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ARTICLE IV.

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ON A NEW SHOVELNOSE STURGEON FROM THE MISSISSIPPI RIVER.

(PLATES IV.—VII.)

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BY

S. A. FORBES, PH.D., AND R. E. RICHARDSON, A.M.

## ERRATA AND ADDENDA.

- Page 55, line 15, for 1854 read 1855.  
Page 55, line 16, for *Horticultural* read *State Agricultural*.  
Page 60, in second table, Illinois, for 240 read 241.  
Page 65, first line above foot-note, for *ventricosa* read *ligamentina*.  
Page 72, line 9, for *imbecilis* read *imbecillis*.  
Page 79, line 19, for *asperimus* read *asperrimus*.  
Page 80, above *Quadrula rubiginosa* insert Section *Fusconaia* Simpson.  
Page 76. The record of Calkins for *Margaritana margaritifera* is without doubt erroneous and should be eliminated. This species is not found in Illinois.  
Page 95. *Pomatiopsis sheldonii* Pilsbry should read *Amnicola sheldonii* and should be transferred to the genus *Amnicola* on page 93.  
Page 100. *Physa gyrina oleacea* Tryon is the immature stage of *Physa gyrina*.  
Page 103. *Lymnæa tazewelliana* is a synonym of *Lymnæa parva*.  
Page 105. *Lymnæa palustris michiganensis* is the immature form of *Lymnæa reflexa*.  
Page 106. *Lymnæa reflexa iowensis* and *Lymnæa reflexa crystalensis* are synonyms of *Lymnæa reflexa*.  
Page 112, line 6 from bottom, for *gouldi* read *gouldii*.  
Page 114, line 5 from bottom, for *juxtigens* read *juxticens*.  
Page 115, line 21, for *Witter* read *Walker*; line 23, *Polygyra sayii* Binney should be changed to *Polygyra sayana* Pilsbry.  
Page 116, line 1. *Polygyra exoleta* Binney (1885) should be changed to *Polygyra zalceta* Binney (1837).  
Page 117, line 11 from bottom, for *leai* read *leaii*; line 3 from bottom, *Polygyra monodon fraterna* is a good species and should read *Polygyra fraterna*.  
Page 119, foot-note. A specimen of *alliaris* in the collection of Mr. Aldrich, received from Calkins, proves to be *draparnaldi*.  
Page 121, line 3 from bottom, for *Champaign* read *Piatt*.  
Page 122, line 12 from bottom, for *Pyramidula striatella* Anthony read *Pyramidula cronkkitei anthonyi* Pilsbry; line 4, for *Held* read *Hald*.  
Page 123, for *Helicodiscus lincatus* Say read *Helicodiscus parallelus* Say.  
Page 162, line 7, for *glandulosa* read *linearis*.  
Page 171, line 17, for *riparia* read *vulpina*.  
Page 176, line 8 from bottom, for *canadense* read *majus*.  
Page 180, line 9, for *virginica* read *virginiana*.  
Page 221, line 6 from bottom, for *rectangulus* read *rectangularis*.  
Page 226, line 3, for *fasciatus* read *fasciata*.  
Page 239, line 11, strike out Lake Co. entry.  
Page 246, lines 6 and 7, and page 248, lines 1, 14, 20, and 23, for *Ænothera* read *Onagra*.  
Page 248, line 4, for *candida* Horn substitute n. sp.

Page 249, line 8 from bottom, for *Olethreutes dimidiana* Sodoff? read *Olethreutes separatana* Kearfott, and strike out parenthetical matter.

Page 251, line 7, for *grossa* read *thoracica*; line 21, for words preceding H. 6, read *Asilus rufipennis* Hine; line 18 from bottom, for words preceding H. 2, substitute *Asilus cacopillogus* Hine.

Page 253, line 8, for *Linn.* read *Emory*.

Page 257, line 15, for *pennsylvanicus* DeG. read *auricomus* Rob.

Page 261, Note 6. *Melanoplus macneilli* is very probably *M. fluviatilis* Brun.

Page 262, Note 9. Dr. Bergroth writes that *Nabis elongatus* is preoccupied. The original is *elogantus* in the check list. Comparison with long-winged *vicarius* is desirable before re-naming it.

Page 309, in table, for 59 read 57, and for 743 read 741.

Page 310, in table, for 59 read 57.

