostomus insignis*, B. & G. Proc. Acad. Nat. Sc. Philad. vii. 1854, 28.
Inhabits the Rio San Pedro, tributary of the Rio Gila.

2. MINOMUS PLEBEIUS.—*Catostomus plebeius*, B. & G. Proc. Acad. Nat. Sc. Philad. vii. 1854, 28.
From the Rio Mimbres, Lake Guzman, Mexico.

3. MINOMUS CLARKII.—*Catostomus clarkii*, B. & G. Proc. Acad. Nat. Sc. Philad. vii. 1854, 27.
From the Rio Santa Crux.

And then giving the name of

ACOMUS

to those species in which the head is very elongated, the dorsal fin higher than long, and the scales much smaller upon the anterior region of the body than upon the posterior. The lips being papillated and very deeply cleft. The pharyngeals are gently arched and not expanded; the teeth compressed and bituberculated, the inner projection conspicuous; the outer one, obsolete, though existing.

1. ACOMUS FORSTERIANUS.—*Catostomus forsterianus*, RICH. Faun. Bor. Amer. iii. 1836, 116.
Inhabits British North America.

2. ACOMUS AURORA.—*Catostomus aurora*, AGASS. Lake Sup. 1850, 360. Pl. ii. figs. 3 and 4. May not differ from the preceding.
Lake Superior.

3. ACOMUS LATIPINNIS.—*Catostomus latipinnis*, B. & G. Proc. Acad. Nat. Sc. Philad. vii. 1853, 388.
Rio San Pedro, tributary of Rio Gila.

4. CATOSTOMUS (ACOMUS) GUZMANIENSIS,—has the general physiognomy of *A. latipinnis*, owing to the great development of its fins. Is, however, very readily distinguished from the latter by the presence of much larger scales, and especially upon the dorsal region, where they are very small in *A. latipinnis*.
D 13; A 7; C 4, 1, 8, 8, 1, 4; V 9; P 17.
The anterior two rays, in both the dorsal and anal, are rudimentary; so also the exterior one in the ventrals.

The head forms the fifth of its total length; the shape is subquadrangular, subpyramidal. The eyes are small and circular. The lips are well developed and covered with large papillæ, but the posterior one is less indented than in *A. latipinnis.*

The upper regions are purplish black, with an orange lateral band from head to tail. The inferior regions are yellowish white.

Specimens of this species were collected by Dr. C. B. Kennerly, under Major Emory, in Janos River, which empties its water in Guzman Lake, State of Chihuahua.

5. CATOSTOMUS (ACOMUS) GENEROSUS.—It is a rather short and contracted species, particularly when compared to *A. griseus.* The head constitutes about the fifth of the total length. The eye is moderate in size and circular. The anterior margin of the dorsal fin is equi-distant between the tip of the snout and the insertion of the caudal fin. The scales are larger than in *A. griseus.* The dorsal region, as well as the flanks, are olivaceous brown, spotted with black. Inferiorly unicolor.

Specimens were collected in Cottonwood Creek, an affluent of the great Salt Lake of Utah, and brought home by Lieut. E. G. Beckwith, U. S. A.

6. CATOSTOMUS (ACOMUS) GRISEUS.—The body is slender, gracefully fusiform in its outline, the head forming the fifth of the entire length. The anterior margin of the dorsal is equidistant between the tip of the snout and the insertion of the caudal fin. The ventrals are inserted opposite the posterior third of the dorsal. The anal is slender.

D 13; A 10; C 6, 1, 8, 8, 1, 5; V 10; P 16.

Collected in the Sweet Water fork of Platte River, by J. S. Bowman, Esq.

Scales exhibiting radiating furrows all around. Upper regions greyish; inferior regions whitish or yellowish.

7. CATOSTOMUS (ACOMUS) LACTARIUS—is closely allied to the preceding species, from which it differs by a stouter head and larger eyes, and larger scales on the body. The structure of the scales themselves is very different, since the radiating furrows exist upon the anterior and posterior sections only, instead of being distributed all over the scale. The upper margin of the dorsal is concave, whilst it is nearly straight in *A. griseus.*

D 13; A 10; C 4, 1, 8, 8, 1, 5; V 11; P 17.

Greyish brown above, greyish white beneath.

Specimens of this species were collected in Milk River, affluent of the upper Missouri, by Dr. George Suckley, under Gov. I. I. Stevens.

The genus

CATOSTOMUS, Lesu.

would then be restricted to such species in which the head is moderately elongated, the dorsal fin generally longer than high, and the size of the scales less disproportionate anteriorly and posteriorly than in *Acomus.* The lips are papillated and deeply cleft. The pharyngeals provided with a little expansion inferiorly. The teeth are compressed, with the inner projection of the crown alone developed.

The type of this group is *Catostomus hudsonius. C. communis* would be a second species. And the following:

3. CATOSTOMUS OCCIDENTALIS, Ayres, Proc. Cal. Acad. Nat. Sc. i. 1854, 18. —AGASS. Amer. Journ. of Sc. 2d Ser. xix. 1854, 94.

By a singular coincidence, this species received the same specific name from two authors at a few weeks interval.

San Francisco, Cal.—Dr. Newberry.

4. CATOSTOMUS LABIATUS, Ayres, Proc. Cal. Acad. Nat. Sc. i. 1855, 32.
Klamath Lake, O. T.—Dr. Newberry.

5. CATOSTOMUS MACROCHEILUS.—This species is very different from both of the preceding ones by a larger and more elongated head, a larger mouth, and hence much larger lips, covered with large papillæ. The scales which cover the body are larger than in *C. occidentalis*, and smaller than in *C. labiatus*. The head constitutes the fifth of the total length; the horizontal diameter of the eye is contained nearly six times in the length of the side of the head. The head itself is subquadrangularly pyramidal, truncated anteriorly with the upper edge of the snout projecting. The anterior margin of the dorsal is a little nearer the end of the snout than the insertion of the caudal fin. Its upper margin is concave. The anal is well developed, for its tip extends beyond the base of the caudal. The ventrals are inserted opposite the middle of the dorsal. The pectorals are large and long.

D 17; A 9; C 5, 1, 8, 8, 1, 6; V 10; P 18.

Bluish black above; yellowish golden on the sides and whitish beneath.

Collected at Astoria, O. T., by Lieut. W. P. Trowbridge, U. S. A.

6. CATOSTOMUS SUCKLII.—The head, as usual, forms the fifth of the entire length. It is subquadrangular, the upper surface rather sloping towards the blunt snout. The eye is small and subelliptical; its horizontal diameter being contained somewhat over five times in the length of the side of the head. The anterior margin of the dorsal fin is equidistant between the tip of the snout and the insertion of the caudal. Its height is equal to its length, and its upper margin is slightly concave. The posterior margin of the caudal is deeply emarginated, crescentic. The insertion of the ventrals is a little in advance of the middle of the dorsal fin.

D 14; A 10; C 5, 1, 8, 8, 1, 4; V 10; P 18.

The scales are large and but a little smaller anteriorly than posteriorly; they are subelliptical in shape, longer than deep, with their anterior and posterior margins irregular.

Specimens of this species were collected by Dr. Geo. Suckley, under Governor I. I. Stevens, in Milk River, an affluent of the upper Missouri.

7. CATOSTOMUS BERNARDINI.—A specimen of seven inches and a half, slender and graceful. The head forms a little less than the fifth of the total length. The eye is large and subcircular; its horizontal diameter entering a little over four times in the length of the side of the head. The upper margin of the dorsal is subconvex, the tips of the posterior rays reaching a vertical line which would intersect the anus. The caudal is subcrescentic posteriorly. The ventrals and pectorals are well developed.

D 15; A 10; C 5, 1, 8, 8, 1, 5; V 10; P 16.

Uniform purplish black above, yellowish white beneath.

Specimens of this species were collected by Dr. C. B. Kennerly, under Major W. H. Emory, at San Bernardino, in the upper waters of the Rio Huagui, west of the Sierra Madre, Mexico.

CHONDROSTOMI.

This group must include a much greater number of genera and species than was formerly anticipated. But, as a group, it must be based upon characters very different from those derived from the structure of the mouth. Indeed, those cartilaginous maxillary sheathes so prominent in *Chondrostoma*, *Chondrochylus*, *Chondrorhynchus* and *Lavinia*, gradually become less and less conspicuous, until we find but a thin pellicle, such as occurs in other groups of the same family. The characters of *Chondrostomi*, as derived chiefly from the American representatives, consist in the absence of barbels; in the position of the mouth, which is generally overhung by the upper jaw, and sometimes both jaws are equal. The pharyngeal teeth are of the grinding type and cultriform kind (*Dentes cultriformes*),

disposed upon a single series, with one exception only, and that occurs occasionally in *Campostoma*. I say *occasionally*, because in the majority of cases there is also but one single row in the latter. *Exoglossum* is removed from this group, of which it has none of the characters, except the absence of barbels.

We introduce the tribe by the genus

CAMPOSTOMA, Agass.,

which may be characterised as follows: Head subconical; body subfusiform; both compressed. Snout obtuse and protractile; mouth inferior, though its cleft is horizontal; lips very conspicuously developed; no barbels or cirrhi. Eyes of moderate development. Isthmus very wide. Origin of ventrals situated in advance of the anterior margin of the dorsal. Caudal furcated. Scales longer than high. Pharyngeal bones strongly curved, with a small dilatation upon their convexity. Teeth of the cultriform kind, of the grinding type, occasionally slightly hooked. They are disposed upon a double row of four and one, in the following manner: 4—4, or 1 | 4—4 | 1.

1. CAMPOSTOMA ANOMALUM, Agass. Amer. Journ. of Sc. 2d ser. xix. 1855, 219. —*Rutilus anomalus*, RAFIN. Ichth. Ohiens. 1820, 52.

2. CAMPOSTOMA ORNATUM—is larger, more elongated and more fusiform than *C. anomalum*. The head enters four times and a half in the total length. The diameter of the eye enters nearly six times in the length of the side of the head. The scales are much smaller than in *C. anomalum*.

D 8+2; A 8+2; C 7, 1, 9, 8, 1, 6; V 8; P 16.

The upper regions are purplish black; the inferior regions golden brown and yellow, with black spots distributed over the flanks. A black patch at the base of all the fins, otherwise the latter are orange or yellowish brown.

From Chihuahua River and a tributary only a few miles long. Collected by John Potts, Esq.

3. CAMPOSTOMA FORMOSULUM.—This species resembles more *C. anomalum* than *C. ornatum*; the most conspicuous difference between it and the former consist in the presence of larger scales. The ground color is alike, but in *C. formosulum* black irregular spots are distributed all over the upper region of the body.

Numerous specimens collected in the Rio Sabinal, a tributary of the Rio San Antonio, Texas, by Dr. C. B. Kennerly, under W. H. Emory, Commissioner U. S. and Mexican Boundary.

4. CAMPOSTOMA NASUTUM.—It is a shorter and more compact species, with the peduncle of the tail rather tapering. Its most prominent character consists in its thick and protruding snout, which overlaps the lower jaw more than in the species already referred to. The ground color is greyish above, and whitish or yellowish beneath; upper region of body and flanks occasionally marmorated. A black patch at the base of the caudal and dorsal fins.

Specimens were collected by Lieut. D. N. Couch, U. S. A., at Cadereita, and near Monterey, New Leon, in April, 1853.

From the foregoing species of moderate size, we pass to a genus composed of quite small fishes, differing from the former by the position of the ventral fins, which are inserted either immediately under the anterior margin of the dorsal fin or posteriorly to it, never in advance, as in *Campostoma*. To designate these we have selected the name of

DIONDA.

They are very intimately related to the Hyborhynchi, and differing from them by a smaller and more pointed head, a smaller mouth, though constructed upon the same plan as in *Hyborynchus*, that is, the lower jaw being thin, flat and rounded upon its periphery. The body is more slender and elongated, the snout

more protruding. The scales are either large, or else of moderate size, and the lateral line follows more or less the middle of the flanks. The dorsal fin is higher than long, and shorter than in *Hyborynchus*, and the anterior ray is more closely united to the next. The insertion of the ventrals is always situated posteriorly to the anterior margin of the dorsal, or under it, never in advance of it. The caudal is furcated. The pharyngeal bones are stouter than in *Hyborynchus*, the lower branch or limb has the same length as the upper; both are more curved, thus rendering the convexity of that bone more conspicuous; it is expanded as usual. The teeth are similar to those of *Hyborynchus*, being, however, not quite so compressed and not hooked. Four are observed upon one single row: 4—4.

This genus is closely allied to *Campostoma*, and since our Diondæ are, generally speaking, small fishes, we should not be surprised at hearing that some of the species of *Campostoma*, while yet immature could not always be easily distinguished from them, for the mouth is, properly speaking, not smaller than in *Campostoma*.

The following species have fallen under our observations.

