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The scientific publications of the National Museum include two series, known, respectively, as *Proceedings* and *Bulletin*.

The *Proceedings*, begun in 1878, are intended primarily as a medium for the publication of original papers, based on the collections of the National Museum, that set forth newly acquired facts in biology, anthropology, and geology, with descriptions of new forms and revisions of limited groups. Copies of each paper, in pamphlet form, are distributed as published to libraries and scientific organizations and to specialists and others interested in the different subjects.

The dates at which these separate papers are published are recorded in the table of contents of each of the volumes.

The present volume is the ninety-fourth of this series.

The *Bulletin*, the first of which was issued in 1875, consists of a series of separate publications comprising monographs of large zoological groups and other general systematic treatises (occasionally in several volumes), faunal works, reports of expeditions, catalogs of type specimens, special collections, and other material of similar nature. The majority of the volumes are octavo in size, but a quarto size has been adopted in a few instances in which large plates were regarded as indispensable. In the *Bulletin* series appear volumes under the heading *Contributions from the United States National Herbarium*, in octavo form, published by the National Museum since 1902, which contain papers relating to the botanical collections of the Museum.

ALEXANDER WETMORE,
Acting Secretary, Smithsonian Institution.



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¹ Date of publication.

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CATALOG OF HUMAN CRANIA IN THE UNITED STATES NATIONAL MUSEUM COLLECTIONS: NON-ESKIMO PEOPLE OF THE NORTHWEST COAST, ALASKA, AND SIBERIA

By ALEŠ HRDLIČKA*

INTRODUCTION

THE present catalog of crania is the seventh and concluding part of a work describing the large and valuable collections of human skulls in the United States National Museum. Its object, as that of all the previous parts, is to furnish American and other students of man with reliable, detailed measurements, made by the same experienced observer, using tested methods and standard instruments, as the basis of future studies and the solution of anthropological problems.

The data given herein are supplemented by those obtained by me in various Russian institutions, principally the anthropological museums at Leningrad and Moscow and the City Museum at Irkutsk. They extend to the Indian and other non-Eskimo populations of the Northwest Coast of North America, Alaska (including Kodiak Island and the Aleutian Islands), and Siberia.

The extension of the catalog to the Siberian materials grew gradually in urgency, for as the work progressed evidence pointed more and more to northern Asia as the source of the original American Indian population. Since it was of prime importance that the data be collected and collated by the same observer and by the same methods as those for the North American skulls, I made a trip to the Soviet Union, including Siberia, in 1939. All possible facilities and aid were accorded

*Dr. Hrdlička died on September 5, 1943, a few days after galley proofs of this paper were received from the printer.—EDITOR.

me by the Russian scientists, and as a result I was able to examine a considerable number of Siberian crania from all periods of occupation. In view of the importance of some of this material, particularly that from the neolithic and more modern periods, the gist of the observations, with some details, was published in the *American Journal of Physical Anthropology* (vol. 29, pp. 435-481, 1942); but the detailed measurements of all except the prehistoric specimens were reserved for the present publication. Meanwhile there was published also the final catalog of the Eskimo crania (*Proc. U. S. Nat. Mus.*, vol. 91, pp. 169-429, 1942).

It was once hoped that this series of catalogs might be extended also to cranial materials from Mexico, Central America, the Antilles, and South America, but except for Peru the collections from these regions are still scarce, much of these vast territories being entirely unrepresented. For the present, therefore, nothing systematic covering these areas is feasible.

It may be useful to show the field covered by the six previous catalogs. These were as follows:

1. The Eskimo, Alaska and Related Indians, Northeastern Asiatics: *Proc. U. S. Nat. Mus.*, vol. 63, art. 12, 51 pp., 1924. (Long out of print and wholly replaced by the 1942 catalog on the Eskimo in general and by the present number.)

2. The Algonkin and Related Iroquois, Siouan, Caddoan, Salish and Sahaptin, Shoshonean, and Californian Indians: *Ibid.*, vol. 69, art. 5, 127 pp., 1927.

