12. DESCRIPTION OF A NEW FORM OF LAMPREY FROM AUSTRALIA, WITH A SYNOPSIS OF THE FAMILY.

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(Pisces, Pl. IV. V.)

The Lamprey which I have now to present to the attention of the Society differs in so remarkable a degree from any other known species, that, premising that I propose for it the name of *Geotria Australis* (Pisces, Pl. V.), I think it best to connect with the description a revision of the whole Family to which it belongs.

PETROMYZONIDÆ.

Nasal aperture closed, and the palate entirely covered with skin.

Lampredia, Rafin. Anal. Nat. 94, 1818.—*Petromyzonidæ* (*Petromyzonini*), Bonap. Syst. Ichth. 1838; De Kay, Nat. Hist. of New York, 379.—(*Fam.*) *Hyperoartia*, Müll. Abhandl. Akad. Berlin, 1836, 77; Mag. Zool. & Bot. i. 406.—*Petromyzidæ*, Gray, Syn. B. M. 1842, 148, 150.

Müller (*Abhandl. Akad. Berlin*) divided the genera thus:—

1. *Petromyzon*, with visible teeth.
2. *Ammocætes*, without visible teeth.

Synopsis of Genera.

A. *Petromyzonina. Teeth distinct; eyes visible.*

1. **PETROMYZON.** Upper inner teeth two, conical, close together; lower single, crescent-shaped; labial teeth numerous, conical; lingual teeth two, pinnate (Pl. IV. f. 1).

2. **LAMPETRA.** Upper and lower teeth transverse, crescent-shaped; labial teeth in two submarginal rows; inner lateral teeth larger, two- or three-lobed, lingual teeth pectinate (Pl. IV. f. 2).

3. **GEOTRIA.** Upper and lower teeth transverse, crescent-shaped; upper lobed; labial teeth numerous, distant, acute, innermost largest; lingual teeth elongate, conical, arched (Pl. IV. f. 3).

4. **VELASIA.** Upper and lower teeth transverse, crescent-shaped; upper two-lobed; labial teeth numerous, crowded, truncate; innermost largest; lingual teeth elongate, arched.

5. **CARAGOLA.** Upper internal teeth two, far apart, three-lobed; lower crescent-shaped, nine-lobed; labial teeth transverse, band-like, four tubercles; lingual teeth flattened (Pl. IV. f. 5).

6. **MORDACIA.** Upper inner teeth two; lateral three-lobed; lower nine, conical, in an arched series; labial teeth conical, in a single submarginal series; lingual teeth elongate, conical, arched (Pl. IV. f. 6).

B. *Ammocætina. Teeth none; eyes hidden.*

7. **AMMOCETES.**

A. Petromyzonina. *Teeth distinct.*

1. PETROMYZON. (Pisces, Pl. IV. fig. 1.)

Upper inner teeth two, triangular, close together. Lower inner tooth single, large, crescent-shaped, many-toothed. Labial teeth conical, acute, numerous, in diverging, arched series; the inner one largest, and gradually becoming smaller near the edge. Tongue with two compressed, pectinated teeth above, and a broad, lunate, dentated tooth beneath, which is strongly bent up between the upper teeth in the centre.

Yarr. Brit. Fish. fig. p. 603; De Kay, Zool. New York, t. 56, 216 (bad).—*Petromyzon*, *sp.*, Linn. Syst. Nat.; Rafin. Anal. Nat.; Müll. Abhandl. Akad. Berlin, 1834, 77 (1836).—*Petromyzon*, Gray, Proc. Zool. Soc. 1851.