1. DIONDA EPISCOPA.—Slender and graceful, fusiform in profile and compressed, with the back slightly arched. The head is large, forming about the fifth of the length. The eye is large and subcircular, its diameter being contained three times and a half in the length of the side of the head. The fins are of but moderate development; the insertion of the ventrals is situated a little posterior to the anterior margin of the dorsal. The rays read as follows:

D 8+2; A 8+2; C 8, 1, 9, 8, 1, 7; V 8; P 14.

The scales are large, the lateral line following the middle of the flanks.

The dorsal region is blackish brown; a black vitta is observed along the flanks, just above the lateral line, extending from a black spot, upon the base of the caudal, to the extremity of the snout. The inferior region is yellowish white spread over with minute black dots.

Collected in the head waters of the Rio Pecos, and brought home by Capt. John Pope, U. S. A. Specimens of the same species were caught by John H. Clark, under Col. J. D. Graham, U. S. A., in Camanche Spring, a presumed tributary of the Rio Grande del Norte (Rio Bravo), or more probably without outlet.

2. DIONDA SERENA.—Could easily be mistaken for *D. episcopa*. Its form is slender and elongated, the dorsal outline being nearly straight; the head enters five times and a half in the total length. The eye is large and circular, its diameter entering only three times in the length of the side of the head. The insertion of the ventrals takes place immediately opposite the anterior margin of the dorsal fin. The pectorals are long and slender, more so even than in *D. episcopa*.

The dorsal region is light brown, the flanks and abdomen being silvery, with the scales of the lateral line dotted with black, imitating spots. A black spot upon the base of the caudal fin.

From the Rio Sabinal, Texas; collected by Dr. C. B. Kennerly, under W. H. Emory, Commissioner U. S. and Mex. Boundary.

3. DIONDA TEXENSIS,—is a very characteristic species. The body is rather deep upon its middle, and the lateral line somewhat depressed. The head is quite small and subconical, entering five times and a half in the total length. The eye is large and circular. The insertion of the ventral fin is placed a little posteriorly to the anterior margin of the dorsal. The dorsal region is greyish brown; the abominal region greyish white; a diffused greyish black band may be observed along the middle of the flanks, embracing the lateral line beneath, and a black spot upon the base of the caudal. The ventrals and pectorals are yellow.

Numerous specimens were collected in the Rio Nueces, Texas, by John H. Clark, under Col. J. D. Graham, U. S. A.

4. DIONDA PAPALIS.—The head in this species is rather small, but rounded off upon the snout; it forms a little less than the fifth of the entire length. The body is thickish anteriorly, subcylindrical, tapering posteriorly. The dorsal and anal are proportionally well developed. The caudal is forked; the ventrals are inserted under the anterior margin of the dorsal. The scales are large. The coloration has been altered to a uniform black subsequently upon its immersion in alcohol with sundry other specimens.

Collected in Delaware Creek, a tributary of the Rio Pecos, and brought home by Capt. John Pope, U. S. A.

5. DIONDA ARGENTOSA,—has a small head and obtuse snout, a rather slender and compressed body. The head constitutes 2–11ths of the total length. The insertion of the ventrals is situated opposite the anterior margin of the dorsal. The scales being quite large, the lateral line is slightly deflected upon the thorax. Color of the dorsal region reddish brown; sides and abdomen as if painted over with silver or quicksilver. Fins olivaceous.

Collected in San Felipe Creek and Devil's River, two tributaries of the Rio Grande del Norte (Rio Bravo), by John H. Clark, under Col. J. D. Graham, U. S. A.

6. DIONDA CHRYSITIS.—Very slender and compressed; head very small and obtuse, contained six times in the total length. Eyes large and circular. Origin of ventrals opposite the anterior margin of dorsal. Upper surface of head tuberculous. Scales large. Dorsal region reddish brown; sides and abdomen as if painted with gold. A black spot upon the base of the caudal fin. Fins themselves yellowish or olivaceous.

Specimens were collected by John H. Clark, under Col. J. D. Graham, U. S. A., in Live Oak Creek, presumed tributary of Rio Pecos, or else losing itself into the ground.

7. DIONDA MELANOPS.—A rather short and deep body characterizes this species. The head is proportionally well developed, forming a little less than the fifth of the total length. The snout is conical and not abruptly truncated. The insertion of the ventrals is situated a little posteriorly to the anterior margin of the dorsal. Scales large. The dorsal region is blackish; the sides and abdomen are dotted with black upon a bluish lead ground, giving the whole fish a dark appearance. A black spot upon the base of the caudal fin.

From Buena Vista, Coahuila;—collected by Lieut. D. N. Couch, U. S. A.

8. DIONDA COUCHI.—Though closely allied to the preceding, it may readily be distinguished from it by a more elongated body and more elongated head. The snout is rounded. The eye is circular and of medium size. The ventrals are inserted posterior to the anterior margin of the dorsal. The scales are quite large. Upper regions greyish black; sides and abdomen yellowish or whitish, either unicolor or maculated. A black spot upon the base of the caudal.

Specimens collected by Lieut. D. N. Couch, U. S. A., at Guajuco, Monterey and Cadereita, New Leon, in the waters of the Rio San Juan.

9. DIONDA PLUMBEA.—Besides several other peculiarities of structure, this species may be distinguished from all its congeners by the size of its scales, which are the smallest in the genus.

Greyish above, whitish or yellowish white beneath. Black spot at base of caudal.

Collected in the head waters of the Canadian River (Llano Estacado), by H. B. Möllhausen, under Lieut. A. W. Whipple, U. S. A.

10. DIONDA SPADICEA.—This has the general aspect of *D. plumbea*, in being slender and elongated in body and head. The latter, however, is more conical and the eye smaller, the scales being but a very little larger. Colors brownish red above, whitish beneath. No spot at the base of the caudal.

From Fort Smith, Ark.;—collected by H. B. Möllhausen, under Lieut. A. W. Whipple, U. S. A.

The ten species that precede as well as the four following ones, are amongst those whose history has most perplexed us. At last we were glad to recognize the genus

HYBORYNCHUS, Agass.

established upon a species of the Ohio and its tributaries, and believed to be *Minnilus notatus* of Rafinesque. We have examined carefully the latter species, and after a series of comparative studies we were enabled to add the following few species to the genus which we thus characterize: Head rather short, upper surface depressed; snout abruptly truncated and rounded. The mouth is of medium size, subterminal, its cleft being horizontal, the lower jaw flattened and thin, rounded upon its periphery and slightly overlapped by the snout. There are no barbels at the angles of the mouth, which do not reach a vertical line drawn in advance of the orbit. The eyes are large; the isthmus is of moderate width. Anterior ray of dorsal fin shorter than the second. The insertion of the ventrals is situated opposite the anterior margin of the dorsal or in advance of it. The caudal is furcated. The scales are large, higher than long; the lateral line follows the middle of the flanks. The pharyngeal bones are slender, and more so upon the inferior limb, which is longer than the upper and curved backwards and sideways, whilst the upper limb is gently curved inwards. The convexity of the same bone is expanded. The teeth are of the cultriform kind of the grinding type, very much compressed, slightly hooked, and consequently provided with quite a narrow grinding surface. Their disposition is upon a single row of four: 4—4.

1. HYBORHYNCHUS PERSPICUUS.—The head is contained five times and a quarter in the total length, instead of constituting the sixth part of it, as in *H. notatus*. The mouth and eye, both, are a good deal larger than in the latter. The insertion of the ventrals is situated immediately under the anterior margin of the dorsal. The caudal fin is more deeply furcated than in *H. notatus*.

D 9+2; A 7+2; C 10, 1, 9, 8, 1, 8; V 9; P 14.

There is a very minute rudimentary ray at the anterior margin of both the dorsal and anal, followed by a second, about half the height of the fin.

Upper region and flanks reddish; abdomen sulphur yellow; lateral line dotted with greyish purple, more distinct towards the base of the caudal upon which a dark spot exists. Fins yellowish, also with a black spot upon the anterior margin of the dorsal below the middle height. Superior portion of the dorsal. greyish, as also the external margin of the caudal.

From Arkansas River, near Fort Smith;—collected by Dr. Geo. G. Shumardn

2. HYBORHYNCHUS TENELLUS.—It is more slender and more compressed tha even *H. perspicuus*. The head is very much depressed, subpyramidal were the snout not rounded, hence appearing quite small; it is contained five times and a half in the total length. The insertion of the ventrals is a little in advance of the anterior margin of the dorsal fin. The eye and mouth are proportionally large, and especially the scales, which are the largest among the hitherto known species of the genus. Color uniform reddish above and on the sides; yellowish beneath. A black spot upon the base of caudal fin. Otherwise the fins are unicolor.

Collected twenty miles west of Choctaw Agency, by H. B. Möllhausen, under Lt. A. W. Whipple.

3 HYBORHYNCHUS PUNICEUS.—As regards the general aspect, this species is intermediate between *H. perspicuus* and *H. tenellus*. It is distinguished from both of these by more developed opercular apparatus and much smaller scales. The color is uniform pale red; the fins are unicolor, yellowish.

Specimens were collected in Antelope Creek, a tributary of the Canadian River, by Dr. C. B. Kennerly, and from Llano estacado, by H. B. Möllhausen, both under Lt. A. W. Whipple, U. S. A.

4. HYBORHYNCHUS CONFERTUS.—This species has a short and contracted appear

the lower jaw rounded instead of angular, and, generally speaking, the eye rather large.

1. HYBOGNATHUS ARGYRITIS.—This species seems to come nearest to *H. nuchalis*, Agass., than any of the following ones. The eye, however, is quite large, subcircular in shape, its diameter entering a little short of four times in the length of the side of the head. The snout is rather pointed, and the mouth larger than in the species enumerated further below. The largest specimens observed are four inches and a half in total length. The dark stripe along the dorsal line does not appear conspicuously here, but may be observed, as on all the others, more or less distinctly.

We have examined specimens collected in Milk River by Dr. Geo. Suckley, under Gov. I. I. Stevens, and in the Arkansas River near Fort Smith, by Dr. Geo. G. Shumard.

2. HYBOGNATHUS EVANSI.—May easily be distinguished from the preceding by a much stouter head, more protruding snout, small mouth, smaller eye. The opercle is as long as deep, subquadrangular, slightly emarginated behind, as in the rest of the species.

Collected at Fort Pierre, Nebraska, by Dr. John Evans.

3. HYBOGNATHUS PLACITUS.—The general aspect is shorter than in any of the preceding species. The snout is thickish, but less so than in *H. evansi;* the mouth smaller also. The eye is circular, its diameter being contained over four times in the length of the side of the head. The scales are also larger than in *H. evansi.* Greyish brown above, greyish silver along the middle of the flanks, and metallic white or yellow beneath.

Collected in the sluices of the Arkansas near Fort Makee; brought home by Lieut. E. G. Beckwith, U. S. A.

The fish described by Dr. Ayres, under the name of *Gila microlepidota*, presents such peculiarly shaped pharyngeal bones, that we did not hesitate erecting it into a distinct genus under the name of

ORTHODON,

in allusion to the erect form of its teeth. But to proceed more systematically: the head is subconical, attenuated towards the snout. The mouth is below the medium size, terminal, oblique, both jaws even; no barbels of any sort. A knob or tubercle upon the symphysis of the lower jaw, as in *Hybognathus.* Eye of medium size. Isthmus small. Body subfusiform, having the aspect of the Gilæ, but the ventrals are inserted under the anterior margin of the dorsal fin. The caudal is furcated. The scales are small; the lateral line submedial, being somewhat depressed along the middle of the abdomen. The pharyngeal bones are thin, vertically elevated, or rather broad in the vertical direction, bent as usual and widening towards the upper and inner limb, so as to be broadest there. The lower branch is much narrower. The teeth are of the cultriform kind of the grinding type, compressed, lanceolated, erect, very slightly bent inwards. They are disposed upon a single row of five, thus: 5—5, the upper ones being quite raised above the edge of the bone.

ORTHODON MICROLEPIDOTUS.—*Gila microlepidota*, AYRES, Proc. Cal. Acad. Nat. Sc. i. 1855, 21.

San Francisco, Cal.—Dr. Newberry.

The genus we next come to, and for which we have chosen the name of

ALGANSEA,

has features and characters altogether different from any known genus. The head is subconical, more or less pointed, though rounded upon its periphery. The mouth being of medium size, slightly oblique upwards, its angles never extending beyond the anterior rim of the orbit, and destitute of barbels; the jaws themselves terminate evenly. The eye is of moderate development.

There is a narrow isthmus between the gill openings. The body short and stoutish, quite compressed, covered with scales of medium or of large size, the lateral line being submedial, slightly deflexed upon the middle of the abdomen. The fins are rather moderate in development; the origin of the ventrals is situated opposite to the anterior margin of the dorsal, the posterior margin of the latter never reaching the anterior margin of the anal. The caudal fin is emarginated posteriorly. The pharyngeal bones are moderately strong; the upper and lower branches of nearly equal strength, though the lower is a little longer than the upper. The convexity is strongly marked and dilated. The teeth are of the cultriform kind of the grinding type, disposed upon a single row of four or five, as follows: 4—4 or 5—5. The uppermost stand boldly out above the surface of the bone.