3. Australians, Tasmanians, South African Bushmen, Hottentots, and Negro: *Ibid.*, vol. 71, art. 24, 140 pp., 1928.

4. Pueblos, Southeastern Utah Basket-makers, Navaho: *Ibid.*, vol. 78, art. 2, 95 pp., 1931.

5. Indians of the Gulf States: *Ibid.*, vol. 87, pp. 315-464, 1940.

6. Eskimo in General: *Ibid.*, vol. 91, pp. 169-429, 1942.

Meanwhile, since 1926, important collections were gathered in Alaska and the neighboring parts of the Northwest Coast on the Indian and other non-Eskimo groups of the region. These included materials from two hitherto unknown large groups, the Pre-Koniag of Kodiak Island and the Pre-Aleuts of the Aleutian Archipelago. The detailed measurements of the crania of all these are given in the present catalog. This includes, therefore, data on the crania from the following localities:

- | | |
|--------------------------|-----------------------------------|
| 1. The Northwest Coast. | 7. Kodiak Island (Koniag). |
| 2. Southeastern Alaska. | 8. Kodiak Island (Pre-Koniag). |
| 3. Southwestern Alaska. | 9. Aleutian Islands (Aleut). |
| 4. The Yukon. | 10. Aleutian Islands (Pre-Aleut). |
| 5. Shageluk Slough. | 11. Siberia. |
| 6. The Alaska Peninsula. | |

The methods of measurement were outlined in the 1942 catalog on the Eskimo in general, and comparisons as well as other details are given in the same catalog and also in two papers now in press.¹ The present data will require, therefore, but little discussion. This will be found at the conclusion of this paper.

¹ "Anthropology of Kodiak Island" and "Anthropology of the Aleutian and Commander Islands," Wistar Institute, Philadelphia.

NORTHWEST COAST INDIANS: MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium. (glabella and maxium)	Diam. lateral maxium.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Irdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
XVI-A-6	Nat. Mus. Canada.	Lytton	50		18.3	14.0		79.5							
XVI-A-83	do.	Spencers Bridge	80		17.5	14.0	13.3	89.0	84.44		14.93				
99-1185	A.M.N.H.	Lytton	60		18.2	14.6		86.2							
99-1067	do.	do.	60		18.1	14.6	14.3	86.7	87.46		15.07				7.7
XVI-A-13	Nat. Mus. Canada.	50 miles above Prince Rupert.	65		17.6	14.2	12.9	86.7	81.13		14.90				
99-1567	do.	Port Hammond	55		17.7	14.4	13.0	81.4	81.0		15.03				
99-4308	do.	Thompson River	65		17.5	14.3	13.6	81.7	85.53		15.13				
XVI-A-15	Nat. Mus. Canada.	Spencers Bridge	60		17.6	14.4	13.2	81.8	82.50		15.07				7.8
XVI-A-20	do.	do.	80		18.0	14.8	12.8	82.2	78.05		15.20				
XVI-A-10	do.	Lytton	55		17.4	14.5	13.4	85.3	84.01		15.10				7.3
XVI-A-68	do.	Kamloops	35		17.2	14.6	14.0	84.9	88.05		15.27				
Specimens			(11)		(11)	(11)	(9)	(11)	(9)		(9)				(3)
Totals			615		185.1	158.4	120.5	81.19	83.57		136.3				22.8
Averages			55.9		17.74	14.40	13.39				15.14				7.60
Minima			30		17.2	14.0	12.8	76.5	78.1		14.90				
Maxima			80		18.3	14.8	14.3	84.9	88.1		15.67				