1. PETROMYZON MARINUS. The LAMPREY.

Petromyzon marinus, Linn. Bloch, iii. pl. 77; Linn. (édit. de Gmelin) Faun. Suec. 292; Artedi, Ichth. gen. 64. syn. 90; Neue Schrift. der Berl. Naturf. 7. 466; Schneid. Bloch, i. 530, 1801; Penn. Brit. Zool. iii. 102. pl. 10, 1776–78; Shaw, Gen. Zool. v. 251. pt. 2. pl. 133, 1804; Don. Brit. Fish. pl. 81, 1820–21; Flem. Brit. An. 163. sp. 1, 1827; Cuv. Règ. An. ii. 404, 1829; Müll. Mém. de l'Acad. Berlin, 1834, 78. t. 4. f. 1, 5; Osteol. t. 9, 65, 67, 68. f. 9; Yarr. Brit. Fish. 2 ed. ii. 598, 1841.—*Lamproie marbrée*, Daub. Encycl. Méth.; Bonn. Planches d'Hist. Nat. de l'Enc. Méth.—*Petromyzon maculosus*, Artedi, Ichth. gen. 64. syn. 90.—*Petromyzon lamproie*, Bloch, Hist. Nat. Poiss. 31, 77. pt. 13.—*Petromyzon maximus*, Cuv. Règ. An. ii. 118, 1817.—*Petromyzon*, Klein, Misc. Pisc. iii. f. 30. n. 3.—*Mustela sive Lampetra*, Belon, Aquat. 76; Salv. Aquat. f. 62 b.—*Lampetra major*, Schwenck. Theriotr. Siles. f. 451; Charlet, Onom. f. 153. n. 3; Aldrov. 539. liv. 4. c. 13; Jonston, liv. 2. tit. 2. c. 3. pl. 24. f. 5.—*Lamproie*, Coms. Hist. Nat. v. 284; Fermin, Surin. 85; Rond. 310. pt. 1. liv. 13; Valmont de Bomare, Dict. Hist. Nat.—*Lampetra Rondeletii*, *Lamprey* or *Lamprey-Eel*, Will. Ichth. 105. pl. 2. f. 2, 1685; Ray, Syn. f. 35. n. 3.—*Ioatzma unagi*, Kämpfer, Voy. au Japan, i. pl. 12. f. 2.—*Il mustilla*, Forsk. Desc. Anim. f. 18.—*Plota fluta*, Authors.—*Lampetra*, *Lampreda kentmanni*, *lampreda*, *marina*, *mustela*, Gesn. (germ.) 180 b. et paralip. 22.—*Le Pétromyzon Lamproie*, Lacépède, Hist. Nat. Poiss. i. 2, 3. pl. 1, 1798.—*La Grande Lamproye*, Cuv. Règ. An. ii. 404, 1819.

Hab. European Seas.

2. PETROMYZON JURÆ. MACCULLOCH'S LAMPREY.

Petromyzon Juræ, MacCull. West. Isles, ii. 186, 187. t. 29. f. 1; Jen. B. V. A. 522.—*Petromyzon fluviatilis*, *var.*, Flem. Brit. An. 162.

Hab. Coast of Scotland, east shore; island of Jura.

Probably a variety of *P. marinus*: the drawing of the teeth shows it has no relation to *P. fluviatilis*.

3. ?PETROMYZON AMERICANUS. AMERICAN SEA LAMPREY.

Petromyzon marinus, Schæpff. Beobachtungen, &c. viii. 184 ; Mitch. Trans. Lit. & Phil. Soc. i. 461.—*Petromyzon americanus*, Lesueur, Amer. Phil. Soc. (N. S.) i. 382 ; Hist. N. A. Fish. ined. plate ; Storer, Rep. on the Fishes of Massachusetts ; De Kay, Nat. Hist. of New York, 379. pl. 66. f. 216. pt. 1 ; Zool. 1842.

Hab. N. America.

4. PETROMYZON NIGRICANS. BLUISH SEA LAMPREY.

Petromyzon nigricans, Lesueur, Amer. Phil. Soc. (N. S.) i. 385 ; Storer, Rep. on the Fishes of Massachusetts ; De Kay, Nat. Hist. of New York, 381. pl. 79. f. 247 (teeth indistinct), pt. 1 ; Zool. 1842.

Hab. N. America.

5. PETROMYZON ARGENTEUS. SILVERY LAMPREY.

Petromyzon argenteus, Kirtland, Boston Journ. iii. 342. pl. 4. f. 3 ; De Kay, Nat. Hist. of New York, 382. pt. 1 ; Zool. 1842.

Hab. N. America, river Ohio.

2. LAMPETRA. (Pisces, Pl. IV. fig. 2.)

Upper inner tooth single, transverse, lunate, entire, with a conical prominence at each end. Lower inner tooth single, transverse, lunate, many-toothed, outer lobe largest. Labial teeth unequal, the outer numerous, small, subequal, conical, in a single, submarginal series, the inner larger, unequal ; of the upper part small, in series ; of the sides in a single series, larger, with two or three conical tubercles. Tongue with two compressed, pectinated teeth above, and a large, crescent-shaped, transverse tooth below, crenated on the edge, and with a larger, conical projection in the centre.

Yarr. Brit. Fish. fig. p. 604 ; De Kay, Nat. Hist. of New York, t. 79, 249 (bad).—*Petromyzon*, *sp.*, Linn., Cuv., Müll.—*Lampetra*, *sp.*, Ray.—*Lampetra*, Gray, Proc. Zool. Soc. 1851.