1. ALGANSEA TINCELLA.—*Leuciscus tincella*, VAL. in *Cuv.* & *Val.* Hist. Nat. des Poiss. xvii. 1854, 323.—The scales in this species are next in size to those of *A. obesa*. There are about twelve rows beneath and fourteen above the lateral line. I say about, because the specimens are somewhat mutilated, as most market specimens are. The insertion of the ventrals are situated a little posteriorly to the anterior margin of the dorsal. The eye is smaller than in any of the preceding species of this genus. Reddish brown above, silvery on the sides, and white beneath.

Purchased in the city of Mexico by Major Wm. Rich.

2. ALGANSEA BICOLOR.—Of all the species hitherto known of this genus, the one here referred to has the largest scales, five rows of which may be counted from the origin of the ventrals to the lateral line, and nine from the lateral line to the anterior margin of the dorsal, in all fifteen rows. The ventrals are inserted a little in advance of the anterior margin of the dorsal. The body is thickest anteriorly, and tapers backwards; the nape is slightly swollen. The head enters about four times and a half in the total length. The back and sides are of a metallic bluish black, intermingled on the lower half of the flank with a golden hue. The inferior surface is white, contrasting with the color of the back.

Caught in Klamath Lake, O. T., by Dr. John S. Newberry, under Lieut. R. S. Williamson.

3. ALGANSEA OBESA.—A very corpulent species covered with scales of moderate development, and so far, the smallest in the genus. The depth is contained about three times in the length, caudal fin excluded. There are eight longitudinal rows of scales between the origin of the ventrals and the lateral line, and fourteen rows above it to the anterior margin of the dorsal, in all twenty-three rows. Dorsal region bluish grey; sides greyish; belly yellowish.

Specimens of this species were collected in the waters of Humboldt River by the late J. Soulé Bowman and Lieut. E. G. Beckwith.

4. ALGANSEA FORMOSA.—A very graceful and well proportioned fish as regards body and head. The latter is rather slender and conical, constituting the fourth of the total length, in which the greatest depth enters nearly five times. The origin of the ventrals is situated under the anterior margin of the dorsal, as in *A. obesa*. The scales are next in size to those of *A. bicolor*. Seven rows are found between the origin of the ventrals and the lateral line, and ten above it, making eighteen rows in all. Metallic greenish brown above and on the sides, minutely dotted with black; beneath yellowish or whitish.

This species was collected in Mercede and Mohave rivers, by Dr. A. L. Heermann, under Lieut. R. S. Williamson, and is very closely allied to *Lavinia gibbosa*, Ayres, but since I have no specimens of the latter, and that those before me measure but five inches and a half, I feel reluctant to attempt an identification.

Of all the genera recently established by Prof. Agassiz, there is none that has given me so much difficulty to understand, as his genus *Acrocheilus*.

The lengthy description appended to it, reminded me very forcibly of those "specific descriptions referring chiefly to individual peculiarities of specimens, a kind of portrait of peculiar individuals without much likeness."* After a careful study of whatever specific there was in the description of *Acrocheilus alutaceus*, I came to the conclusion that *Acrocheilus* was identical with

LAVINIA,

published for the first time in 1854, nearly one year before *Acrocheilus* was proposed. Circumstances of that kind are always to be regretted on either side. The characters of the genus are as follows: The body is very much compressed, deep, subfusiform in outline, covered with well developed scales; the lateral line forming an open curve, convex downwards, nearer the abdominal outline than the back. The fins are well developed; the insertion of the ventrals are situated either in advance of the anterior margin of the dorsal, or immediately under it. The posterior margin of the dorsal approximates more or less the anterior margin of the anal. The caudal is deeply furcated, rounded upon its insertion, and provided with numerous well-marked rudimentary rays above and below. The head is rather small. The cleft of the mouth is situated altogether anteriorly to the orbit; it is of medium size, the upper jaw overlapping the lower one, which is either rounded or truncated upon its symphysis. There are no buccal barbels. The eye is of moderate size; a narrow isthmus separates the gill openings. The pharyngeal bones are strongly curved, the upper branch directed inwards and downwards, the inferior one slightly arched backwards, with the convexity dilated. The teeth, being of the cultriform kind of the grinding type, and disposed upon one single series of five, thus: 5—5, with a sharp terminal point.

1. LAVINIA EXILICAUDA, B. & G. Proc Acad. Nat. Sc. Phila. vii. 1854, 137. *Lavinia compressa*, Ayres, Proc. Cal. Acad. Nat. Sc. i. 1855, 21.

From Sacramento River, Cal.; collected by Dr. A. L. Heermann.

2. LAVINIA ALUTACEA.—*Acrocheilus alutaceus*, AGASS. & PICK. Amer. Journ. of Sc. 2d ser. xix. 1855, 99.

From Willamet Falls and Wallawalla river, collected by Dr. Charles Pickering, under Capt. C. Wilkes, U. S. N.

3. LAVINIA HARENGUS.—This species is intermediate between *L. exilicauda* and *L. alutacea*. The most characteristic feature consists in the relative position of the dorsal and anal fins, which are wider apart. Their size is nearly the same, and if any difference should be observable, the anal would be found a little larger than the dorsal. The specimens before us are in a mutilated condition, inasmuch as the scales are all fallen. The dorsal region seems to have been of a much deeper hue than the lower half of the sides, which are whitish, as well as the belly, contrasting with the rather dark hue of the dorsal region.

Caught at Monterey, Cal., by A. S. Taylor, Esq.

IV.

This fourth group is less uniform, if the teeth are taken into account. The latter belong to the hooked types, with or without grinding surface (*Dentes uncinato-submolares* and *uncinato-subconici*), of the raptatorial (*Dentes raptatori*) and prehensile (*D. prehensiles*), kinds chiefly; in most cases disposed upon a double series. But all its representatives are provided with buccal or maxillary barbels. In the species from the Pacific range a thin cartilaginous pellicle is observed upon the jaws: illustrating what we had already remarked, that the cartilaginous lips are not sufficient to characterise the group of Chondrostomi. Of course, it is in the latter where that character assumes its greatest developement.

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*Amer. Journ. of Sc. 2d. ser. xix. 1855, 220

We begin the group with the genus

ARGYREUS, Heck.

which is the exact synonym of Agassiz's *Rhinichthys*. And we are not a little surprised at seing the learned Professor bring forward his generical appellation,* introduced into the nomenclature in 1850, in preference to that of Heckel instituted in 1840, especially when elsewhere he appears so eager at restoring all such names as have the priority of publication, and which is nothing but just.

The natural characters of the genus *Argyreus*, are: "A snout more or less protruding beyond the lower jaw, thus giving the mouth an inferior position." In that respect it resembles *Campostoma* and similar Chondrostomi. "The mouth itself is rather small, surrounded with quite narrow and smooth lips," covered with a deciduous cartilaginous pellicle in the western species, "and provided upon its angle with a small barbel, sometimes very conspicuous." The gill openings are separated beneath by a very wide isthmus. The insertion of the ventrals is situated in advance of the anterior margin of the dorsal fin, which is higher than long. The caudal is furcated. The scales are small. The pharyngeal bones are quite narrow, and stouter above than below. The teeth are of the hooked type without grinding surface, strongly hooked and disposed thus: 1 | 4—4 | 2, that is, upon two rows, four in the outer row, and one or two in the inner row.

The following species have already been mentioned:

1. ARYGREUS ATRONASUS, Heck.—See STORER, Hist. of Fish. of Mass. in the Mem. of the Amer. Acad. new ser. vol. v. 1855.

2. ARGYREUS NASUTUS, Grd.—See STORER, Hist. of Fish. of Mass. in the Mem. of the Amer. Acad. v. 1855.

3. ARYGREUS MARMORATUS.—*Rhinichthys mormoratus*, AGASS. Lake Sup. 1850, 354, Pl. ii. figs. 1 and 2.
From Sault St. Mary.—L. Agassiz.

4. ARGYREUS OBTUSUS.—*Rhinichthys obtusus*, AGASS. Amer. Journ. of Sc. 2d. ser. xvii. 1854, 357.
From Tennessee River.

5. ARGYREUS MELEAGRIS.—*Rhinichthys meleagris*, AGASS. Amer. Journ. of Sc. 2d. ser. xvii. 1854, 357.
From Iowa.

To which we add, as new:

6. ARGYREUS DULCIS.—It has the snout more prominent than *A. atronasus*, and less so than *A. nasutus*. The head is well developed, constituting the fourth of the length, the caudal fin excluded. The eye is quite small and subcircular, its horizontal diameter entering six times in the length of the side of the head, a little over twice in advance of its anterior rim. The mouth is larger than in most of its congeners, and the barbel much more conspicuous. The dorsal fin, as usual, is higher than long, but its upper margin is slightly convex. Its anterior margin is nearer the extremity of the snout than to the insertion of the caudal fin. The latter constitutes a little less than the fifth of the entire length. The anal is a little shorter than the dorsal, but not as deep as the latter is high.

D 10; A 9; C 4, 1, 9, 8, 1, 5; V 8; P 13.

The dorsal region is greyish yellow; the sides yellowish, with an indistinct silvery band; beneath yellowish white. The dorsal region, including the upper part of the flanks, is spread over with black specks, sometimes observed beneath the silvery band also.

Specimens, the largest of which measuring about three inches and a half, were collected by the late J. S. Bowman, in the Sweet Water, a tributary stream

* Amer. Journ. of Sc. 2d. ser. xvii. 1854, 357.

of Nebraska, or Platte River. Smaller specimens of the same species were obtained in Cottonwood Creek, Utah, by Lieut. E. G. Beckwith, U. S. A.

7. ARGYREUS NUBILUS.—This is a very characteristic species. The head is very small, and the body, fusiform in shape and compressed, is thick and swollen upon its middle. The tail again is rather slender. The snout is subconical, but not more protruding than in the preceding species; the mouth is a great deal smaller than in the latter, with its barbels less conspicuous. The head constitutes about the fifth of the entire length. The eye is moderately developed and subcircular in shape; its horizontal diameter is contained about five times in the length of the side of the head. The dorsal, caudal and anal fins are of but moderate development, the pectorals and ventrals rather small.

D 8+2; A 7+2; C 5, 1, 9, 8, 1, 6; V 8; P 12.

The number of rays in the fins does not materially differ from that of the preceding species; in both, the anterior two rays of the dorsal and anal fins are mere rudiments.

The color above is blackish brown, with a purplish hue along the middle of the flanks; the inferior regions are of a soiled white or yellowish brown. The upper surface of the head and upper half of the sides, including the eye, is deep black; inferiorly it is whitish or yellowish white.

Specimens, four inches in total length, were collected at Fort Steilacoom, Puget Sound, W. T., by Dr. Geo. Suckley, U. S. A., under Gov. I. I. Stevens.

8. ARGYREUS OSCULUS.—Has more the fascies of *A. atronasus* than of any other of its congeners, both by the outline of its body and head, and the shape and position of the mouth. The head is comparatively small, forming the fifth of the length, with the exception of the lobes of the caudal. The eye is rather large and subcircular, its diameter entering about four times in the length of the side of the head. The dorsal and anal fins are well developed, the former being convex superiorly, and the latter subconvex exteriorly. The posterior margin of the caudal is crescentic. The posterior extremity of the ventrals extend as far as the vent, which is not the case in the two species described above.

D 8+2; A 7+2; C 5, 1, 9, 8, 1, 6; V 8; P 14.

The anterior two rays of both the dorsal and anal fins are mere rudiments, as already stated.

The color is reddish brown above; olivaceous on the sides, with numerous dark blotches and dots. Beneath uniform yellowish white or silvery white.

Many specimens, the largest of which measuring less than three inches, were collected by John H. Clark, under Col. J. D. Graham, U. S. A., in the Babocomori, a tributary stream of the Rio San Pedro, itself flowing into the Rio Gila.

9. ARGYREUS NOTABILIS.—This species resembles *A. osculus* in many respects, but will always be easily distinguished from it by a more truncated snout, and consequently by a mouth not so deeply cleft. The dorsal fin is situated more anteriorly also. The scales are smaller. The ground color is yellowish or brownish above, golden or orange beneath, covered all over, the abdominal region excepted, with small black spots.

Specimens caught in the Rio Santa Crux, Sonora, by John H. Clark, under Col. J. D. Graham, U. S. A.

