DESCRIPTION OF A NEW FISH FROM ALASKA (ANARRHICHAS LEPTURUS), WITH NOTES UPON OTHER SPECIES OF THE GENUS ANARRHICHAS.

By TARLETON H. BEAN.

The United States National Museum has received from Mr. Lucien M. Turner a species of *Anarrhichas*, which I at first hoped would prove to be the *orientalis* of Pallas.* It differs, however, widely from the description of that species, and does not correspond with any other known to me.

Two specimens of the Alaskan *Anarrhichas* were secured at St. Michael's in 1876. These are the first and only representatives of the genus from the Pacific in the Museum collection.

One of them, No. 21509, is 600 millimetres long; the other, No. 21510, is 495 millimetres. The lengths to the origin of the middle caudal rays are 555 and 455 respectively, and with these all the other measurements are compared.

DESCRIPTION.—The greatest height of the body (.20) is contained 5 times in the unit of length, and equals the distance of the dorsal from the end of the snout (.20). Its height at the pectorals (.17½) is contained 3 times in the distance of the anal from the snout (.52½). The least height of the tail (.04½) is contained twice in the length of the middle caudal rays (.09).

The greatest length of the head (.24) equals 1½ times its greatest height (.16), and is contained in the unit of length 4 times. The distance from the nostril to the anterior margin of the orbit (.015) is contained 3 times in the distance between the eyes (.045). The greatest width of the head (.11) is a little less than half its length, and is contained 9 times in the unit of length. The width of the interorbital area (.045) is about equal to the length of the snout (.04–.045). The length of the upper jaw (.13) equals 3 times the width of the interorbital area, and a little more than one-half of the length of the head. The maxillary extends to the perpendicular through the middle of the length of the head, the angle of the mouth being equally distant from the end of the snout and the end of the opercular flap.

The length of the mandible (.145) nearly equals that of the pectoral (.15), and is contained 7 times in the unit of length. The mandible extends to a point about equally distant from the end of the snout and the origin of the dorsal. There are four large canines in the upper jaw and five in the lower, all of them strongly recurved. Behind the canines in each jaw are a few short, sharp, conical teeth, also recurved. The palatines are in two rows, 4 teeth in the outer and 5 in the inner series. The teeth of the outer series are much the longer. Vomerine teeth ten, in two series. The vomerine patch begins in advance of the palatines, and

*Zoög. Rosso-Asiatica, iii, 1831, p. 77.

extends farther back than the latter. The length of the palatine series is to that of the vomerine as 16 to 27.

The distance from the snout to the orbit (.05–.055) is contained nearly or quite 4 times in that from the snout to the origin of the dorsal. The long diameter of the eye (.035) equals one-seventh, or slightly more than one-seventh, of the length of the head, and not quite one-fourth of the length of the lower jaw.

The distance between the end of the snout and the origin of the dorsal (.20) is contained 5 times in the unit of length, and equals twice the length of the longest dorsal ray (.10).

The distance of the anal from the snout (.52) equals 3 times the height of the body at the pectorals. The length of the first anal ray (.035) equals the long diameter of the eye (.035). The longest anal ray (.05–.055) equals a little less than half of the width of the body, and less than one-fourth of the length of the head. The vent is about midway between the end of the snout and that of the dorsal, and under the 25th to the 27th dorsal rays.

The length of the middle caudal rays (.085) is contained twice in the height of the body at the pectorals, and equals twice the least height of the tail. The caudal is rounded.

The distance of the pectoral from the snout (.23) is contained $4\frac{1}{3}$ times in the unit of length, and the length of the pectoral (.15) is contained $6\frac{2}{3}$ times. The extended pectoral reaches to the perpendicular through the origin of the 16th dorsal ray.

Radial formula: D. 81; A. 50–53; C. 20–21; P. 21.

Scales: Head and fins scaleless. The median line of the body and the whole of the tail are covered with small widely-separated scales, resembling those of *Lota*, but not depressed.

Color: The prevailing color of the alcoholic specimens is dark brown, without bands and spots. The belly is light brown or gray, clouded with very dark brown.

Anarrhichas lepturus needs to be contrasted only with *A. orientalis* and *A. lupus*. It seems to me improbable that any species of *Anarrhichas* can be safely identified with *orientalis*. The description of that species is certainly insufficient, and may be erroneous. The total length, for example, is stated to be 2 feet 2 inches, English measure; the length of the head, 11 inches—a proportion which is without a parallel in the other species of the genus. Assuming that the length of the head is not correctly given, and that it bears the same proportion to the total length as that of *A. lepturus*, it still differs from the latter in (1) the absence of scales, (2) the situation of the nostril midway between the eye and the mouth, (3) its radial formula—D. 84; C. 17—(4) the presence of 6 canines in the upper jaw. We must, however, accept the description as it stands, for the measurements are evidently those intended by the author, in which event the length of the head alone will serve to distinguish *orientalis* from all other species.