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{a}{b} \times 100\right)$	Facial Index, upper $\left(\frac{c}{b} \times 100\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxim.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—Index	Lower Jaw—Height at Symphysis
XVI-A-6	14.4					10.0			3.5		3.8		92.11								
XVI-A-83						10.6	88.0	47.5	3.55		4.15		85.54		5.1	2.6	50.98				
99-1185	14.3		53.85	10.7	9.0	10.0			3.85	3.9	4.1	4.05	93.90	96.30	5.1	2.55	50.0				
99-1057	14.9				9.1	10.3															
XVI-A-13						10.4	88.0	57.0	3.5	3.5	4.0	3.9	87.50	89.74	4.8	2.3	47.92				4.0
99-1567	14.3				9.2	10.4			3.35	3.3	3.7	3.65	90.54	90.41	5.65	2.2	58.94				3.5
99-4308	14.3		54.55	10.4	9.4	10.4															
XVI-A-15	14.3				9.4	10.4			3.5		4.1		85.87		5.3	2.6	49.06				
XVI-A-20	14.3				8.8	10.3	73.0	55.5													
XVI-A-10	13.5		54.07	9.8	8.8	10.2															
XVI-A-68						10.2															
Specimens	(6)		(3)	(3)	(5)	(9)	(3)	(3)	(6)	(3)	(6)	(3)	(6)	(3)	(5)	(5)	(5)	(2)	(2)	(2)	(2)
Totals	85.7			30.9	45.5	92.6	209.0	160.0	21.25	10.7	23.85	11.6	89.10	92.24	25.95	12.25	47.81	11.2	12.7	88.2	7.5
Averages	14.28		54.16	10.30	9.10	10.29	69.7	63.3	3.57	3.97	3.87	3.87	85.87	88.91	4.8	2.2	48.91	5.60	6.35	88.2	3.75
Minima	13.5				8.8	10.0			3.35	3.7	3.7	3.65	85.87	88.91	4.8	2.2	48.91				
Maxima	14.9				9.4	10.6			3.85	4.15	4.15		93.90		5.65	2.6	50.98				

NORTHWEST COAST INDIANS: FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabella ad max.)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Monton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
XVI-A-11	Nat. Mus.	Lytton	40	-----	17.2	13.4	13.2	77.9	86.3	-----	14.60	-----	-----	-----	6.7
99-1082	Can.	do.	25	-----	17.3	13.5	13.1	78.0	85.1	-----	14.63	-----	-----	-----	6.9
99-1307	A.M.N.H.	Thompson River	22	-----	17.4	13.6	13.5	78.2	87.1	-----	14.83	-----	-----	11.2	-----
XVI-A-5	Nat. Mus.	Lytton	65	-----	17.3	13.8	12.6	79.8	81.0	-----	14.57	-----	-----	-----	-----
99-1923	Can.	do.	55	-----	16.6	13.4	12.9	80.7	80.0	-----	14.30	-----	-----	-----	-----
XVI-A-8	A.M.N.H.	do.	40	-----	17.2	13.9	13.0	80.8	83.6	-----	14.70	-----	-----	-----	7.4
XVI-B-11	Nat. Mus.	do.	24	-----	17.7	14.3	13.8	80.8	86.8	-----	15.27	-----	-----	-----	7.5
XVI-A-86	Can.	Haida	25	-----	16.8	13.7	12.1	81.5	79.3	-----	14.20	-----	-----	-----	6.5
99-98	do.	Spencers Bridge	35	-----	16.9	13.2	12.4	81.5	81.7	-----	13.93	-----	-----	9.9	7.0
XVI-A-16	A.M.N.H.	do.	55	-----	17.6	14.6	12.8	81.6	73.6	-----	15.10	-----	-----	-----	7.2
99-1313	N.M.C.	do.	30	-----	16.3	13.6	12.4	81.9	82.1	-----	14.20	-----	-----	11.7	7.1
XVI-A-7	A.M.N.H.	Thompson River	60	-----	10.7	13.7	13.2	82.0	86.6	-----	14.53	-----	-----	-----	7.1
XVI-A-3	Nat. Mus.	Lytton	60	-----	17.0	14.1	13.2	82.0	81.9	-----	14.77	-----	-----	-----	6.7
XVI-A-27	Can.	Kamboops	30	-----	16.8	14.0	12.3	83.3	77.0	-----	14.97	-----	-----	-----	6.7
XVI-A-69	do.	Spencers Bridge	60	-----	16.0	14.4	13.6	83.2	80.9	-----	14.97	-----	-----	-----	-----
XVI-A-14	do.	Kamboops	65	-----	16.6	14.4	12.2	85.7	78.7	-----	14.40	-----	-----	-----	-----
Specimens	(16)	Lillooet	701	-----	(16)	(16)	(16)	(16)	(16)	-----	(16)	-----	-----	(4)	(11)
Totals	701	-----	43.8	-----	272.2	221.6	206.3	81.4	83.6	-----	233.37	-----	-----	41.8	73.8
Averages	43.8	-----	17.01	-----	13.85	12.89	12.89	81.4	83.6	-----	14.59	-----	-----	11.20	6.89
Minima	22	-----	16.2	-----	13.2	12.1	12.1	77.9	73.7	-----	13.93	-----	-----	3.9	6.2
Maxima	65	-----	17.9	-----	14.6	14.6	13.8	86.7	87.1	-----	15.27	-----	-----	12.0	7.3