The hydrographic basin of the Rio Gila harbors a generic type which, at first sight, one would refer to *Argyreus*; but on a closer inspection, its generic traits will appear quite conspicuous. The name of

AGOSIA

is proposed for it; the diagnosis is as follows: Snout rounded, slightly protruding beyond the lower jaw, though the mouth opens horizontally. The mouth is of medium size, surrounded with narrow and smooth lips, and provided upon its angle with a very small barbel. The isthmus is of moderate width. The insertion of ventrals is situated opposite the anterior margin of dorsal fin, which is higher than long. The caudal is bifurcated. The scales are minute·

The pharyngeal bones are expanded upon their curvature. The teeth are of the prehensile kind of the hooked type, provided with a grinding surface; strongly hooked, and disposed thus: 4—4, that is, upon one single row of four.

Now, comparing the above with the characters assigned to *Argyreus*, we find that the most prominent difference resides in the pharyngeal teeth. The isthmus is narrower, and the insertion of the ventrals placed further back.

1. AGOSIA CHRYSOGATER,—is about three inches and a half in total length, the head forming a little more than the fifth of it. The posterior extremity of the maxillary extends to the vertical line of the anterior rim of the orbit. The eye is large and circular, its diameter being contained about four times in the length of the side of the head. The anterior margin of the dorsal is a little nearer the end of the snout than the insertion of the caudal. The following is the formula of the fins:

D 10; A 7; C 4, 1, 9, 8, 5,; V 9; P 16.

A minute rudiment at the anterior margin of both the dorsal and the anal fins are not included in the above numbers.

The region above the middle of the flanks is reddish brown, spotted or dotted with black, especially upon the head; a black vitta separates this region from that beneath, which is unicolor of a golden hue.

The species was collected in the Rio Santa Crux, Sonora, by John H. Clark, under Col. J. D. Graham.

2. AGOSIA METALLICA.—The specimens of this species are a little shorter than those of the preceding one. It is very characteristic, and easily distinguished from its congener. The head is shorter and the snout more abruptly rounded. The eye is smaller also. The body is more gracefully subfusiform and compressed. The dorsal is higher and narrower, rounded superiorly. The posterior margin of the caudal is crescentic, less furcated than in *A. chrysogaster*.

The formula of the fin's rays present also some difference:

D 9; A 8; C 4, 1, 9, 8, 1, 5; V 8; P 15.

The same is true with regard to the rudiment at the anterior margin of the dorsal and anal, and which must be sought for under the skin.

Upper regions greyish brown dotted with black; inferiorly silvery and unicolor; a black vitta on the sides separating the two hues.

Collected by John H. Clark, under Col. J. D. Graham, U. S. A., in the Rio San Pedro, an affluent of the Rio Gila.

The genus which we have formerly characterized under the name of

POGONICHTHYS,

although enlarged by the accession of a new species, stand within the same limits as were originally assigned to it. The body is fusiform and elongated, compressed, covered with large and uniform scales, and provided with a conspicuous lateral line deflexed upon the middle of the abdomen. The dorsal fin is higher than long; the ventrals are inserted in advance of the anterior margin of the dorsal. The caudal is bifurcated. The head is of moderate size or else small, either rounded or flattened upon its upper surface. The snout being more or less protruding beyond the lower jaw, the mouth assumes a somewhat inferior position, although opening horizontally forwards. The mouth itself is of medium size, provided upon its angle with a barbel inserted upon the anterior edge of the posterior extremity of the maxillary. The eye is of moderate development. The isthmus is quite narrow. The pharyngeal bones are proportionally stout, the inferior limb being, however, slender, slightly arched and expanded upon its symphysis. About the height of the third tooth the convexity suddenly expands, tapering off towards the extremity of the upper branch, which is slightly bent inwardly downwards. The teeth are well developed, very much compressed upwards and hooked. They are of the prehensile kind, of the hooked type, with a grinding surface, somewhat inclined backwards, and disposed upon a double row of two and four: 2 | 4—4 | 2.

This genus is intimately related to *Leucosomus*, differing from it chiefly, by the structure of its teeth, which are provided with a grinding surface in *Pogonichthys*, whilst there is a sharp edge in *Leucosomus*.

1. Pogonichthys inæquilobus, B. & G. Proc. Acad. Nat. Sc. Philad. vii. 1854, 136.

Besides the specimens collected by Dr. Heermann in the San Joaquin River, Cal., we have received others from Petaluma, Sonoma County, Cal., collected by E. Samuels.

2. Pogonichthys symmetricus, B. & G. Proc. Acad. Nat. Sc. Philada. vii. 1854, 136.

From Fort Miller, San Joaquin Valley, Cal.; collected by Dr. Heermann.

3. Pogonichthys argyreiosus, Girard, Proc. Acad. Nat. Sc. Philada. vii. 1854, 153.

Collected at Presidio, near San Francisco, Cal., by Lieut. W. P. Trowbridge, U. S. A.

4. Pogonichthys communis.—This species is the most characteristic of the genus, by its small and flattened head and the large scales which cover the body. The mouth is larger in proportion than in any of its congeners; in large specimens the snout overlaps entirely the lower jaw, in which respect it resembles *Gila elegans* most remarkably. The barbel upon the angle of the mouth is very conspicuous. The fins are all well developed; the external rays of the pectorals extend beyond the usual termination of these fins in other species. The dorsal region is reddish grey or greyish red, according to circumstances; the rest of the body whitish yellow or yellowish golden, the fins being unicolor.

We have examined numerous specimens of this species. They were collected at Fort Pierre, Nebr., by Dr. John Evans; at Fort Union, by E. J. Denig; above Fort Union and in Milk River, by Dr. Geo. Suckley, under Gov. I. I. Stevens; in the Yellowstone River, by Dr. F. V. Hayden, and in the Sweet Water, a tributary of Platte or Nebraska River, by the late J. Soulé Bowman.

The genus of genuine Gudgeons,

Gobio, Cuv.

is a type that may easily be characterized. Head subconical, with the snout rather thick and obtuse, overlapping the lower jaw, thus giving the mouth a somewhat inferior position. The latter, however, is directed forwards; it is large, and provided with a well developed barbel upon the posterior extremity of the maxillary. The eye is of moderate development. The isthmus is large. The body is elongated, subcylindrical. The dorsal and anal, both, are rather narrow fins. The insertion of the ventrals takes place under the anterior margin of the dorsal or a little behind it. The caudal is bifurcated. The scales are large and the lateral line nearly median. The pharyngeals are gracefully curved, the upper and lower branches tapering, the convexity very slightly expanded. The teeth are slender, subcylindrical upon their base, compressed above, of the raptatorial kind of the hooked type, without grinding surface, and disposed upon a double series of one, two or three, and three, four or five, as follows: 3 | 5—5 | 2, or 2 | 4—4 | 1, &c. &c.

This genus may be distinguished from *Leucosomus* by its protruding snout, much more developed maxillary barbel, and narrow dorsal and anal fins, and finally its pharyngeal teeth more strongly hooked.

1. Gobio gelidus.—Body and head very slender and elongated; head forming about the fifth of the total length. The snout is quite prominently developed. The eye is rather small compared to *G. fluviatilis*, resembling more, in that respect, *G. cataractæ*, from which, however, this species can readily be distinguished by the position of its ventral fins, which are inserted under the anterior margin of the dorsal, whilst they are placed in advance of it in *G. cataractæ*.

Color yellowish brown, lighter beneath than above, with a silvery streak along the middle of the flank.

Specimens of this species were collected in Milk River, an affluent of the upper Missouri, by Dr. Geo. Suckley, under Gov. I. I. Stevens.

2. GOBIO ÆSTIVALIS.—This is quite a characteristic species, differing from all its congeners by a rather compressed body, elevated and arched upon its middle, and tapering rapidly along the peduncle of the tail. The snout is much shorter and less obtuse than in *G. gelidus;* the eye is larger also, and the position of the ventrals a little more forwards. The scales are larger, too. In coloration we see no marked difference between this species and *G. gelidus.*

Caught in the Rio San Juan, near Cadereita, New Leon, by Lieut. D. N. Couch, U. S. A.

3. GOBIO VERNALIS.—The body is fusiform, thickest anteriorly, tapering posteriorly. The head is short, the snout blunt and rounded. The eye is large, its diameter being contained three times and a half in the length of the side of the head. The caudal fin is long and deeply furcated; it constitutes nearly the fourth of the entire length, whilst the head enters in the latter nearly five times and a half. The color is uniform yellowish brown, with a silvery streak along the middle of the flanks. The opercular apparatus and cheek are highly silvery.

From Arkansas River, near Fort Smith; collected by Dr. Geo. G. Shumard.

Under the head of *Luxilus* will be found the reasons for transferring the name of

LEUCOSOMUS, Heck.

to *Leuciscus pulchellus*, instead of *Cyprinus chrysoleucus.* We shall now characterize this genus, as it is, henceforth, to stand in the ichthyic system. The body is elongated, subfusiform, compressed. The head is stout, conical, either abruptly truncated or tapering off. In either case, the mouth is large, subterminal, and the upper jaw slightly protruding beyond the lower. A small barbel upon the maxillary, near the angle of the mouth. Eyes of medium size. Insertion of ventrals a little in advance of the anterior margin of the dorsal, or immediately under it. Caudal bifurcated. Scales large, a little longer than high; lateral line following the middle of the flanks. Pharyngeal bones stoutish, sickle-shaped; the inferior branch rather slender, the convexity having a slight expansion tapering off towards the tip of the upper branch. The teeth are subconical, compressed and strongly hooked, of the raptatorial kind, of the hooked type, without grinding surface. They are disposed upon a double row of four and two in the following manner: 2 | 4—4 | 2; sometimes 2 | 5—4 | 3, and even 1 | 4—4 | 2.

The genus *Cheilonemus*, Bd., is strictly synonymous with *Leucosomus;* the latter differs from *Semotilus* by the presence of maxillary barbels.

1. LEUCOSOMUS PULCHELLUS.—*Leuciscus pulchellus*, STORER, Rep. 1839, 91.—*Leuciscus argentius*, STORER, Rep. 1839, 90.—*Leucosomus chrysoleucus*, HECK., in Russ. Reise. ii. 1843, 1042, pl. i. *Leuciscus storeri*, VAL., in *Cuv.* & *Val.*, Hist. Nat. Poiss. xvii. 1844, 319.—*Cheilonemus pulchellus*, GRD., in *Storer*, Fish. of Mass., in Mem. Amer Acad. v. new ser. 1855, 120, pl. xxii., fig. 2.

Inhabits the fresh waters of New England.

2. LEUCOSOMUS PLUMBEUS.—*Gobio plumbeus*, AGASS., Lake Sup. 1850, 366.—If at all different from the preceding, this will be a second species of the genus.

Lake Huron and Lake Superior.

3. LEUCOSOMUS DISSIMILIS.—This species will be easily recognized by the small size of the scales of the back compared to those of the flanks. In that respect it approximates species of the genus *Semotilus.* Its head is subconical, contained a little less than four times in the total length. The eye is large, its diameter being contained four times in the length of the side of the head. The color is

uniform greyish brown above, silvery along the middle of the flank and yellowish beneath.

Specimens of this species were collected by Dr. Geo. Suckley, under Gov. I. I. Stevens, in Milk and Little Muddy rivers, tributaries of the upper Missouri.

4. LEUCOSOMUS PALLIDUS.—This species has the same general physiognomy as *L. dissimilis*. The scales of the back are likewise a great deal smaller than on the flanks, but in *totum* they are larger than in the preceding species. The origin of the ventrals is situated in advance of the anterior margin of the dorsal, a feature that will enable us at once to discriminate between this species and *L. dissimilis*. The dorsal region is greyish brown, the ventral region yellowish white. A black spot at the base of the caudal, as well as upon the anterior margin of the dorsal.

Specimens were collected in Antelope Creek, Arkansas, by Dr. C. B. Kennerly, under Lieut. A. W. Whipple, U. S. A.

5. LEUCOSOMUS INCRASSATUS.—Remarkable for its stout and short body and well developed head, which constitutes a little more than the fourth of the total length. The scales are proportionally smaller than in *L. pallidus*. Dark greyish above, light greyish beneath, with a yellowish hue all over the head and body. A black spot upon the anterior margin of the dorsal; none upon the caudal.

Collected twenty miles west of Choctaw Agency, by H. B. Möllhausen, under Lieut. A. W. Whipple, U. S. A.

The following genus, for which the name of

NOCOMIS

is thought well appropriated, has a short, stoutish and compressed body, covered with large scales. The ventrals are inserted opposite the anterior margin of the dorsal, mayhap a little anterior to it. The caudal is furcated. The head is large, rounded upon the snout, which is declivous. The mouth is large and terminal, the lower jaw being slightly overlapped by the upper. A barbel upon the posterior extremity of the maxillary. Eyes small. Isthmus rather wide. The pharyngeals are stoutish, somewhat expanded upon their convexity; expansion tapering off towards the tip of the upper limb, which is gently curved inwards. The inferior limb is scarcely longer than the upper, looks more slender, is flattened upon its extremity, which is turned outwards, causing a convexity inwardly. The teeth are of the voratorial kind of the hooked type, without grinding surface. They are subcylindrical, acerated and hooked, disposed upon a double series of one and four, in the following manner: 1 | 4—4 | 1.