Page 314, line 5, for 1587 read 481; line 16, after *stubble* insert *meadows*; line 17, after *pastures* strike out *and meadows*, and after 1500 strike out *each*.

Page 315, last line, for 553 read 481.

Page 362, line 7 from bottom, for *longa* read *parvilamellata*.

Page 373. As a second entry in synonymy insert as follows:

1854. *Nothrus bistriatus*, Nicolet, Acariens des Environs de Paris, p. 397, Pl. VII., Fig. 7.

Page 376, line 13 from bottom, for *Oribata* read *Oribates*.

Page 378, line 1, for XXV. read XXXV.

Page 384, after line 5 insert as follows:

*N. bipilis* Hermann. Mem. Apt., p. 95.

In moss, Arcola and Parker, Ill.

Page 384, line 5 from bottom, for *pyrostigma* read *pyrostigmata*.

Page 386, after line 11 from bottom insert as follows:

*H. bistriata* Nicolet. Acariens des Environs de Paris, p. 397, Pl. VII., Fig. 7.

Under logs and in moss, Urbana and Arcola, Ill.

Page 388, line 12, for *sphærum* read *sphærule*.

ARTICLE IV.—*On a New Shovelnose Sturgeon from the Mississippi River (Plates IV.—VII.).* BY S. A. FORBES AND R. E. RICHARDSON.

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In the course of our studies of the fishes of Illinois, made in connection with the preparation of a report upon the ichthyology of the state, it became necessary last year to examine greater numbers of the larger species of the Mississippi River than could well be preserved in collections. Consequently, in June, 1904, Mr. Richardson visited for this purpose the fishing grounds at Grafton, Illinois, at the mouth of the Illinois River, and the fish boats at Alton, where the catches from that part of the Mississippi and from the lower Illinois are mainly handled by the firm of Ashlock & Son, long established at that point.

Mr. H. L. Ashlock of this firm expressed at this time his belief that a distinct sturgeon, known to the fishermen of the locality as the "white sturgeon," was occasionally obtained among the catches of the common shovelnose locally called the "switch-tail," an opinion presently confirmed by the receipt of one specimen of this species and the head of another, brought in by his fishing crews. Seven additional specimens have since been sent us by Mr. Ashlock, all taken in fyke-nets at or near Grafton.

The failure of students of American ichthyology to distinguish this species can be accounted for only on the supposition that specimens of it have never come to their notice, since its distinguishing characters are too obvious and important to have been overlooked. Its uniformly light color, relatively long head, very small eye, sharp and elongate snout, naked breast and belly, relatively small and numerous dermal scutes, numerous ribs, and few-pointed gill-rakers, separate it sharply from the common shovelnose. Its scarcity must doubtless explain its absence from our literature. According to Mr. Ashlock's estimate, about one in five hundred of the shovelnose sturgeons taken in the central Mississippi belongs to this new species, and

as the number of these sturgeons examined by all the ichthyologists of America taken together, doubtless falls far short of five hundred, it is not remarkable that it has hitherto been overlooked.

Recognizing, as we are disposed to do, the generic criteria proposed for the scaphirhynchoids by Berg ('04), we regard this form as generically distinct from species hitherto described.

PARASCAPHIRHYNCHUS, gen. nov.

Snout broad, shovel-shaped; caudal peduncle long and flattened above, broader than deep, and completely covered by scutes. Breast and belly naked, sides sprinkled with small discoidal ossifications. Lips four-lobed; spiracles and pseudo-branches wanting; gill-rakers fan-shaped, two- or three-pointed on the lower half of the arch; ribs twenty or twenty-one; air-bladder well developed, about 8 times in length of head and body.

One species; known at present only from the Mississippi River.

*Parascaphirhynchus albus*, sp. nov.

Head long, 2.9 to 3.2 in total length, and the body comparatively short; depth, 7.5 to 9 in length of head and body; distance from gill-cavity to front of dorsal 2.5 in total length. Color very light, the upper parts bluish gray in life, the lower parts of the sides and belly shading from very light gray to almost milky white.