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{c}{ax100}\right)$	Facial Index, upper $\left(\frac{c}{bx100}\right)$	Basion-Alveolar Pt.	Basion Subnasal Pt.	Basion-Nasion	Facial angle	Alveolar angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index	Lower Jaw—Height at Symphysis
XVI-A-11	12.8		52.3	10.1	9.2	10.0	71.0	61.5	3.55	3.55	3.75	3.75	3.9	91.0	4.6	2.25	48.9	5.3	6.0	88.3	
99-1062																					
99-4307	13.0	86.2	53.1	10.1	8.8	9.9	71.0	55.0	3.55	3.75	3.75	3.75	3.75	100.0	4.7	2.2	47.8	5.5	6.6	83.3	3.4
XVI-A-5	13.2				8.7	9.9			3.45		3.75				4.9	2.1	42.9				
99-1223																					
XVI-A-8	12.8		57.8	10.0	8.6	9.7	66.0	45.5	3.5	3.5	3.6	3.5	3.5	100.0	5.4	2.55	47.2	5.5	6.1	90.2	
XVI-B-11	13.5	88.9	53.6	10.4	8.8	9.8	69.0	45.5	3.95	3.95	4.0	4.0	4.0	98.7	5.05	2.45	48.5	5.7	6.8	83.8	
XVI-A-86	12.9		50.4	9.5	8.6	9.5	70.0	58.0	3.55	3.5	3.7	3.6	3.55	90.9	4.6	2.4	46.2	5.0	6.0	83.3	
99-98	12.4	79.8	50.4	9.3	8.2	9.5	72.0	46.0	3.25	3.2	3.6	3.5	3.6	90.1	4.7	2.35	50.0	4.9	5.8	84.5	2.7
XVI-A-16	13.5		51.9	10.4	9.2	10.2	68.5	49.0	3.3	3.3	3.95	3.85	3.85	85.7	5.1	2.65	52.0	5.9	6.4	82.2	2.7
99-4313	13.3	88.0	53.1	10.2	8.0	9.6	65.0	49.0	3.3	3.3	3.8	3.7	3.7	86.8	5.0	2.45	49.0	5.3	6.2	85.6	
XVI-A-7	12.5		50.3	10.2	8.0	9.7	63.0	50.0	3.6	3.55	3.85	3.55	3.55	92.6	5.1	2.3	45.1	5.6	6.4	87.6	3.7
XVI-A-3	13.7		48.9	9.8	8.0	10.0	71.5	53.0	3.45	3.5	4.1	4.0	4.0	84.2	4.95	2.35	47.5	5.2	5.9	88.1	
XVI-A-27	13.5		49.9	9.8	8.0	9.4	66.0	47.5	3.45	3.45	3.8	3.75	3.75	90.8	4.85	2.35	50.3	5.2	6.2	83.9	
XVI-A-69	13.5				7.8	10.0			3.8	3.7	4.05	3.85	3.85	93.8	5.3	2.3	43.1	5.2	6.0	86.7	
XVI-A-14					7.8	9.2			3.5	3.6	3.8	3.6	3.6	92.1	5.2	2.75	52.0	5.4	6.2	87.1	
Spectrums	(13)	(4)	(11)	(11)	(14)	(16)	(11)	(11)	(13)	(13)	(13)	(13)	(13)	(13)	(14)	(14)	(14)	(13)	(13)	(13)	(3)
Totals	170.6		109.8	121.8	136.0	136.0	733.0	500.0	43.65	45.85	49.75	40.0	40.0	97.8	69.45	33.55	48.3	62.7	80.6	86.6	9.80
Averages	13.12		85.8	9.98	8.70	9.75	68.6	50.9	3.51	3.53	3.83	3.77	3.77	93.6	4.96	2.40	47.9	5.36	6.20	86.9	3.27
Minima	12.4		79.8	9.3	7.8	9.2	63.0	45.0	3.25	3.2	3.6	3.5	3.5	83.6	4.6	2.1	42.9	4.9	5.8	83.2	
Maxima	13.7		57.8	10.4	9.2	10.2	72.0	61.5	3.95	3.95	4.1	4.0	4.0	98.7	5.4	2.75	52.9	5.7	6.8	92.5	