This genus is allied to *Semotilus* by its pharyngeal teeth, differing chiefly by its mouth, which is not so deeply cleft, and by its maxillary barbels, which are absent in *Semotilus*.

NOCOMIS NEBRACENSIS.—It is a fish about four inches in total length, of a uniform reddish brown hue above, and golden yellow beneath; a blackish streak along the middle of the flanks terminating into a black spot upon the base of the caudal fin. The lateral line is nearly medial, being but slightly depressed along the thoracic region.

Collected in the Sweet Water, a tributary of Platte or Nebraska River, by the late J. Soulé Bowman.

V.

The genera brought together in this paragraph are numerous, and quite as varied in their dentition as in the former group. They differ from the latter by the absence of barbels. As in the preceding, the teeth are of the hooked types, with or without grinding surface (*Dentes uncinato-submolares* et *uncinato-subconici*), mostly of the raptatorial kind. In the majority of cases, the teeth are disposed upon a double series also.

This and the former group ought to be subdivided in a natural method, which is not our object now. Moreover, a thorough grouping of the American Cypri-

noids cannot yet be attempted with any sort of satisfaction, as long so the eastern representatives are not all revised.

The most curious genus, it must be conceded, is that of

EXOGLOSSUM, Rafin.

The body is elongated, subcylindrical, slightly compressed. The head is subconical, flattened upon the occiput, and terminated by a blunt snout. The mouth is subterminal, opening downwards and forwards, the lower jaw being shorter than the upper and not surrounded by the lips around its symphysis, the lips being largely developed at the angle of the mouth and along the upper jaw also. The eye is of moderate size. The isthmus is wide. The origin of the ventrals is situated opposite the anterior margin of the dorsal. The caudal is bifurcated. The scales are of medium size, nearly quadrilateral. The pharyngeal bones are exiguous, very slender upon their inferior branch, hardly dilated above. The teeth are of the raptatorial kind of the hooked type, without grinding surface, instead of which a sharp, but not crenated, edge. They are disposed upon a double row of one and four, thus: 1 | 4—4 | 1.

1. EXOGLOSSUM MAXILLINGUA, Hald. in *Rupp*, Hist. of Lanc. Co., Pa., 1844, 474.—AGASS. Amer. Journ. of Sc. 2d Ser. xix. 1855, 215.—*Cyprinus maxillingua*, Lesu., Journ. Acad. Nat. Sc. Philada. i. 1817, 85.—*Exoglossum lesueurianum*, Rafin., Journ. Acad. Nat. Sc. Philada. i. 1818, 420.

Prof. Haldeman was the first who thought of restoring the name of *maxillingua* to this species.

2. EXOGLOSSUM MIRABILE.—A very characteristic species, very slender and fusiform, and distinguished from the preceding by a smaller head, smaller mouth, the position a little more backwards of the ventrals, and larger scales. The color is reddish brown above, light reddish beneath, with a silvery band along the middle of the flanks from head to tail. A black spot upon the insertion of the caudal fin.

Caught in the Arkansas River, near Fort Smith, by Dr. Geo. G. Shumard.

Along with young specimens of *Gila grahami*, caught in the San Pedro, were numerous little fishes from two and a half inches to three inches long, which, upon a superficial examination, might not have been distinguished from their associates just mentioned, for the fact of the absence of scales could not have given them an aspect very different from the young Gilæ, since the latter have very minute scales in their immature state. A careful comparison between the two sets of specimens very soon revealed generic characters so peculiar, that we had to institute, under the name of

MEDA,

a genus widely different from all other American cyprinoids, by the presence, upon the anterior margin of the dorsal, of a stout undivided (though articulated) ray, resembling in its general appearance that which is observed in *Barbus*, *Luciobarbus*, *Scaphiodon* and *Systomus*, differing, however, from all of these in the structure of its posterior edge, which is grooved instead of being serrated. The absence of buccal barbels in *Meda*, is another feature to warrant its claims as a genus, which differs from *Cyprinus*, *Carassius*, *Carpio*, &c., by characters equally obvious, as will be seen by the following diagnosis:

Body elongated, slender, compressed, fusiform in its profile, and perfectly naked. The lateral line may be traced along the middle of the flanks, slightly deflexed upon the abdomen. The head is elongated, subconical, rounded upon the snout without being truncated. The mouth is proportionally large, subterminal, its cleft slightly oblique upwards, the lower jaw fitting into the upper. No barbels. The eye large and circular. The isthmus narrow. Dorsal fin higher than long, provided anteriorly with a stout, articulated but simple and osseous ray grooved posteriorly and nearly as high as the second ray, which is

slightly higher, and the highest of all. The ventrals are inserted in advance of the anterior margin of the dorsal, and adherent to the ventral line for more than the half of their total length. The caudal is deeply furcated. The pharyngeal bones are slender, especially upon their inferior limbs, which are longer than the upper ones. The latter are flattened or expanded, and curved inwardly downwards. The teeth are very slender, subconical, compressed at their base, of the prehensile kind of the hooked type, without grinding surface. They are disposed upon a double series of one and four: 1 | 4—4 | 1. Thus, equally distinct from both *Phoxinus* and *Phoxinellus*, to which this genus bears an external resemblance.

Thus far we are acquainted with but one species.

MEDA FULGIDA.—The head constitutes a little more than the fifth of the total length. The angle of the mouth is even with a vertical line drawn in advance of the orbit. The dorsal region is reddish yellow; the middle of the flanks as if painted with silver; underneath pale yellow.

From Rio San Pedro, tributary of the Gila; collected by John H. Clark, under Col. Graham, U. S. A.

We now bring here together, under the name of

CLIOLA,

some species of small cyprinoids, having the external aspect of *Dionda*, but differing from the latter by the pharyngeal teeth, which are curved, and without grinding surface. The snout is rounded, the mouth small and terminal, with both jaws equal. There is a rather wide isthmus. The eyes are well developed, also. The dorsal fin is about as long as high, or longer than high. The caudal fin is bifurcated; the insertion of the ventrals, opposite the anterior margin of the dorsal. The scales being large, and the lateral line following the middle of the flanks. The pharyngeal bones are of moderate strength; the inferior branch is rather slender, and nearly straight when viewed in front; from the insertion of the teeth, they gradually expand to the entire convexity which is gentle and gradual. The teeth themselves are of the raptatorial kind, of the hooked type, without grinding surface, compressed, curved, and disposed upon one single row of four: 4—4.

1. CLIOLA VIGILAX.—*Ceratichthys vigilax*, B. & G., Proc. Acad. Nat. Sc. Phila. vi. 1853, 390.—*Leuciscus vigilax*, B. & G., in *Marcy's* Expl. of Red Riv. of La., 1853, 248. Zool. Pl. xxiv. figs. 1—4.

From Otter Creek, a tributary to the northern fork of Red River, Ark.

2. CLILOA VELOX.—A very slender and elegant species, differing from *C. vigilax*, by a more conical head, much larger eyes, and larger scales. A black spot may be observed upon the anterior margin of the dorsal fin. The ground color is olivaceous, with the middle of the flanks silvery; a black vitta follows the course of the lateral line. A black spot exists also upon the base of the caudal fin.

Specimens were collected by Dr. C. B. Kennerly, under Major W. H. Emory, in the San Pedro creek, a tributary of the Rio San Antonio, Texas.

3. CLIOLA VIVAX.—This species might easily be mistaken for *C. velox*, were it not for the shortness of its head and its small eye. Besides, the body is not so much elongated, and is covered with scales a great deal smaller. The color is uniform light yellowish or saffron, with a black spot upon the base of the caudal fin, and another upon the anterior margin of the dorsal; the middle of the flanks exhibits traces of a greyish or blackish vitta.

Caught in Leon River, a tributary to the Rio San Antonio, Texas, by Dr. C. B. Kennerly, under Lt. A. W. Whipple, U. S. A.

Amongst the few genera which seem to be common to both hemispheres, there is the genus

ALBURNUS, Rond.

which we find distributed over a large portion of our continent. But, in order to include the American species in that genus, the diagnosis is to be slightly modified, so as to read: Raptatorial teeth disposed upon a double row of two and four or five, thus: 2 | 5—5 | 2 or 2 | 4—4 | 2. In all the species which I have examined, the teeth are disposed according to the second formula.

The teeth themselves are slender and compressed, more or less hooked. The pharyngeal bones are slender, expanded upon their convexity, the upper limb bent inwards and downwards, and the inferior limb rather exiguus and shorter than the upper. Should the American species, now referred to this genus, prove generically distinct upon a more minute comparison, which we cannot now establish, the name of ALBURNELLUS might unite them under a new generic appellation.

1. ALBURNUS DILECTUS,—is about three inches and a half in total length; the head forming a little less than the sixth part of it. The greatest depth is nearly equal to the length of the head. The diameter of the circular eye is contained a little more than three times in the length of the side of the head, and less than once in advance of its anterior rim. There are ten longitudinal rows of scales between the insertion of the ventrals and the base of the dorsal. The lateral line is upon the fourth row from the ventrals upwards. The color is uniform yellowish red with a lateral silvery streak.

Collected in the Arkansas river near Fort Smith, by Dr. Geo. G. Shumard.

2. ALBURNUS UMBRATILIS,—is a shorter and deeper species, and which might easily be taken for a *Luxilus*, so striking is its general resemblance with small specimens of the latter genus. The greatest length is about three inches; the greatest depth being equal to the length of the head, and contained five times in the total length. The lateral line, though running along the fourth row of scales from the insertion of the ventrals, is more deflexed upon the abdomen than in *A. dilectus;* the longitudinal rows of scales being fourteen in number. The ground color is silvery grey above; the back, sides and fins as if shaded; the belly reddish.

Specimens were collected, by H. Möllhausen, in Sugar Loaf Creek, a tributary to Poteau river, flowing into the Arkansas near Fort Smith.

3. ALBURNUS AMABILIS —This is a very slender and graceful species, about two inches and a half in total length. The head constitutes the fifth of the length, and the greatest depth, the sixth. There are nine longitudinal rows of scales upon the flanks, between the insertion of the ventral fins and the dorsal line. The lateral line, as usual, is found along the fourth row from the ventrals upwards. The color is dark reddish brown, silvery upon the flanks. A black patch upon the base of the tail.

Specimens were collected in the Rio Leona, an affluent of the Rio Nueces, by John H. Clark, under Col. J. D. Graham, U. S. A.

4. ALBURNUS MEGALOPS.—Resembles *A. amabilis* in general traits, being slender and graceful, but easily distinguished from it by a shorter and more rounded snout and a larger eye. The coloration is the same with the exception of the black caudal patch, which does not exist here. The average size of the specimens before us is about two inches.

Caught in San Felipe Creek, Texas, by John H. Clark, under Col. Graham.

5. ALBURNUS SOCIUS.—Resembles *A. megalops* by its snout and eye. The total length is two inches and a half, the head forming the fifth part of it. The greatest depth is a little less than the length of the head. The dorsal region is olivaceous, the flanks silvery, and the belly yellowish. Opercular apparatus golden.

Specimens of this species were collected in Live Oak Creek, Texas, by John H. Clark, under Col. J. D. Graham, U. S. A.

of dorsal fin, or a little behind it. Dorsal and anal fins without strong and undivided ray anteriorly. Scales very large, imbricated, much higher than long. Lateral line forming a downward curve beneath the middle of the flanks. Pharyngeal bones rather slender with an angular expansion at the upper portion of the descending branch, the expansion itself tapering away towards the upper and inner extremity. The teeth are compressed, of the prehensible kind, of the hooked type, very slightly hooked, provided with a grinding surface; being disposed upon a double row as follow: 2 | 4—4 | 2.

The teeth of this genus are figured by Heckel, under the name of *Argyreus rubripinnis*, the second species of his genus *Argyreus*, and which is nothing else but *Plargyrus cornutus* in a breeding dress.

The species are:

1 PLARGYRUS CORNUTUS.—*Cyprinus cornutus*, MITCH.—See *Storer's* Fishes of Mass. in Mem. Amer. Acad. v. New Ser. 1855, 118, where this species is figured and described.

2. PLARGYRUS TYPICUS.—*Rutilus plargyrus*, RAFIN. Ichth. Ohiens. 1820, 50.—*Leuciscus plargyrus*, KIRTL.—STORER, Synops. 1846, 158.

3. PLARGYRUS GIBBOSUS.—*Leuciscus gibbosus*, STORER, Proc. Bost. Soc. Nat. Hist. ii., 1845, 48; Synops. 1846, 166.
Alabama.