A. lepturus is distinguished from *A. lupus* by (1) its uniform brown color, (2) its scanty squamation, (3) its slender tail, (4) its greater number of dorsal and anal rays. It resembles *A. lupus* in many respects, but differs from it as widely as *lupus* does from *latifrons*.

In the measurement tables which follow the hundredths of length are calculated from the total length without the caudal.

A key to the species of *Anarrhichas* is given. In this no reference is made to the *denticulatus* of Kröyer, because the slight descriptions which we have of this species do not serve to distinguish it from *latifrons*. The species known on the American coast as *A. latifrons* is evidently the *latifrons* of Steenstrup* & Collett,† and I cannot see that it differs from the *denticulatus* of Günther‡ or of Kröyer.§

Table of Measurements.

Species: *Anarrhichas lepturus.*

Current number of specimen	21510.		21509.	
Locality	St. Michael's, Alaska.		St. Michael's, Alaska.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length	495	.....	600	.....
Length to origin of middle caudal rays	455	.....	555	.....
Body:				
Greatest height	.....	20	.....	19
Greatest width	.....	13	.....	.....
Height at base of pectorals	.....	17½	.....	17
Least height of tail	.....	4½	.....	4
Head:				
Greatest length	.....	24½	.....	23
Distance from nostril to anterior margin of orbit	.....	1½	.....	1½
Greatest width	.....	12	.....	10½
Width of interorbital area	.....	4½	.....	4½
Length of snout	.....	4	.....	4½
Greatest height	.....	16	.....	15½
Length of upper jaw	.....	12½	.....	13½
Length of mandible	.....	14½	.....	14½
Distance from snout to orbit	.....	5	.....	5½
Diameter of orbit	.....	3½	.....	3½
Dorsal:				
Distance from snout	.....	20	.....	20
Greatest height	.....	6	.....	.....
Length of longest ray	.....	10	.....	.....
Anal:				
Distance from snout	.....	52½	.....	52
Length of first ray	.....	3½	.....	.....
Length of longest ray	.....	5½	.....	5
Caudal:				
Length of middle rays	.....	9	.....	8
Pectoral:				
Distance from snout	.....	23	.....	23½
Length	.....	15	.....	15
Dorsal	81	.....	81	.....
Anal	50	.....	53	.....
Caudal	21	.....	20	.....
Pectoral	21	.....	21	.....

*Noget om Slægten Sönlv &c., 1876, p. 43 (Vidensk. Medd. fra den naturhistoriske Forening i Kjöbenhavn, 1876, p. 201, tab. iii, figs. 3, 3′, & 3″).

†Chra. Vidensk.-Selsk. Forhandl. 1879, No. 1, p. 46, pl. ii, fig. 2.

‡Cat. Fish. Brit. Mus. iii, 1861, p. 211.

§Gaimard, Voy. en Scand. etc., Zool., Poiss., pl. xii, fig. 1 (no description).

Table of Measurements—Continued.

Species: *Anarrhichas lupus.*

	23364 *a*.		23364 *b*.	
Current number of specimen				
Locality	Lat. 42° 50′ N. Lon. 65° 50′ W., 85 fth.		Lat. 42° 50′ N. Lon. 65° 50′ W., 85 fth.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length	107	.....	123½	.....
Length to origin of middle caudal rays	94	.....	109	.....
Body:				
Greatest height	19	20	22	20
Greatest width	12	12¾	13	12
Height at base of pectorals	19	20	22	20
Least height of tail	4	4¼	6	5½
Head:				
Greatest length	25	26½	28½	26
Greatest width	13	14	13½	12½
Width of interorbital area	5	5⅓	5	4.6
Length of snout	4	4¼	5	4.6
Teeth	(*)	.....	(*)	.....
Length of upper jaw	13	14	14	13
Length of mandible	14	15	15	14
Distance from snout to orbit	6½	7	6½	6
Long diameter of eye	8	8½	8	7⅓
Dorsal:				
Distance from snout	24	25½	24	22
Greatest height	6½	7	8	7⅓
Length of first ray	6	6⅜	7	6⅔
Length of longest ray	10	10⅝	12	11
Anal:				
Distance from snout	53	56⅜	59	54
Length of first ray	3¼	4	4	3⅔
Length of longest ray	6½	7	8	7⅓
Caudal:				
Length of middle rays	13	14	14⅓	13⅓
Pectoral:				
Distance from snout	24	25½	27	25
Length	17	18	19	17⅝
Branchiostegals	VII	.....	VII	.....
Dorsal	75	.....	75	.....
Anal	45	.....	46	.....
Caudal	21	.....	21	.....
Pectoral	19	.....	20	.....

* The vomerine series extends farther back than the palatines.