Scutes small (Pl. VI.), sixteen to nineteen in the dorsal row, forty-one to forty-seven in the lateral, and ten to thirteen in the ventral. Spines of the dorsal and lateral scutes sharp, projecting strongly backward, and reaching to near the posterior border of the scute. Denticulated ossifications between the dorsal and lateral, and lateral and ventral rows of scutes diminishing in size and abundance from above downward. A few imperfect plates along the dorsal row of scutes, extending as far forward as the backward reach of the pectorals, more numerous and larger backwards, and becoming continuous with



the dorsal covering of the caudal peduncle. Belly wholly naked in front of ventrals; breast with a few bony points similar to those on the lower part of the sides. The pectoral shields are long and narrow (Pl. V.), the triangular, posterior part equaling in area the remainder of the shield.

Rostrum long and narrow (Pl. V.), 2.5 to 2.9 in length of head; the eye very small, 8.3 to 10 in the interorbital space, which is 3.7 to 4.2 in the length of the head. Barbels doubly pectinated on the anterior edge, the posterior pectinations obsolete or wanting, the inner barbels 1.7 to 2.9 in length of outer. Mouth large, 1.4 to 1.6 in the greatest width of the rostrum. Papillæ of the four clusters on the lower lip reduced to a few flattened scallops at the hinder edge of the lappet.

Gill-membranes united to the isthmus and to each other in a deep angle (Pl. V.), and continued backward to cover the anterior fourth of the pectoral shields. Operculum long and narrow, its depth contained more than twice in distance from posterior margin of cheek to posterior margin of gill-opening, and this distance about 8.5 times in length of head and body. Gill-rakers 10 or 11, +3, the two rows of each arch separated by a broad smooth surface (Pl. VII.).

Dorsal fin of 35 to 43 rays, the length of its base 11.8 to 12.8 in length of head and body; anal rays 20 to 23, ventral rays 23 to 26.

Length of our seven specimens 19 to 43 inches, to base of caudal fin, the largest weighing 9.75 pounds. Mr. Ashlock has seen specimens 4.5 feet long, with an estimated weight of 16 pounds.

Described from 9 specimens.

The sexual differences are not known, all our specimens being males. The species is said by Mr. Ashlock to spawn between March and June, and to continue spawning sometimes as late as August. The testes were well developed in those taken about the middle of June.

Although seen by us only from the Mississippi River at Grafton, this fish is said by Mr. Ashlock to be more abundant along the lower Missouri. Catches of sturgeon were seen by

him at West Alton, Mo., in which a fifth of the number were of this species. It is also said by him to occur, as a rule, in swifter water than the common shovelnose.

The following table exhibits some of the more important differences observed in comparing our nine specimens of *Parascaphirhynchus albus* with twenty-one specimens of *Scaphirhynchus platorhynchus* in the Laboratory collection.

	<i>P. albus</i>	<i>S. platorhynchus</i>
Ribs.....	20 or 21	10 or 11
Ventral radials .....	9	7
Gill-rakers (points)....	2 or 3	2-5 (usually 4 or 5)
Air-bladder in length head and body.....	8	5
Belly and breast.....	naked	fully armored
Sides between scutes .....	scattered ossifications	" "
Depth lateral scutes in length head and body .....	28-32.5	19.8-23.8
Eye in interorbital space.....	8.3-10	5.3-8.3 (usually less than 7)
Inner barbel in outer .....	1.7-2.9	1.1-1.4
Width mouth in width snout .....	1.4-1.6	1.6-1.9
Width head in length head.....	2.5-2.9	1.9-2.2
Length head in length head and body .....	2.9-3.2	3.5-3.8

The first of the shovelnose sturgeons was described in 1820 by Rafinesque as *Acipenser platorhynchus*, and was, in 1835, made by Heckel the type of a new genus distinguished from *Acipenser* by the absence of spiracles. The first of the Asiatic species was described by Kessler from the Suir-dar in 1872 as *S. fedtschenkoi*; the second, *S. kaufmanni*, by Bogdanov in 1875; and the third in 1877 from the Amu-dar as *S. hermanni* by Kessler, who also discussed and figured Bogdanov's species. A fourth species was described by Nikolsky in 1900 as the type of a new genus, *Pseudoscaphirhynchus*. Berg ('04) unites the three preceding species under this genus, but does not recognize Nikolsky's species as distinct.

The American and Asiatic species were first subjected to detailed anatomical analysis by Brutzer ('59) and Iwanzow ('87), the memoir of the latter being our fullest treatise on its subject. Zograf wrote in 1887, and again in 1896, especially on the embryonal teeth of these and other cartilaginous ganoids.

The two genera above mentioned have recently been studied by Berg ('04).