4. PLARGYRUS FRONTALIS.—*Leuciscus frontalis*, AGASS., Lake Sup. 1850, 368. Pl. iii. fig. 4.
Lake Superior.

5. PLARGYRUS GRACILIS.—*Leuciscus gracilis*, AGASS., Lake Sup. 1850, 370.
Lake Huron.

6. PLARGYRUS BOWMANI.—We inscribe this species to the memory of one, who, under difficulties of various sorts, during a travel across the continent, thought it not of little importance to collect and preserve specimens of natural history, which he forwarded to the Smithsonian Institution. The species is gracefully subfusiform in its profile, the depth in advance of the dorsal being equal to the fifth of the entire length, in which the head itself enters about four times and a half. The eye is very large; its diameter being contained a little less than four times in the length of the side of the head. Dorsal region reddish brown; sides silvery, abdomen yellowish. A black streak along the flanks and above the lateral line.

A specimen, four inches in total length was caught in the Sweet water, a tributary of Platte or Nebraska river, by the late J. Soulé Bowman.

Had the name of *Hypsolepis* not been made synonymous of *Plargyrus*, we might have applied it with perfect propriety to the group which we now call

CYPRINELLA,

since the fishes therein included, possess that curious character of scales higher than long. They replace in the South-west, the Plargyri of more northern climes. Though generally smaller than the species of *Plargyrus*, some do resemble the latter in a very striking manner, whilst others are much shorter and deeper in proportion. The chief differences between the present genus and *Plargyrus*, is to be found in the pharyngeal teeth and the position of the ventrals.

To *Moniana* it bears more striking resemblances and real affinities. The position of the ventral fins is the same, the pharyngeal bones are alike also, the teeth are of the same general pattern, but disposed upon a double series in *Cyprinella*, and upon one only in *Moniana*. Besides, in *Cyprinella*, the snout generally protrudes beyond the lower jaw, though the mouth is slightly oblique and subterminal. But let us formulate the generic characters of the genus we are now treating of: Body very compressed, either elongated and subfusiform, or else with the dorsal and abdominal outlines rather arched, but which may, after all,

simply indicate the female sex at the breeding season. The head is of moderate size, subconical, the snout generally protruding beyond the lower jaw. The mouth is small, slightly oblique and subterminal. No barbels of any sort. Eyes moderate. Isthmus narrow. Tail tapering, caudal fin bifurcated. Insertion of ventrals opposite or slightly in advance of the anterior margin of dorsal fin. Scales of moderate development, imbricated, much higher than long. Lateral line forming a downwards curve beneath the middle of the flanks. Pharyngeal bones like those of *Plargyrus*. The teeth are slender and compressed, of the raptatorial kind of the hooked type, slightly hooked, without grinding surface, instead of which, a sharp ridge inconspicuously crenated, and disposed upon a double row of four and one, in the following manner, 1 | 4—4 | 1.

We know already several species of this genus, besides one formerly described and with which we commence the list.

1. CYPRINELLA BUBALINA.—*Leuciscus bubalinus*, B. & G., in *Marcy's* Expl. of Red Riv. of La. 1853, 249. Zool. Pl. xiv. figs. 5—8.—It is one of those species, the dorsal outline of which is very much arched.

From Otter Creek, a tributary to the northern fork of Red River, Ark.

2. CYPRINELLA UMBROSA.—Also a deep bodied species, much larger than the preceding, indeed the largest of the species hitherto known of its genus. The ventral outline as much arched as that of the back. The greatest depth, taken at the anterior margin of the dorsal, is equal to the third of the length, the caudal fin excluded. The entire length measures about three inches and a quarter, the caudal fin being a little less than the greatest depth. The nape is a little depressed; the head constitutes the fourth of the length, caudal fin excluded. The eye is circular, its diameter entering a little over three times in the length of side of the head. The anterior margin of the dorsal is nearer the tip of the snout than the insertion of the caudal. The insertion of the ventrals is a little in advance the anterior margin of the dorsal.

D 8 + 2; A 9 + 2; C 3, 1, 9, 8, 1, 4; V 8; P 14.

Greyish red above; greyish white beneath. Fins unicolor.

Specimens were caught by H. B. Möllhausen, under Lt. Whipple, in Coal creek, a tributary to the southern fork of the Canadian river, Ark., and also twenty miles west of the Choctaw Agency.

3. CYPRINELLA GUNNISONI.—The body is short but not so deep as in the preceding species. The head is smaller than in *C. umbrosa*, but the eye preserves the same proportions. A characteristic feature may be found in the scales which show a greater portion of their surface, though equally as high. Color reddish brown, dark above and light beneath.

Collected in Cottonwood creek, a tributary of the Great Salt Lake of Utah, and brought home by Lt. E. G. Beckwith, U. S. A.

4. CYPRINELLA BECKWITHI.—A species allied to the preceding by its external form and general appearance, but readily distinguished from it by a larger head, and larger scales also. The latter one likewise larger than in *C. umbrosa*. Color greyish brown above, orange red beneath; fins unicolor.

From the sluices of the Arkansas river near Fort Makee; brought home by Lt. E. G. Beckwith, U. S. A.

5. CYPRINELLA SUAVIS.—This species establishes the transition between the deep and slender species. The head forms about the fifth, and the depth the fourth of the total length. Yellowish red above, and yellowish white beneath with a silvery hue.

Collected near San Antonio, Texas, by Dr. C. B. Kennerly, under Lt. A. W. Whipple, U. S. A.

6. CYPRINELLA LEPIDA.—Elongated and fusiform; the greatest depth taken upon the anterior third of the body, being contained four times and a half in the total length; the head forming a little less than the fourth of the same length. The

head, therefore, is well developed; the eye is circular, its diameter being contained four times in the length of the side of the head. The scales are larger than in any of its hitherto known congeners. Light reddish above, pale sulphur yellow beneath.

Caught in the Rio Frio, a tributary to the Rio Nueces, Texas, by Dr. C. B. Kennerly, under Lt. A. W. Whipple, U. S. A.

8. CYPRINELLA NOTATA.—Also an elongated and fusiform species, but easily distinguished from *C. lepida*, by a shorter head, less furcated caudal, and, especially, by smaller scales; the latter differing also in their general outline and radiating furrows. Reddish above; yellowish beneath, with a jet black patch upon the base of the caudal fin.

Collected in the Rio Seco, a tributary to the Rio Nueces, Texas, by Dr. C. B. Kennerly, under Lt. A. W. Whipple, U. S. A.

8. CYPRINELLA WHIPPLII.—Gracefully elongated and subfusiform. Dorsal region slightly arched upon the insertion of the fin. Greatest depth forming a little more than the fifth of the total length, whilst the head, which is subconical, constitutes a little less than the fifth of the same dimension. The eye is quite large, larger than in any other species of the same genus, since its diameter enters but a little over three times in the length of the side of head. Another very characteristic feature is to be found in a very high dorsal fin, rounded upon its upper margin. The origin of the ventral fins is situated opposite the anterior margin of the dorsal. The scales are of moderate development, and the lateral line is but slightly flexed downwards. Reddish brown above; golden yellow beneath; a black patch upon the posterior margin of the dorsal.

Caught in the Sugar Loaf creek, a tributary of Poteau river, itself emptying its waters into the Arkansas river, near Fort Smith, Ark., by H. B. Möllhausen, under Lt. A. W. Whipple, U. S. A.

9. CYPRINELLA MACROSTOMA.—This species is very characteristic. The body is deep upon its middle, tapering posteriorly. The head is subconical, with a prominent snout and a very large mouth. The eye is well developed. The ventrals are inserted a little in advance of the anterior margin of the dorsal fin. Red; silvery upon the opercular apparatus and middle of the sides.

Specimens were collected in Devil's River, Texas, by John H. Clark, under Col. J. D. Graham, and at China, New Leon, by Lt. D. N. Couch, U. S. A.

10. CYPRINELLA VENUSTA.—Gracefully compressed and fusiform in profile. The snout protruding and subconical. The species is related to *C. macrostoma*, from which it chiefly differs by the relative size of its mouth and shape of the body. The ventrals are likewise inserted a little in advance of the anterior margin of the dorsal. Greyish red above, pale beneath; sides silvery. A black patch upon the base of the caudal fin.

Numerous specimens were collected in the Rio Sabinal, Texas, by Dr. C. B. Kennerly, under Major W. H. Emory.

11. CYPRINELLA TEXANA.—Body very slender and fusiform; head small and subconical; mouth small; eye large. Ventrals inserted under the anterior margin of the dorsal. Color reddish brown, sides silvery; lateral line accompanied by black dots terminating into a black spot upon the base of the caudal.

From Rio Salado, Texas, and Turkey creek, Texas, collected by John H. Clark, under Col. J. D. Graham.

12. CYPRINELLA LUXILOIDES.—At first, this species would remind us of certain species of *Luxilus* in its general appearance. The body being deep, gradually tapering away forwards and backwards. The head is well developed, and the mouth also. Ventrals inserted slightly in advance of the dorsal. Reddish brown above; silvery beneath.

From San Pedro creek, Texas, collected by Dr. C. B. Kennerly, under Major W. H. Emory.

13. CYPRINELLA LUGUBRIS.—Elongated, fusiform; head large and mouth accordingly, though the latter is smaller than in *C. macrostoma*. The ventrals are inserted under the anterior margin of the dorsal. Dark brown above, silvery upon the sides and under the belly.

The locality were this species was collected is not precisely known. It was brought home by Lt. E. G. Beckwith.

14. CYPRINELLA LUDIBUNDA.—All the specimens of this species which we have examined are immature, and yet there is no doubt in our mind as to its specific difference from all the species hereto alluded to. The head is small and conical, with the snout round and truncated. The mouth being small. The ventrals inserted in advance of the anterior margin of the dorsal. Color reddish brown; middle of sides silvery; lateral line marked with black dots.

Associated with the preceding, and collected under the same circumstances.

We next introduce a genus composed of small species, all being provided with scales similar in general outline, to those of both *Plargyrus* and *Cyprinella:* we call it

MONIANA.

Its species truly replace the Plargyri in a more southern latitude under a diminutive aspect. As regards structure, they differ widely from *Plargyrus*, as will appear by the following diagnosis: Body compressed, subfusiform. Head rather small, subconical or rounded. Snout occasionally protruding slightly. Mouth suboblique, terminal; both jaws generally equal. No barbels. Isthmus narrow. Eyes moderate. Caudal fin bifurcated. These characters, so far, are found in *Plargyrus*. But now for the differences. The insertion ofthe ventrals is situated in advance of the anterior margin of the dorsal, which is higher than long. The pharyngeal teeth are compressed, of the raptatorial kind, of the hooked type, without grinding surface, instead of which, a sharp ridge is observed, very minutely crenated. They are disposed upon a single row of four, thus: 4—4.

Besides a species previously described, there are several new ones to be placed on record.

1. MONIANA LUTRENSIS —*Leuciscus lutrensis*, B. & G. in *Marcy's* Expl. of Red Riv. of La. 1853, 251. Zool. Pl. xiv. figs. 9—12.

From Otter creek, tributary of the northern fork of Red River, Ark. It was also caught in Gypsum creek, a tributary of the false Washita River, by H. B. Möllhausen, under Lt. A. W. Whipple, U. S. A.

2. MONIANA LEONINA.— The largest of the hitherto known species of the genus. The entire length measures three inches and a quarter, the head forming the fourth of it, the caudal fin excluded. The body is very deep upon its middle, where the greatest depth is a little less than the fourth of the entire length. The mouth is proportionally small. The eye being circular, its diameter entering four times in the length of the side of the head. The rays are:

D 9 + 2; A 10 + 2; C 5, 1, 9, 8, 1, 7; V 9; P 16.

Greyish brown above; white or dull yellowish beneath.

Specimens were collected in Leon River, a tributary to the Rio San Antonio, Texas, by Dr. C. B. Kennerly, under Lt. A. W. Whipple, U. S. A.

3. MONIANA DELICIOSA.—This is one of the most slender of all the species hitherto known of the genus. Its length is a little over two inches and a half, the head forming the fifth part of it. The latter is proportionally small, subconical anteriorly. The eye is quite large and circular, its diameter entering about three times in the length of the side of the head. There are ten longitudinal rows of scales upon the greatest depth of the body; the scales them-

selves are large. The color is reddish brown above, silvery along the middle of the flanks and yellowish beneath.

Specimens of this species were collected in Leon River, a tributary of the Rio San Antonio, by Dr. C. B. Kennerly, under Lieut. A. W. Whipple, U. S. A.

4. MONIANA PROSERPINA,—is remarkable for its slender body, subconical head, and very small mouth. The eye is of moderate development. The total length is two inches and a quarter, the head constituting the fifth part of it. Eleven rows of scales may be counted upon the line of greatest depth of the body. Greyish brown above; metallic greyish white upon the sides and beneath.

From Devil's River, Texas; collected by John H. Clark, under Col. J. D. Graham, U. S. A.

5. MONIANA AURATA.—A most handsome species, with a rather deep body gradually tapering posteriorly, and a rounded and subtruncated head bearing minute spines upon its upper surface. The eye is proportionally small, and the mouth of medium size. Chesnut brown above; a diffused blackish streak along the middle of the flanks; golden beneath.