1 Allowance made for wear of teeth, where needed.

SOUTHEAST ALASKA INDIANS: MALES
(Dall and Pennoek Islands)

TLINGIT

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium (gabella ad maximum)	Diam. lateral maxium.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c.c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
379170	(Julian Steward) U. S. N. M.	Boys' Bay (Dall Island).	40	.....	18.9	15.0	14.1	79.57	83.19	.....	16.00	.....	.....	13.4	8.0
379172	do.	do.	24	.....	19.0	15.2	13.8	80.0	80.70	.....	16.00	.....	.....	12.5	7.4
379165	do.	do.	30	.....	18.7	15.2	13.8	81.28	81.42	.....	15.90	.....	.....	12.0	7.5
379168	do.	Pennoek Island.	35	.....	18.8	15.5	13.8	82.45	80.47	.....	16.03	.....	.....	12.7	7.7
379167	do.	do.	30	.....	17.9	14.8	14.2	82.68	86.85	.....	15.63	.....	.....	12.7	7.9
379165	do.	do.	55	.....	17.8	15.1	13.5	84.83	82.07	.....	15.47	.....	.....	12.3	7.4
Specimens.			(6)		(6)	(6)	(6)	(6)	(6)		(6)			(5)	(6)
Totals.....			234		11.1	90.80	83.2	.....	82.42		95.03			62.90	45.90
Averages.....			39.0		18.52	15.13	13.87	81.73	82.42		15.81			12.58	7.65
Minimum.....			24		17.8	14.8	13.5	79.4	80.5		15.47			12.0	7.4
Maximum.....			55		19.0	15.5	14.2	84.8	86.8		16.03			13.4	8.0