Table of Measurements—Continued.

Species: *Anarrhichas lupus.*

Current number of specimen	22249.		17419.		23005.		†14900.	
Locality	Ipswich Bay, Massachusetts.		Bergen, Norway.		Christiania Fjord, Norway. R. Collett.		Coxswain's Ledge, July 25, 1874.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length	380	.....	570	.....	639	.....	1110	.....
Length to origin of middle caudal rays	345	.....	522	.....	585	.....	1020	.....
Body:								
Greatest height	.....	19½	.....	19	.....	21½	.....	24½
Greatest width	.....	9½	.....	9	.....	.....	.....	10½
Height at base of pectorals	.....	18	.....	18	.....	19½	.....	21½
Least height of tail	.....	5	.....	5	.....	4½	.....	5
Head:								
Greatest length	.....	24	.....	23	.....	22½	.....	24½
Distance from nostril to anterior margin of orbit	.....	2	.....	2⅛	.....	2	.....	2
Greatest width	.....	13	.....	11⅓	.....	10	.....	11⅓
Width of interorbital area	.....	3⅛	.....	4½	.....	4⅛	.....	6
Length of snout	.....	4⅓	.....	5½	.....	4½	.....	5½
Greatest height	.....	17	.....	18	.....	19	.....	20⅓
Length of upper jaw ‡	.....	12	.....	11⅔	.....	10½	.....	12⅔
Length of mandible	.....	13	.....	12½	.....	12½	.....	14⅔
Distance from snout to orbit	.....	6½	.....	7	.....	6⅝	.....	6½
Long diameter of eye	.....	5	.....	3⅜	.....	3⅜	.....	3
Dorsal:								
Distance from snout	.....	22	.....	21	.....	19½	.....	21
Greatest height	.....	6⅓	.....	.....	.....	7	.....	.....
Length of longest ray	.....	10	.....	12	.....	10½	.....	12⅓
Anal:								
Distance from snout	.....	50	.....	50	.....	49½	.....	52
Length of first ray	.....	5	.....	.....	.....	3	.....	4⅔
Length of longest ray	.....	7	.....	7½	.....	5⅝	.....	6
Height at last ray	.....	.....	.....	.....	.....	3½	.....	.....
Caudal:								
Length of middle rays	.....	10	.....	9⅔	.....	9⅓	.....	9
Length of external rays	.....	.....	.....	.....	.....	8½	.....	8¼
Pectoral:								
Distance from snout	.....	23½	.....	22½	.....	22	.....	*22
Length	.....	15	.....	15	.....	14⅜	.....	14⅔
Branchiostegals	.....	.....	.....	.....	VI	.....	.....	.....
Dorsal	74	.....	73	.....	74	.....	72	.....
Anal	46	.....	47	.....	48	.....	44	.....
Caudal	20	.....	20	.....	20	.....	.....	.....
Pectoral	20	.....	20	.....	20	.....	21	.....

* The pectoral extends to the 14th dorsal ray.
† These measurements are taken from a cast.
‡ In No. 17419 the vomerine teeth extend farther back than the palatine.

Table of Measurements—Continued.

Species: *Anarrhichas latifrons*, Stp.

Current number of specimen	Collett's measurements, Chra. Vid.-Selsk. Forh. 1879, No. 1, p. 51.		21845.	
Locality	Öxfjord, West Finmark.		Banquereau.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length	656	.....	1108	.....
Length to origin of middle caudal rays	608	.....	1048	.....
Body:				
Greatest height	145	23.85	255	24.33
Greatest width	.....	.....	97	9.25
Distance of anus from snout	318	.....	.....	.....
Height at anal origin	130	21.38	239	23
Least height of tail	21	3.45	44	4.19
Head:				
Greatest length	120	19.74	192	18.32
Greatest width	78	12.83	116	11.05
Width of interorbital area	29	4.78	57	5.44
Length of snout	34	5.59	68	6.49
Length of postorbital part of head	75	.....	.....	.....
Length of upper jaw*	57	9.37	101	9.64
Length of mandible	.....	.....	111	10.59
Distance from snout to centre of orbit	44	7.24	85	8.11
Diameter of eye	20	3.29	27	2.58
Dorsal:				
Distance from snout	116	19.08	205	19.56
Length of base	.....	.....	875	.....
Length of first ray	.....	.....	22	2.10
Length of longest ray (63d)	.....	.....	68	6.49
Anal:				
Distance from snout	.....	.....	590	56.30
Length of base	.....	.....	455	.....
Length of first ray	.....	.....	20	1.91
Length of longest ray (38th)	.....	.....	52	4.96
Caudal:				
Length of middle rays	48	7.89	60	5.73
Length of external rays	.....	.....	53	5.06
Pectoral:				
Distance from snout	136	22.37	220	21
Length	75	12.34	126	12.02
Dorsal	77	.....	*ca.* 77	.....
Anal	45	.....	46	.....
Caudal	18	.....	17	.....
Pectoral	22	.....	20	.....