The following analytical table will serve to exhibit the relations of the three genera here recognized, the characters of the Asiatic genus being derived by us from the papers of Berg, Nikolsky, and Kessler.

- A. Caudal peduncle shortened and laterally compressed as in *Acipenser*, the rows of scutes not meeting above and below to form a complete armor; mouth as in *Acipenser*, the lips two-lobed\* and without clusters of papillæ; gill-rakers lance-shaped as in *Acipenser*; air-bladder small or rudimentary†; ribs numerous.‡

*Pseudoscaphirhynchus* Nikolsky.

- AA. Caudal peduncle lengthened, depressed, broader than deep, and completely armored; lips four-lobed, each lip bearing four clusters of flattened tubercle-like lappets; gill-rakers fan-shaped, two-, three-, four-, or five-pointed on the lower half of the arch.

- b. Ribs twenty or twenty-one; gill-rakers two- or three-pointed; belly and breast naked; air-bladder 8 in length of head and body.

*Parascaphirhynchus*, gen. nov.

- bb. Ribs ten or eleven; gill-rakers two-, three-, four-, or five-pointed; belly and breast wholly covered with subrhombic plates; air-bladder 5 in length of head and body.

*Scaphirhynchus* Heckel.

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\*See Berg, Zool. Anz., XXVII., 22, 1904, p. 667; also Kessler's figures of *P. kaufmanni* and *hermanni*, Aralo-Caspian Exped., IV., 1877, Fig. 25 and 26.

†One twenty-seventh of length of head and body in *P. fedtschenkoi*.

‡Twenty-four or twenty-five in *P. fedtschenko*



## BIBLIOGRAPHY.\*

---

Berg, L. S.

- '04. Zur Systematik der Acipenseriden. Zool. Anz., Bd. XXVII., Nr. 22, pp. 665-667.

Brandt, J. F.

- '69. Einige Worte über die Europäische-Asiatischen Stör-Arten. Mélang. Biolog., T. VII., pp. 110-116; Bull. Ac. Sc. St. Petersb., T. XIV., pp. 171-175.

Bridge, T. W.

- '96. The Mesial Fins of Ganoids and Teleosts. Jour. Linn. Soc. Lond., Vol. XXV., pp. 530-602, Pl. XXXII-XXXIII.

Brutzer, G.

- \*'59. De Scaphirhyncho Rafinescii disquisitiones anatomicae. Dorpat, 1859.

Davidoff, M. v.

- '79. Beiträge zur vergleichenden Anatomie der hinteren Gliedmasse der Fische. Morph. Jahrb., Bd. V., pp. 450-520, Taf. XXVIII.-XXXI.

Fitzinger, L., and Heckel, J.

- '41. Monographische Darstellung der Gattung *Acipenser*. Ann. Wiener Mus. Naturgesch., Bd. II., pp. 263-326, Taf. XXV-XXX.

Gray, J. E.

- '34. Characters of two new species of *Acipenser*. Proc. Zool. Soc. London, Vol. II., pp. 122-123.

Grevé, C.

- '96. Ueber die Lebensweise der central-asiatischen Arten der Gattung *Scaphirhynchus*. SB. Ges. Dorpat, Bd. XI., pp. 137-144.

Günther, Albert.

- '73. Note on *Scaphirhynchus Fedtschenkoi*. Ann. Mag. Nat. Hist., Ser. 4, Vol. XII., 1873, No. 70, p. 277.

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\* Papers whose titles are starred have been seen by us in abstract only.

Heckel, J.

- '35. *Scaphirhynchus*, eine neue Fischgattung aus der Ordnung der Chondropterygier mit freien Kiemen. Ann. Wiener Mus. Naturgesch., Bd. I., pp. 71-78, Taf. VII.

Iwanzow, N.

- '87. *Scaphirhynchus*. Eine vergleichend.-anatomische Beschreibung. Bull. Soc. Imp. des Natural. Mosc., N. Sér., T. I., pp. 1-41, Pl. I. and II.

Kessler, K. F.

- '72 On a remarkable Fish of the Family of Sturgeons discovered by M. A. P. Fedchenko in the River Suir-dar. Mém. Soc. d'Hist. Nat. Mosc., Vol. X, p. 26, Pl. 12 (in Russian). Translation, Ann. & Mag. Nat. Hist., Ser. 4, Vol. XII., 1873, No. 70, pp. 269-276. Redescribed and figured in Fedchenko's Turkestan Journey, II, Pt. 6. p. 48, Pl. VI., Fig. 28, 29, and Pl. VII., Fig. 30-35; Nachr. Ges. Mosc. XI., Ser. 5, 1874.