* *Dorsal fins separate.*

1. LAMPETRA FLUVIATILIS. LAMPERN OF RIVER LAMPREY.

Petromyzon fluviatilis, Linn. Bloch, pt. 3. pl. 78. f. 1 ; Linn. (edit. de Gmel.) ; Müll. Prod. 37. n. 307 ; Aldrov. 587 ; Penn. Brit. Zool. v. pt. 106. pl. 10, 1776–78 ; Schneid. Bloch, 530, 2, 1801 ; Shaw, Gen. Zool. 257. pt. 2, 1804 ; Don. Brit. Fish. pl. 80, 1820–28 ; Flem. Brit. An. 404, 1827 ; Cuv. Règ. An. ii. 404, 1829 ; Mém. de l'Acad. Berlin, 78, 1834 ; Jen. Man. Brit. Vert. 521. sp. 210, 1835 ; Yarr. Brit. Fish. 2 ed. ii. 598, 1841 ; Parnell ; Rich. Faun. Bor. 294, 1836.—*Petromyzon fluviatilis*, Cuv. Règ. An. ii. 118, 1817.—*Lamproie prycka*, Daub. Encycl. Méth.—*Nein-oga natting*, Faun. Suec. 106.—*Petromyzon*, &c., Artedi, gen. 64. syn. 89. sp. 99.—*La petite Lamproie*, Bloch, 34. pt. 3. pl. 78. f. 1.—*La Lamproie branchiale*, Bonn. Planches de l'Encycl. Méth.—*Petromyzon*, *Prick* (*negen-oog*), Gro-

nov. Mus. i. 64. n. 114; Zooph. 38.—*Mustela*, Pliny, liv. 9. c. 17.—*Mustela fluviatilis*, Belon, Aquat. 75.—*Lampetra subcinerea, maculis carens*, Salv. Aquat. 62.—*Lampetra, alterum genus*, Gesn. Aquat. 597.—*Lampreda*, Icon. Anim. 326.—*Lampetra, medium genus*, Will. Ichth. 106. tab. g. 2, 3. f. 1, 2; Ray, Syn. Pisc. 25. n. 1.—*Lampetra fluviatilis*, Aldrov. 587; Jonston, 104. pl. 28. f. 11; Schone, 41; Charlet, 159. n. 7; Marseli, Dan. Pann. iv. 2. t. 1, 1726.—*Lampetra fluviatilis, media*, Schwenck. Theriotr. Siles. 532.—*Jaatz me unagi*, Kämpfer, Voy. dans le Japon, i. 156. pl. 12. f. 2.—*Minog*, Rzæzynski, 134.—*Lamproie*, Fermin, Hist. Nat. de Surinam, 85.—*Petromyzon*, Kramer, Elenchus, 38. n. 1; Klein, Misc. Pisc. iii. 29. n. 1. t. 1. f. 3.—*Le Petromyzon pricka*, Lacépède, Hist. Nat. des Poiss. i. 18, 1798.

Hab. Europe.

2. LAMPETRA PLANERI. FRINGED-LIPPED LAMPERN.

Petromyzon planeri, Linn. Bloch, viii. pl. 78. f. 3; Linn. (édit. de Gmelin); Schneid. Bloch, 531, 532, 4, 1801; Shaw, Gen. Zool. v. pt. 2. p. 259, 1804; Jen. Man. Brit. Vert. 522. sp. 211, 1835; Müll. Mém. de l'Acad. Berlin, 78, 1834; Cuv. Règ. An. ii. 404, 1829; Yarr. Brit. Fish. 2 ed. ii. 607, 1841.—*Lamproiea planer*, Bonn. Planches de l'Encycl. Méth.—*Le Pétromyzon planer*, Lacépède, Hist. Nat. des Poiss. i. 30. pl. 3, 1798.

Hab. Europe.

** *Dorsal fin in contact with the second.*

3. LAMPETRA SANGUISUGA. LEECH LAMPERN.

Petromyzon Sanguisuga, Lacépède, Hist. Nat. des Poiss. ii. 99. pl. 1; Supp. to Petromyzon; Shaw, Gen. Zool. v. pt. 2. p. 261, 1804.—*Petromyzon planeri, var.*, Cuv. Règ. An. ii. 118.

Hab. Europe, Seine.

A very doubtful species; Cuvier says it is the same as the former.

4. LAMPETRA LAMOTTENII. AMERICAN LAMPERN.

Petromyzon Lamottenii, Lesueur, Hist. N. A.; De Kay, Nat. Hist. of New York, 382. pl. 79. f. 249 (mouth), pt. 1; Zool. 1842.

Hab. N. America, New York.