From Piedra Painte, New Mexico; collected by John H. Clark, under Col. J. D. Graham.

6. MONIANA COMPLANATA.—The most compressed of all the species so far known. The profile is regular; the peduncle of the tail rather slender. The total length is two inches and a half, the head entering in it five times and a half. The mouth and eye are of but moderate size. Scales large and very deciduous. Pale red above, silvery upon the sides and yellowish beneath.

Collected at Brownsville, Texas, by Capt. Van Vliet, U. S. A.

7. MONIANA LÆTABILIS.—The body is subelliptical in profile, the tail slender. The head well developed, being contained four times and a half in the total length, which measures about two inches. The greatest depth is equal to the length of the head. The fins are quite conspicuously developed; the scales large, as usual in the genus, being also deciduous. Reddish brown above, yellowish white beneath; sides silvery.

Specimens collected by H. B. Möllhausen, under Lieut. W. A. Whipple, in Hurah Creek, a tributary of the Rio Pecos, of the Rio Grande del Norte (Rio Bravo).

8. MONIANA PULCHELLA.—Allied to *M. lutrensis*, but differing from it by a shorter snout and a more compact tail. The eye is large also. A distinctive feature between the two species is to be found in the squamation, since the scales are more deeply imbricated in *M. lutrensis* than in *M. pulchella*. The color is reddish brown; silvery upon the sides.

Caught by H. B. Möllhausen, under Lieut. A. W. Whipple, U. S. A., in the Sugar Loaf Creek, emptying its waters into the Poteau River, itself a tributary of the Arkansas, near Fort Smith.

9. MONIANA FRIGIDA.—This species is a little more than three inches in total length, and stands next to the largest of the hitherto known species. The head forms about the fifth of the length. The body is rather deep and very much compressed; the caudal fin deeply forked. The eye is circular, and its diameter contained four times in the length of side of the head.

The rays of the fins are,

D 8+2; A 8+2; C 6, 1, 9, 8, 1, 6; V 8; P 13.

The color is of a reddish brown above, silvery white beneath. The middle of the flanks exhibits an indistinct or rather diffused silvery band, sometimes blackish.

Specimens of this species were collected by John H. Clark, under Col. J. D. Graham, U. S. A., in the Rio Salado, Rio Sabinal and Rio Medina, all three tributaries to the Rio San Antonio, and in the Rio Nueces also. It was likewise caught in the Rio Frio, a tributary of the Nueces by Dr. C. B. Kennerly, under Lieut. A. W. Whipple, U. S. A.

10. MONIANA COUCHI,—resembles *M. gracilis* most; is, however, distinguished from it by a less fusiform body and a much shorter head. This feature may be traced upon series of specimens of both species with an unfailing constancy. The eye is smaller also, and so is the mouth as might be deduced from the characters just alluded to.

From the vicinity of China, New Leon, Mexico; collected by Lieut. Couch, U. S. A.

11. MONIANA RUTILA,—has the general physiognomy of *M. gracilis*, from which it differs by a more advanced position of the dorsal fin and larger scales. Dorsal region greyish; sides and abdomen golden.

From Cadereita, New Leon, Mex.; collected by Lieut. D. N. Couch, U. S. A.

12. MONIANA NITIDA.—This species differs from *M. couchi* by a more elongated and fusiform body, more elongated head and much larger eye. From *M. rutila* it differs by the same characters of the body, but the head differs by the flattening of its upper surface. There are eleven longitudinal rows of scales upon the line of greatest depth of the body, five above and five below the lateral line. The latter, therefore, is nearly medial, forming but a slight curve upon the middle of the abdomen. Color pale red, sides of head and middle of the flanks silvery.

Collected at Cadereita, New Leon, by Lieut. D. N. Couch, U. S. A.

13. MONIANA FORMOSA.—The prettiest species of the genus; the body is ellipsoid in profile and the tail very much tapering. The region above the lateral line is blackish brown in the adult, and reddish brown in the young, occasionally also dotted with black; the inferior regions are reddish yellow anteriorly and yellowish red posteriorly.

Numerous specimens of this species were collected in the Rio Mimbres, Mex.

14. MONIANA GRACILIS.—A very graceful and slender species, resembling most *M. lutrensis*, from which it however differs by a much smaller head and a more arched back; the body itself is more compact. Ash grey above, yellowish white beneath; flanks silvery.

Specimens were collected near Monterey, New Leon, by Lieut. Couch, U. S. A.

15. MONIANA GIBBOSA.—May readily be distinguished from all its congeners by a short and arched body, resembling a cyprinodon as much as any fish we might compare it to. Pale reddish above, whitish beneath; sides silvery.

Specimens collected at Brownsville, Texas, by Capt. Van Vliet, U. S. A.

16. MONIANA TRISTIS.—A slender and graceful species, subfusiform in profile, though the back is rather arched. The peduncle of the tail is long and of nearly uniform depth. The head constitutes about the fifth of the length. Eleven rows of scales, five above, five below the lateral line. Reddish brown.

Brought home by Lieut. E. G. Beckwith, U. S. A.

The "Fauna Boreali Americana" records under the name of *Cyprinus* (*Abranis*,) *balteatus*, a species of this family, which bears a strong external resemblance to the large species of *Luxilus*, and so much so, that, on a superficial examination, no one would hesitate to refer it to the latter genus. The structure of the pharyngeal teeth affords the most striking generic differences, as will be seen further on. In selecting for it the name of

RICHARDSONIUS,

we have borne in mind the eminent labors of the author of the work just referred to. We will characterize the genus by saying, that the body is very compressed, subelliptical or fusiform in its outline and deep upon its middle. The head is proportionally small; the mouth terminal, slightly oblique, constructed as in *Luxilus*, but somewhat larger, yet unprovided with cirrhi or barbels. The eye is large. Isthmus very narrow. Caudal fin forked; insertion of ventrals situated in advance of the anterior margin of the dorsal. Anal fin longer than the

the presence of much smaller fin; the anal is a good deal smaller than the dorsal, and the ventrals a little less anterior, with reference to the dorsal.

D 10+2; A 8+2; 6, 1, 9, 8, 1, 5; V 10+1; P 16.

Upper regions of a greyish azur; inferior regions dull silvery white; black dots scattered all over the back, sides and belly.

Caught in Lost River, O. T., by Dr. John S. Newberry, under Lt. R. S. Williamson, U. S. A.

There is another generic type, for which we have provided the name of

SIBOMA,

composed so far of but two species, one of which originally referred to the genus *Lavinia*. It is to be recognized by a stout and somewhat compressed body, covered with large scales. The caudal is crescent-shaped posteriorly; the origin of the ventrals is situated a little posteriorly to the anterior margin of the dorsal, or immediately under it. The head is rather small, sloping towards a wedge-shaped snout, rounded superiorly. The mouth is of small size, horizontal, terminal, with jaws even. No barbels. Eye below the medium size. Isthmus rather narrow. Pharygngeal bones stout, expanded upon their convexity, with the inferior branch short and bent inwardly so that its extremity is directed outwardly, whilst the upper branch is slightly bent inwards. The teeth are large and very compressed, and terminated by a slender hook. They are of the raptatorial kind, of the hooked type without grinding surface properly so called, but instead of a sharp edge along the inner margin of the teeth, a blunt and narrow ridge may be observed. They are disposed upon a double row of one and two and four and five, as follows: 1 | 4—5 | 2.

1. SIBOMA CRASSICAUDA.—*Lavinia crassicauda*, B. & G. Proc. Acad. Nat. Sc. Philad. viii. 1854, 137.

Specimens of this species were procured by Dr. A. L. Heermann, under Lt. R. Williamson, in the San Joaquin, Mercede and Mohave Rivers, Cal.

2. SIBOMA ATRARIA.—The largest specimen of this species which we have examined is about seven inches in length, and although small, compared to the specimens of *S. crassicauda*, to which we had to compare it, yet the distinctive features between the two species appear very striking. And first of all, the imbrication of the scales in *S. atraria*, is such as to expose more of their surface than in *S. crassicauda*, and moreover the lateral line in *S. atraria* runs along the seventh row of scales from the insertion of the ventrals upwards, leaving eleven rows above it, to the base of the dorsal fin, whilst in *S. crassicauda*, there are as many rows of scales below as above the lateral line. The absolute number of longitudinal rows of scales is the same in both species. The head is proportionally larger than in *S. crassicaudu*, but the fins are much less developed. The ground color is olivaceous, the sides and the back being nearly black or brownish black, from the number of confluent maculae and dots. The fins itself are blackish upon an olivaceous ground. The sides and upper part of the head, are likewise brownish black.

Found in a spring, in Utah District, near the Desert, by Lt. E. G. Beckwith.

The species which are arranged under the genus

PTYCHOCHEILUS, Agass.

remind us by their general appearance of both *Mylocheilus* and *Mylopharodon*. They have an elongated, subcylindrical and compressed body, an elongated head, a mouth deeply cleft, but no barbels upon its angle. The upper jaw overlaps the lower, though the mouth remains horizontal and subterminal. The eye is of moderate size; and so with the isthmus. The ventral fins are inserted a little in advance of the anterior margin of the dorsal. The caudal is furcated. The scales, of medium size; the lateral line nearly medial. The

pharyngeal bones are long and slender, slightly expanded upon their convexity, with the inferior limb much more slender than the upper. The teeth are of the raptatorial kind, of the hooked type without grinding surface, subconical, slightly hooked, and disposed upon a double series of two and four or five, thus: 2 | 4—4 | 2, or 2 | 5—5 | 2.

1. PTYCHOCHEILUS GRANDIS.—*Gila grandis*, AYRES, Proc. Cal. Acad. Nat. Sc. i. 1854, 18.—*Ptychocheilus major*, AGASS. Amer. Journ. of Sc. 2d. Ser. xix. 1855, 229.

San Francisco, Cal.—Dr. Newberry.

2. PTYCHOCHEILUS OREGONENSIS.—*Cyprinus* (*Leuciscus*) *oregonensis*, RICH. Faun. Bor. Amer. iii. 1836, 305.—*Ptychocheilus gracilis*, AGASS. & PICK. Amer. Journ. of Sc. 2d. ser. xix. 1855, 229.

Specimens of this species were collected at Fort Vancouver and Fort Steilacoom, by Dr. Geo. Suckley, at Astoria, O. T. by Lt. Trowbridge, and in Villamette River, by Dr. Newberry, under Lt. Williamson, U. S. A.

3. PTYCHOCHEILUS RAPAX.—This is a large species too, differing from *P. grandis* by a proportionally shorter head, a more advanced position of the ventral fins and by much smaller scales on the dorsal region in advance of the dorsal. The inferior limb of the pharyngeal bones is not so long and slender, and there are but four teeth upon the main row, instead of five. The teeth and bones are stouter. Colors, blackish brown above; whitish beneath.

From Monterey, Cal.; collected by Lt. W. P. Trowbridge, U. S. A.

4. PTYCHOCHEILUS LUCIUS.—A very characteristic species. The body is compressed, but the head is flattened or depressed and very much developed, constituting nearly the fourth of the entire length. The dorsal and ventrals are situated quite posteriorly. The scales are below the medium size, and the lateral line is bent downwards upon the abdomen. The pharyngeal bones are very slender; the inferior limb is almost exiguous and proportionally as long as in *P. grandis*. There are, however, but four teeth upon the main row, instead of five, as in the case of *P. grandis*. Color bluish grey above; silvery golden beneath.

Collected in the Rio Colorado, by A. Schott, under Major W. H. Emory, Commissioner U. S. and Mex. Boundary.

5. PTYCHOCHEILUS VORAX.—The head is also depressed in this species, but it is much smaller since it contitutes the two-ninths of the entire length. The body is much deeper than in *P. lucius*, and the ventrals are situated more in advance of the dorsal. The dorsal itself is not situated so far back. The scales are very small upon the dorsal region between the dorsal fin and the occiput. Bluish above; silvery beneath.

Specimens were brought home by Lt. E. G. Beckwith, U. S. A. The precise locality, not known.

APPENDIX.

The following species are here recorded as complementary to the preceding ones.

1. HYBOGNATHUS REGIUS.—A large and beautiful species, the largest that has, so far, come to our knowledge, some of the specimens measuring seven inches in length. The body is gracefully elongated, compressed, fusiform in its outline. The greatest depth, taken immediately in advance of the dorsal fin, is contained about five times in the length, or five, and a third of a time. The head is of moderate development, subconical, subtruncated, contained six times in the total length. The mouth is quite small. The isthmus, very narrow. The origin of the ventrals recedes a little from the anterior margin of the dorsal,

which anterior margin of the dorsal, is nearer to the tip of the snout than the base of the central rays of the caudal.

D 2+9; A 2+9; C 5, 1, 9, 8, 1, 7; V 8; P 15.