- \*'77. The Aralo-Caspian Expedition. (IV. Fishes of the Aralo-Pontine Region.) 360 pp., 26 fig. Suppl. to Trans. Petersb. Nat. Hist. Soc. (in Russian).

Kirsch, P. H., and Fordice, M. W.

- '89. A Review of the American Species of Sturgeons (Acipenseridæ). Proc. Acad. Nat. Sci. Phila., 1889, pp. 245-257.

Nikolsky, A. M.

- '00. *Pseudoscaphirhynchus rossokowi*, n. gen. et spec. Annuaire Mus. St. Petersb., T. V, pp. 257-259.

Pelzam, E.

- \*'83. Biologische Untersuchungen ueber Stör-artige Fische. SB. Naturf. Ges. Kasan, Beiträge No. 65. 17 pp.

Rafinesque, C. S.

- '20. Ichthyologia Ohiensis, p. 80.

Regan, C. T.

- '04. The Phylogeny of the Teleostomi. Ann. & Mag. Nat. Hist., Ser. 7, Vol. XIII., No. 77, pp. 329-349, Fig. 1-4, and Pl. VII.

Thacher, J. K.

- '77. Median and Paired Fins, a Contribution to the History of Vertebrate Limbs. Trans. Conn. Acad. Arts and Sci., Vol. III., pp. 281-310, Pl. XLIX.-LX.

- '77a. Ventral Fins of Ganoids. Trans. Conn. Acad. Arts and Sci., Vol. IV., pp. 233-242, Pl. I. and II.

Westberg, P.

- '99. Ueber die Fischgattung *Scaphirhynchus*. KB. Ver. Riga, Bd. XLII., pp. 159-160.

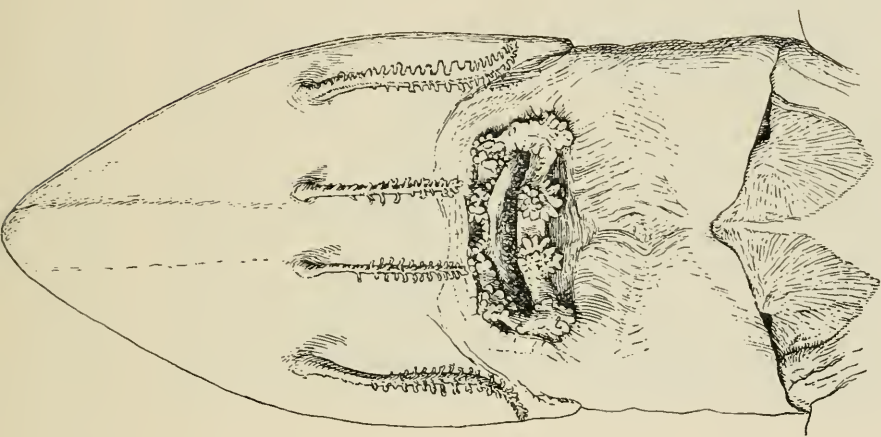
Zograff, N.

- '87. Ueber die Zähne der Knorpel-Ganoiden. Biol. Centralbl., Bd. VII., Nr. 6, pp. 178-183.

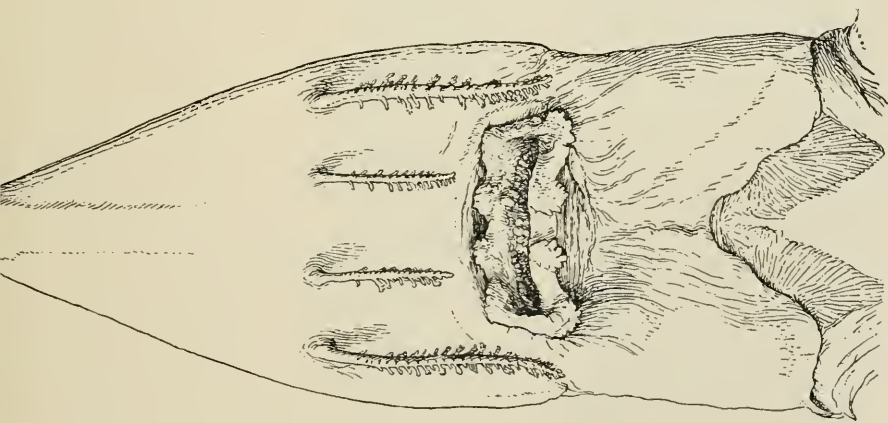
- '87a. On some of the Affinities between Ganoidei-Chondrostei and other Fishes. Nature, Vol. XXXVII., p. 70.