3. GEOTRIA, n. g. (Pisces, Pl. IV. fig. 3.)

Upper internal tooth large, transverse, crescent-like, divided into four lobes; the two inner lobes small, acute; outer truncated. The lower internal tooth transverse, narrow, slightly sinuous. The labial teeth numerous, far apart, conical, acute, in arched series, diverging from the throat; the innermost one larger, rest small; the innermost one of the lower part on each side small, elongate, transverse, with two small, rudimentary tubercles. Tongue with two elongate, conical, arched teeth, with a triangular plate on the lower side of the base. Throat with a very large dilatable pouch. Dorsal fins two,

far apart. Mouth very large, surrounded with rather large, transverse, torn leaves.

This genus chiefly differs from *Velasia* in the rudimentary state of the lower internal tooth, in the form of the labial teeth, in the large size of the oral disk, and the extraordinary development of the throat-pouch, which is found in a rudimentary state in the *Petromyzon marinus*. This development of the pouch is perhaps to adapt the animal to the long drought of the Australian rivers.

1. GEOTRIA AUSTRALIS. POUCHED LAMPREY. (Pisces, Pl. V.)

Hab. South Australia. Fresh water.

4. VELASIA. (Pisces, Pl. IV. fig. 4.)

Upper internal teeth large, transverse, crescent-like, divided into four flat, elongated lobes; the outer lobes largest. The lower internal teeth large, transverse, crescent-like, convex, denticulated on the edge. The labial teeth very numerous, truncated, in crowded, arched series, diverging from the throat; the inner ones large, and gradually diminishing in size to the edge. Tongue with two very large, long, curved teeth, with a triangular plate beneath at their base. Dorsal fins two, far apart. Mouth moderate, edged with transverse foliations.

1. VELASIA CHILENSIS. CHILIAN LAMPERN.

Hab. Chili. In fresh water.

5. CARAGOLA. (Pisces, Pl. IV. fig. 5.)

Upper inner teeth two, large, separate, lateral, submarginal, each with three acute tubercles. Lower inner teeth large, crescent-shaped, nine-lobed; the central and two lateral lobes on each side larger. The labial teeth in a subcircular, submarginal series, large, transverse, band-like, with three or four tubercles. Tongue with two flattened teeth, and a triangular, transverse plate below, with an acute process between the teeth on the upper edge. Dorsal fins two, far apart.

1. CARAGOLA LAPICIDA. CARAGOL.

Hab. West Coast of America.

6. MORDACIA. (Pisces, Pl. IV. fig. 6.)

Upper inner teeth two, separate, lateral, subtrigonal, each with three tubercles. The lower nine conical, acute, in an arched series; the five central smaller. Labial teeth small, conical, in a single, circular, submarginal series, with a single, additional, odd tooth in the centre above. Tongue with two conical, arched teeth. (Rich. Voy. Erebus & Terror, t. 38.)

Petromyzon, sp., Rich. Voy. Erebus & Terror, t. 38, 1845.

1. MORDACIA MORDAX. AUSTRALIAN LAMPERN.

Petromyzon mordax, Rich. Voy. Erebus & Terror, t. 38, 1845.—
Mordacia mordax, Gray, Proc. Zool. Soc. 1851.

Hab. Tasmania.

Species of Doubtful Situation in the Family.

1. PETROMYZON APPENDIX. SMALL LAMPREY.

Petromyzon appendix, De Kay, Nat. Hist. of New York, 381. pl. 64.
 f. 211. pt. 1; Zool. 1842.

Hab. N. America, Hudson River.

“A ring of irregular-shaped corneous processes within the oral orifice, and a large isolated double tooth of the same texture on the inferior portion of the mouth.”—*De Kay*.

2. PETROMYZON TRIDENTATUS. TRIDENTATE LAMPREY.

Petromyzon tridentatus, Gairdener, Rich. Faun. Bor. Amer. 293,
 1836; De Kay, Nat. Hist. of New York, 381. pt. 1; Zool. 1842.

Hab. N. America, Falls of the Walamet.

3. PETROMYZON ARGENTEUS. SILVERY LAMPREY.

Petromyzon argenteus, Bloch, t. 415. f. 2; Schneid. Bloch, 532.
 t. 102. f. 1, 1801; Shaw, Gen. Zool. v. pt. 2. p. 262, 1841.

Hab. Indian Seas.

4. PETROMYZON BICOLOR. BRILLIANT LAMPREY.

Petromyzon bicolor, Shaw, Gen. Zool. v. pt. 2. p. 263, 1804.—
Petromyzon niger, Lacépède, iv. 667.

Hab. Europe, Seine.