There are thirty-eight scales in the lateral line; six longitudinal rows above it, and four beneath, upon the line of greatest depth. Color brownish red above, pale reddish beneath; flanks shining of silver and gold.

Inhabits the Potomac River, and probably all the fresh waters of Maryland. It is commonly called *Smelt*, at Washington and vicinities, and *Gudgeon* at Baltimore and surrounding counties.

2. HYBOGNATHUS NITIDUS.—*Leuciscus nitidus*, DEKAY, N. Y. Fauna. iii. 1842, 209. Pl. xxxiii. fig. 105.—STORER, Synops. 1846, 162.

Collected at Westport, Lake Champlain.—S. F. Baird.

HUDSONIUS.

Body elongated, compressed, fusiform in profile, and covered with quite large scales. The lateral line being nearly medial. The head is of but moderate size; the snout being subconical and rounded anteriorly. The mouth is subterminal, somewhat protractile, in which situation it is directed obliquely forwards and downwards; when shut, the lower jaw fits within the upper, the snout being slightly protruding. There are no barbels about the mouth. The eyes are large; the isthmus is small. The dorsal is higher than long; its anterior margin is even with the insertion of the ventrals. The anal has a proportionally longer base than the dorsal. The caudal is deeply furcated. The pharyngeal bones are well developed; the inferior limb is rather short, its extremity being flattened and slightly turned outwardly. From the middle of the convexity a sudden expansion occurs, tapering into the upper limb, slightly curved downwards. The teeth are of the bruising kind, of the hooked type, provided with a grinding surface. But there occur many irregularities, being more or less hooked and the grinding surface more or less developed. It is not uncommon to observe all these variations upon the pharyngeal of a single specimen. The teeth are disposed upon a double row with the following variations: 2 | 4—4 | 2, 2 | 4—4 | 1, 0 | 4—4 | 2, or 0 | 4—4 | 1.

1. HUDSONIUS FLUVIATILIS.— *Clupea hudsonia*, CLINTON, Ann. Lyc. Nat. Hist. N. Y. I. 1824, 49. Pl. ii. fig. 2.—*Leuciscus hudsonius*, DEKAY, Fauna. of N. Y. III. 1824, 206. Pl. xxxiv. fig. 109.—STORER, Synops. 1846, 157.—AGASS. Lake Sup. 1850, 272.

Specimens collected in Chicago Harbor, Lake Michigan, and in the Root River, at Racine, Wisc.—S. F. Baird.

2. HUDSONIUS AMARUS.—This species is closely allied to the preceding, from which it differs by a smaller head and smaller eye. Its opercle is also broader compared to its height or depth. The head constitutes the sixth of the total length. The greatest depth taken immediately in advance of the dorsal, enters a little over five times in the total length.

The coloration is nearly the same as in *H. fluviatilis*, with the exception that the black spot at the base of the tail disappears at a much earlier period. The species grows to a much larger size also; we have seen specimens seven inches long, in which the satin band along the sides and the black spot of the tail had given way to a uniform golden hue extending to nearly the entire body.

Caught in Chesapeake Bay, and as far up the Potomac River as Washington, where it is caught along side with *Hybognathus regius*, and similarly called *Smelt*.

HYBOPSIS, Agass.

This genus was left rather vaguely defined by its author, for there are many genera in which "the mouth is protractile downwards, after the fashion of Catostomus" with the lips neither swollen nor thickened. And many other genera

too, in which there is "only four or five compressed and hooked teeth in each main row, and one or two in a second row." What is really of generic value is left for us to conjecture, since we are not in possession of its typical species.

The generic characters which we now offer are based upon *Leuciscus storerianus* and a new species from Alabama, and should they prove generally distinct from *H. gracilis*, a new name will have to be coined for our species.

Body elongated, compressed, subfusiform in profile, covered with rather large scales. The lateral line being straight, along the middle of the flanks. The head is of moderate size, subconical and rounded upon the snout which protrudes beyond the lower jaw. A barbel, inserted upon the anterior margin of the posterior extremity of the maxillary, may be seen at the angle of the mouth. The eyes are large, the isthmus narrow. The dorsal is a little higher, and the anal deeper, than long. The insertion of the ventrals takes place opposite the second ray of the dorsal, hence very nearly under its anterior margin. The tail is deeply furcated. The pharyngeal bones have the same form and appearance as in *Hudsonius;* the teeth are likewise of the same kind (bruising) and type (hooked with a grinding surface), but more irregular yet. Sometimes not hooked, the grinding surface contorted and nearly absent, or even resembling a truncated cone. They are disposed upon a double row of four and one: 1 | 4—4 | 1, or 0 | 4—4 | 1.

This genus, it will appear, is intimately related to *Hudsonius*, from which it chiefly differs by the presence of barbels at the angle of the mouth, and by its straight lateral line also.

1. HYBOPSIS STORERIANUS.—*Rutilus Storerianus*, KIRTL. Proc. Bost. Soc. Nat. Hist. I. 1842, 71.—*Leuciscus storerianus*, KIRTL. Bost. Journ. Nat. Hist. V. 1845, 30. Pl. ix. fig. 2.—STORER, Synops. 1846, 265.

From Marietta, Ohio.—Prof. E. B. Andrews; Russellville, Ky.—Dr. Shumard.

2. HYBOPSIS WINCHELLI.—It is a shorter and more contracted species than the preceding. The head forming but the fifth of the total length, whilst it constitutes the sixth in *H. storerianus*. The eye and mouth are also larger; the same is the case with the scales. The color is pale red with a silvery streak along the middle of the flanks.

From Black Warrior River, Ala.—Prof. A. Winchell.

CLINOSTOMUS.

A genus instituted to include several new species, together with one previously described as a *Leuciscus*. Its characters are as follows: Body elongated, compressed, subfusiform in profile. The head is compressed like the body, the frontal surface being very declivous and sloping towards a pointed rostrum, so that in profile the head is subtriangular, and if broader, would be wedge-shaped when seen from above. The mouth is very large, the lower jaw longer than the upper, beyond which it protrudes, giving to the cleft an oblique direction upwards. The eye is very large; the isthmus, quite narrow. The dorsal is higher than long, and inserted on the space between the ventrals and the anal, a little nearer to the former than the latter in a vertical line. The caudal is deeply furcated. The scales are of but moderate development, varying considerably in size between the different species. The lateral line forms a downwards curve upon the abdomen so as to bring its convexity nearer to the ventral than the dorsal outline. The pharyngeal bones are rather slender, the lower limb especially; a slight expansion may be observed upon their convexity; the upper limb being flattened, bent inwardly and either shorter or of equal length with the lower limb. The teeth are of the raptatorial kind, of the hooked type without grinding surface, and disposed thus: 2 | 4—4 | 2, or 2 | 5—4 | 2, and sometimes 1 | 4—4 | 2.

This genus is more closely related to *Ptychocheilus* than to any other of the family. The pharyngeal teeth are constructed upon the same pattern; the chief difference being found in the inclined cleft of the mouth, and the prousion of the lower jaw beyond the upper.

1. CLINOSTOMUS ELONGATUS.—*Luxilus elongatus*, KIRTL. Rep. 1838, pp. 169, 193.—Bost. Journ. Nat Hist. III. 1840, 339. Pl. iv. 1.—*Leuciscus elongatus*, DEKAY, Fauna. of N. Y. III. 1843, 214.—STORER, Synops. 1846, 161.—VAL. in *Cuv. & Val.* Hist Nat. Poiss. XVII. 1844, 494.—*Leuciscus productus*, STORER, Synops. 1846, 164.

Inhabits most of the tributaries of the Ohio River.

2. CLINOSTOMUS FUNDULOIDES.—The body is proportionally much shorter than in *C. elongatus*, and less tapering posteriorly also. The head constitutes a little more than the fifth of the entire length. The greatest depth is equal to the length of the head. The eye is a little smaller than in any of its hitherto known congener; its diameter entering three times in the length of the side of the head. The scales are a good deal larger than in *C. elongatus*. The color is of a pale red, with a silvery hue along the middle of the flanks, and a few scattered black spots.

The specimens before us we caught in the creeks and inlets of the Potomac River, in the neighborhood of Washington, D. C., the largestof which measuring about three inches.

3. CLINOSTOMUS AFFINIS.—Resembles the preceding one in its general bearing. The body however seems to be more tapering posteriorly, the head larger and the mouth more deeply cleft, since the posterior extremity of the maxillary reaches a vertical line passing through the anterior rim of the pupil, whilst in *C. funduloides* the extremity of the same bone extends but half way between the anterior rim of the orbit and the pupil. The eye is a little larger also, whilst the scales are smaller.

Inhabits the waters of James River, Va.—Collected by S. F. Baird.

4. CLINOSTOMUS CAROLINUS.—The head is larger than in *C. affinis*, and the body more elongated, compared to the depth. The eye is a great deal larger, and the scales smaller. Blackish brown above, with scattered black spots; reddish beneath; flanks golden.

From Salem, N. C.—Collected by J. T. Lineback and School. Specimens sent to the Smithsonian Institution.

ALBURNUS LEPIDULUS.—The most slender and elongated of the species hitherto known to us. The total length is about four inches, in which length, the depth enters a little over eight times. The head itself constitutes about the sixth of the length. The posterior extremity of the maxillary scarcely reaches the vertical line drawn in advance of the orbit. The caudal fin is a little longer than the head. The anterior margin of the dorsal fin is nearly equidistant between the tip of the snout and the concavity of the caudal. The pectorals and ventrals are rather small. A broad silvery band may be observed above the lateral line.

Specimens from Black Warrior River, Ala.—Prof. A. Winchell.

PLARGYRUS ARGENTATUS.—A specimen of this species is about three inches long, the head forming the fifth of the entire length. A vertical line drawn across the anterior rim of the orbit, intersects the extremity of the maxillary bone. The eye is large; its diameter entering three times in the side of the head. The dorsal scales anterior to the dorsal fin are quite small, contrasting greatly with those of the side which are well developed. The anterior margin of the dorsal is nearer to the insertion of the rays of the caudal fin than the tip of the snout. The dorsal region is pale red, whilst the sides appear as if coated with silver.

Inhabits the waters of James River, Va.—S. F. Baird.

CERATICHTHYS, Baird.

Body elongated, fusiform or subfusiform, somewhat compressed. Head flattened above, very declivous anteriorly with the snout rounded and overlapping the lower jaw. Mouth moderate in size, subterminal and horizontal

provided with a barbel upon its angle, and inserted upon the extremity of the maxillary bone. Eye approximating the upper surface of the head, and rather moderate in size. The isthmus is wide. The insertion of the ventrals is even with a vertical line drawn from the anterior margin of the dorsal fin. The latter is higher, and the anal deeper—than long. The scales are large, and the lateral line nearly straight along the middle of the flanks. The pharyngeal bones are pretty stout upon their convexity which is very slightly expanded, whilst the upper and lower branches are nearly equally developed, the latter however, more slender. The teeth are stoutish, compressed, of the prehensile kind of the hooked type, generally without grinding surface. Sometimes, however, a grinding surface may be observed upon some of the teeth which are subject to some variations being compressed or else subconical, generally hooked and occasionally conical. They are disposed upon a single row: 4—4.

1. CERATICHTHYS BIGUTTATUS, Bd.—*Semotilus biguttatus*, KIRTL. Bost. Journ. Nat. Hist. III. 1840, 344. Pl. v. fig. 1.—*Leuciscus biguttatus*, DEKAY, Fauna of N. Y. III. 1842, 214.—STORER, Synops. 1846, 161.

From Yellow Creek, a tributary of the Mahoning.—J. P. Kirtland.

2. CERATICHTHYS AMBLOPS.—*Rutilus amblops*, RAFIN. Ichth. Ohiens. 1820, 51.

Falls of the Ohio.—Rafinesque.

3. CERATICHTHYS LEPTOCEPHALUS.—A species easily to be distinguished from its congener, by its small head which enters four times and a half in the total length. The body itself is proportionally shorter than in *C. amblops* especially. Its scales are likewise larger than in the latter species. The color is of a uniform blackish grey above, and greyish white beneath.

Specimens were collected at Salem, N. C., by J. T. Lineback and School, and preserved in the Museum of the Smithsonian Institution.

NOCOMIS BELLICUS.—It is a more bulky and deeper fish than its congener from Nebraska. And what is still more characteristic, its head is smaller, hence its mouth smaller also. We could not detect the small teeth constituting the inner row, but supposed they got lost in the preparation of the pharyngeal bones. At any rate, whether lost or entirely absent, we have here a second species of the genus *Nocomis*. Color reddish above; reddish yellow beneath, with an obsolete black spot upon the base of the caudal.

Caught in the Black Warrior River, Ala.—Prof. A. Winchell.

Alphabetical List of the species collected by the United States and Mexican Boundary Commission; Major Wm. H. Emory, Commissioner.

*Index to the Systematic Names not included in the foregoing List.**

* Synonyms are in *italics*.