- \* '96. Note sur l'odontographie des Ganoidei-Chondrostei. Ann. Sci. Nat. Ser. 8, T. I., pp. 197-219, Pl. IV. and V.; Abstract, Congr. Zool. Leyden, pp. 320-322.

V.



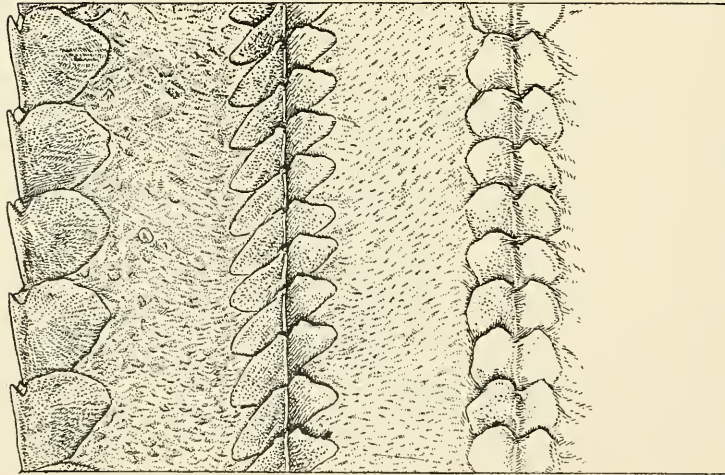
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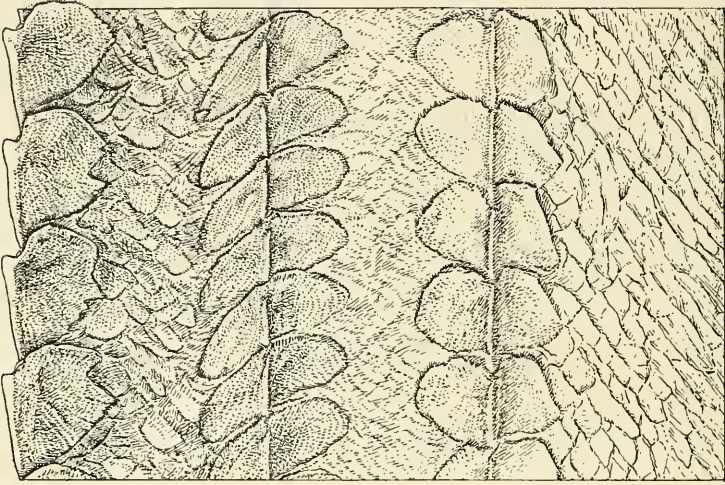
(1)

Ventral view of head of (1) *Parascaphirhynchus albus* and (2) *Scaphirhynchus platorhynchus* Two thirds natural size.

VI.



(1)

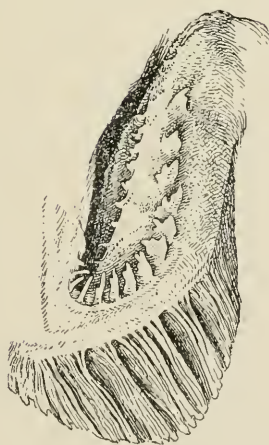


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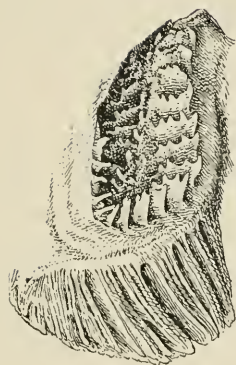
Section of dermal armor of side and belly of (1) *Parascaphirhynchus albus* and (2) *Scaphirhynchus platorhynchus*. Five sixths natural size.



VII.



(1)



(2)

Gill-rakers of right outer arch of (1) *Parascaphirhynchus albus* and (2) *Scaphirhynchus platorhynchus*. Natural size.