5. PETROMYZON PLUMBEUS. LEADEN LAMPREY.

Petromyzon plumbeus, Shaw, Gen. Zool. v. pt. 2. p. 263, 1804.
 —*Petromyzon Septœil*, Lacépède, iv. 667.

Hab. Europe, Seine.

6. *Ammocetina*. *Teeth none; eyes none.*

7. AMMOCETES.

Teeth none.

Ammocetes, Dum. Zool. Anal.; Cuv. Règ. An. ii. 118, 1817;
 Müll. Abhandl. Akad. Berlin, 1834, 78 (1836).—? *Lampreda*, Rafin.
 Anal. Nat. 94, 1815.

1. AMMOCETES BRANCHIALIS. PRIDE OF SANDPIPER.

Ammocetes branchialis, Dum.; Flem. Brit. An. 164. sp. 3, 1828;
 Cuv. Règ. An. 406, 1829; Müll. Mém. de l'Acad. Berlin, 1834;
 Jen. Man. Brit. Vert. 522. sp. 212, 1835; Yarr. Brit. Fish. 2 ed. ii.

609, 1841.—*Petromyzon branchialis*, Linn. (édit. de Gmelin) 1815; Bloch, pt. 3. pl. 78? f. 2; Linn. Faun. Suec. 292; Wulff. Ichth. Borus. 15. n. 20; Müll. Prod. Zool. Dan. 37. n. 307 b; Kramer, Elench. 483; Penn. Brit. Zool. iii. 107. pl. 10, 1776–78; Shaw, Gen. Zool. 260, 1804.—*Petromyzon corpore annuloso*, &c., Artedi, gen. 42. syn. 90.—*Lamproie branchiale*, Bonn. Planches de l'Encycl.; Daub. Encycl. Méth.—*Petromyzon*, Gronov. Zooph. 38. n. 160; Klein, Misc. Pisc. iii. 30. n. 4.—*Petromyzon cæcus*, Couch, Mag. Nat. Hist. v. 23. f. 60.—*Mustela fluviatilis*, Gesner, Aquat. 589; Icon. Anim. 286; Thierb. 159 b.—*Lampetra minima*, Aldrov. 539.—*Lampern*, or *Pride of the Isis*, Will. Ichth. 104.—*Pride*, Plot, Hist. of Oxford, 182. t. 10.—*Lampetra cæca*, Will. Ichth. tab. g. 3. f. 1; Ray, Syn. Pisc. 35. n. 2, 4; Couch, Loudon's Mag. Nat. Hist. v. 23. f. 9, 10.—*Lampræta neunange*, Jonston, t. 28. f. 10.—*Lamproyon et Lamprillon*, Rond. Hist. Poiss. ii. 202.—*Querder*, *Schlammquerder*, Schwenckf. Theriotr. Siles. 423.—*Der Kieferwurm*, Müll. l. c. iii. 234.—*Lampreyon*, Valmont de Bomare, Dict. Hist. Nat.—*Le Petromyzon lampreyon*, Lacépède, Hist. Nat. des Poiss. i. 26. pl. 2. f. 1, 1798.

Hab. Europe, rivers.

2. AMMOCÆTES RUBER. RED LAMPREY.

Ammocætes ruber, Cuv. Règ. An. 406, 1829; Müll. Mém. de l'Acad. Berl. 78, 1834.—*Petromyzon ruber*, Lacépède, Hist. Nat. des Poiss. ii. 99. pl. 1; Supp. to *Petromyzon*; Shaw, Gen. Zool. v. pt. 2. p. 261, 1804.—*Ammocætes branchialis*, var., Cuv. Règ. An. ii. 118, 1817.

Hab. Europe, Seine.

3. AMMOCÆTES CONCOLOR. MUD EEL OR BLIND EEL.

Ammocætes concolor, Kirtland, Boston Journ. iii. 473. pl. 27. f. 1 a, b, 1841.

Hab. N. America, Mahoning and Scioto rivers.

4. AMMOCÆTES BICOLOR. COLOURED MUD LAMPREY.

Ammocætes bicolor, Lesueur, Amer. Phil. Soc. (N. S.) i. 386.—*Ammocætes bicolor*, Storer, Fishes of Massachusetts, 198; De Kay, Nat. Hist. of New York, 383, 679. f. 248. pt. 1; Zool. 1842.

Hab. N. America, Connecticut river.

5. AMMOCÆTES UNICOLOR. PLAIN MUD LAMPREY.

Ammocætes unicolor, De Kay, Nat. Hist. of New York, 383. pl. 79. f. 250. pt. 1; Zool. 1842.

Hab. N. America, Lake Champlain.