*The palatine series of teeth in No. 21845 extends much farther back than the vomerine and is nearly or quite twice as long as the latter.

KEY TO THE SPECIES OF THE GENUS *Anarrhichas*.

A. Banded species.

b. Bluish gray, with 9–12 darker cross-bands. Vomerine teeth extend farther back than the palatine ..... LUPUS.

bb. Greenish, with 14 deep green cross-bands; operculum having a green or blue spot; head, back, and sides above mingled bluish and red. Height of body contained about $5\frac{2}{3}$ times in its length ..... FASCIATUS.

A A. Species without bands.

c. Spotted (in life).

d. Many large, round, black spots. Vomerine teeth extend nearly or quite as far back as the palatine ..... MINOR.

dd. Brown, obscurely spotted with darker. Vomerine teeth do not extend nearly so far back as the palatine.....LATIFRONS.*

cc. Unicolored.

e. Brown; D. 84; C. 17; scales none; nostril midway between eye and mouth; head contained 2½ (!) times in total length; 6 canines in upper jaw.....ORIENTALIS.

ee. Dark brown; vomerine series longer than palatine, and extends farther back; D. 81; C. 20–21; scales few; nostril nearer eye than mouth; head contained 4½–4¾ times in total length; 4 canines in upper jaw.....LEPTURUS.

A partial synonymy of the species is appended:

1. Anarrhichas lupus Linné.

Anarrhichas lupus LINNÉ, Syst. Nat., I, 1766, p. 430: DEKAY, Nat. Hist. N. Y., Fishes, 1842, p. 158, pl. xvi, fig. 43.

Anarrhichas vomerinus STORER, Hist. Fish. Mass., 1867, p. 99, pl. xviii, fig. 1.

2. Anarrhichas minor Olafsen.

Anarrhichas minor OLAFSEN, Reise i Island, 1772, § 683*b*, p. 592, tab. 42.

Anarrhichas pantherinus ZUIEW, Nov. Act. Petrop., 1781, p. 271, tab. *b*.

Anarrhichas leopardus AGASSIZ in SPIX, Pisc. Bras., 1829, p. 92, tab. li.

3. Anarrhichas orientalis Pallas.

Anarrhichas orientalis PALLAS, Zoog. Rosso-Asiat., 1831, p. 77, tab. xi.

4. Anarrhichas latifrons Steenstrup & Hallgrimsson.

Anarrhichas latifrons STP. & HALLGR., Förh. Skand. Naturf, 3die Möte, 1842, p. 647: COLLETT, Chra. Vid. Selsk. Forh., 1879, No. 1, p. 46, pl. ii.

Anarrhichas (*Lycichthys*) *latifrons* GILL, Baird's Ann. Rec. S. & I. for 1876 (1877), p. clxvii.

? *Anarrhichas denticulatus* KRÖYER, Overs. Vidensk. Selsk. Kjöbenhavn, 1844, p. 140: GAIMARD, Voy. en Scand., etc., Zool., Poiss., 1845, pl. 12.

5. Anarrhichas fasciatus Bleeker.

Anarrhichas fasciatus BLKR., Nederlandsch Tijdschrift voor de Dierkunde, Amsterdam, Deel iv, 1874, p. 151.

U. S. NATIONAL MUSEUM, *October* 25, 1879.

NOTES ON CERTAIN TYPICAL SPECIMENS OF AMERICAN FISHES IN THE BRITISH MUSEUM AND IN THE MUSEUM D'HISTOIRE NATURELLE AT PARIS.

By DAVID S. JORDAN, M. D.

In a recent visit to Europe the writer has had the privilege of examining the original types of certain species of American fishes, described

**Anarrhichas latifrons* and *A. denticulatus* are made the type of a distinct subgenus by Professor Gill, who proposes to separate these from the *lupus* type by the following characters: The greater convexity and longitudinal arching of the skull at the posterior frontal region, and the much greater extension backwards of the palatine series of teeth as compared with the vomerine band. Examination of the large collection of the three Atlantic species of *Anarrhichas* in the National Museum has convinced me that these characters have not the taxonomic value claimed for them, *owing to their great variability in individuals.* The figures published by Steenstrup (Vid. Medd. naturh. For. Kjob., 1876, tab. iii) represent extremes of *A. minor* and *A. latifrons*, which, without access to many examples of both species, would be misleading. *A. minor*, for instance, sometimes has the vomerine band of teeth extending little farther back than is observed in *A. latifrons*. The dentition of *A. latifrons*, too, is subject to considerable variation with age, as is the shape of the skull. *A. minor* seems to show closer affinity to *A. latifrons* than to *A. lupus*.