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth, max- im.	Nasal Index	Upper Alveolar Arch— Length, maxim.	Upper Alveolar Arch— Breadth, maxim.	Upper Alveolar Arch— Length, maxim.	Upper Alveolar Arch— Breadth, maxim.	Lower Jaw—Height at Symphysis
379170	15.1	88.74	62.98	11.1	9.6	11.2	68.5	59.5	3.5	3.6	4.4	4.3	79.55	83.76	5.1	5.1	63.67	4.9	7.2	5.7	7.2	83.52
379172	14.9	83.89	49.66	10.7	9.6	10.4	77.0	56.0	3.6	3.55	4.1	4.0	95.37	93.75	5.05	2.8	65.45	0	7.2	5.7	7.2	79.17
379166	15.4	77.92	48.70	10.5	9.4	10.8	71.5	57.0	3.6	3.6	4.0	3.9	90.91	90.81	5.15	2.5	48.54	6.6	6.7	5.6	6.7	83.58
379168	15.2	86.39	60.66	9.8	8.7	10.2	69.5	57.0	3.8	3.8	4.3	4.2	83.37	90.78	5.15	2.65	47.46	6.8	6.8	5.6	6.8	82.32
379167	14.7	81.46	63.74	10.5	9.0	10.2	68.0	59.0	3.8	3.75	4.1	4.0	92.68	93.72	5.4	2.4	44.41	5.7	6.4	5.7	6.4	89.09
379165	15.1	81.46	69.01	10.5	9.5	10.2	67.0	54.5	3.25	3.2	4.0	3.9	81.23	82.09	5.45	2.75	63.46	6.8	6.8	5.7	6.8	83.82
Specimens	(6)	(9)	(6)	(9)	(9)	(9)	(9)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)
Totals	90.4	83.64	60.77	10.43	9.35	10.50	68.58	56.58	3.58	3.58	4.15	4.05	86.14	88.48	5.22	2.60	49.84	3.72	6.85	3.72	6.85	82.46
Averages	15.07	77.9	48.7	9.8	8.7	10.2	67.0	54.5	3.25	3.2	4.0	3.9	79.6	82.1	5.05	2.4	44.4	3.6	6.4	3.6	6.4	73.2
Minima	14.7	88.7	63.7	11.1	9.9	11.2	71.5	52.0	3.8	3.8	4.4	4.3	92.7	93.8	5.45	2.8	55.4	9.0	7.2	9.0	7.2	82.1
Maxima	15.4																					

¹ Near.
² Allowance made for wear of teeth.

SOUTHEAST ALASKA INDIANS: FEMALES
(Dall Island)

TLINGIT

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabella ad max.)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Alveol. Pt.-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)							
379173	U.S.N.M.	Bobs Bay	20		17.8	14.6	13.4	82.02	82.72		15.27											
379171	do.	do.	50		17.2	14.3	13.5	83.14	85.71		15.00				7.4							
Catalog No.	Diam. Bizygomatic max. (c)	Facial Index, total	Facial Index, upper	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits-Height, right	Orbits-Height, left	Orbits-Breadth, right	Orbits-Breadth, left	Orbital Index, right	Orbital Index, left	Nose-Height	Nose-Breadth max.	Nasal Index	Upper Alveolar Arch-Length, max.	Upper Alveolar Arch-Breadth, max.	Upper Alveolar Arch-Index	Lower Jaw-Height at Symphysis	
379173	14.0	88.57	62.80	10.6	9.2	10.0	61.5	51.5	3.7	3.7	4.0	3.9	92.60	94.87	4.8	2.8	58.33	5.7	6.7	85.07		
379171																						

¹ Near.

² Allowance made for wear of teeth.

SOUTHEAST ALASKA INDIANS: MALES

HAIDA

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabella ad maximum)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlička's method)	Teeth, wear	Menton-Nasion Height (a) ¹	Alveol. Pt.-Nasion Height (b)
304053	U. S. N. M.	Queen Charlotte Islands.	Adult.		17.7	14.4	13.6	81.4	84.7		15.23	1,400		12.4	7.7
304052	do.	do.	do.		17.8	15.4	13.2	86.5	79.5		15.47	1,600		12.0	7.0

TLINGIT

300898	U. S. N. M.	Admiralty Island	Adult.		18.2	14.1	14.6	77.5	90.4		15.63	1,630		12.9	8.0
242885	do.	Southeast Alaska	do.		18.8	14.6	12.6	77.7	75.4		15.33	1,590		12.4	8.0
228795	do.	do.	55		19.0	14.9	13.9	78.4	82.0		15.93	1,505		12.4	7.1
304095	do.	Admiralty Island	Adult.		18.8	14.8	13.8	78.7	82.1		15.80	1,620		12.1	7.8
300896	do.	Prince of Wales Island.	do.		18.3	14.4	13.3	78.7	81.4		15.33	1,450		12.1	7.7
242048	do.	Near Sitka	do.		19.3	15.2	14.6	78.8	84.6		16.37	1,580		12.8	8.0
243986	do.	Southeast Alaska	do.		18.2	14.4	12.2	79.1	74.8		14.93	1,410		10.4	6.6
273205	do.	Near Wrangell	28		18.8	14.9	14.6	79.8	86.6		16.10	1,590		13.3	7.9
242952	do.	Southeast Alaska	Adult.		17.8	14.2	13.4	79.8	83.8		15.13	1,590		11.6	7.4
242904	do.	Near Sitka	Adult.		18.8	15.0	13.6	79.8	80.5		15.80	1,725		12.9	7.9
225255	do.	Wrangell	do.		18.8	15.1	12.9	80.3	76.6		15.60	1,610		12.8	7.8
300894	do.	Heceta Island, near Prince of Wales Island.	do.		18.7	15.4	14.2	82.4	83.3		16.10	1,580		12.8	7.8
Specimens				(12)	(12)	(12)	(12)	(12)	(12)		(12)	(12)		(9)	(11)
Totals				223.5	177.0	163.7					188.1	18,820		111.2	84.2
Averages				18.63	14.75	13.64		79.2	81.7		15.67	1,568		12.86	7.65
Minima				17.8	13.4	12.2		77.5	74.8		14.93	1,410		10.4	6.6
Maxima				19.3	15.4	14.6		82.4	90.4		16.37	1,725		12.9	8.0

¹ Allowance made for wear of teeth, where needed.

SOUTHEAST ALASKA INDIANS: MALES—Continued

HAIDA

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total	Facial Index, upper	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Lower Jaw—Height at Symphysis
304053	13.4	92.5	57.5	10.2	9.2	10.1	67.0	57.0	3.7	3.8	3.85	3.85	96.1	93.7	5.6	2.6	49.7	5.3	6.8	3.4
304052	14.5	82.8	43.3	10.0	9.2	10.4	73.0	59.0	3.65	3.65	4.25	4.25	89.9	89.9	5.3	2.9	67.7	5.4	6.7	3.7

TLINGIT

	(12)	(9)	(11)	(12)	(12)	(12)	(11)	(11)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(11)	(10)	(4)
300698	13.8	69.5	59.0	10.3	9.2	10.2	69.5	57.0	3.6	3.75	4.0	3.9	90.0	86.1	5.6	2.3	41.1	5.7	6.6	3.6
242855	14.7	---	64.4	10.8	9.3	10.2	61.0	50.0	3.4	3.55	4.1	3.9	83.9	80.1	4.25	2.45	47.1	5.1	7.0	---
228795	14.6	---	46.0	10.5	9.3	10.4	69.0	54.0	3.4	3.4	4.1	4.1	83.9	83.9	4.85	2.7	47.7	5.1	7.1	---
304055	15.3	---	61.0	10.0	9.1	10.0	67.5	61.5	3.6	3.6	4.2	4.1	85.7	87.8	4.4	2.5	46.5	5.5	6.8	---
300896	13.5	87.0	57.0	10.1	8.8	9.8	65.0	50.0	3.8	3.9	3.8	3.9	92.7	94.9	3.4	2.7	50.0	5.6	(3.8)	---
242948	14.9	89.6	53.7	10.8	10.0	11.3	72.0	64.0	3.5	3.7	3.8	3.9	92.1	93.9	3.7	2.5	43.9	3.9	6.8	---
243886	14.4	72.2	45.8	10.1	9.1	10.0	70.0	47.0	3.6	3.55	4.1	4.1	87.8	86.6	3.15	2.9	56.3	4.4	6.2	---
273205	14.4	85.9	54.9	10.3	9.4	10.5	69.0	62.5	3.75	3.8	4.2	4.1	89.3	92.7	3.4	2.25	41.7	3.7	6.8	3.5
242932	13.6	86.3	54.4	9.4	8.4	9.4	67.0	56.5	3.55	3.7	3.9	3.9	91.0	94.9	5.3	2.4	45.3	3.3	6.2	---
242901	14.9	86.6	53.0	10.7	9.3	10.4	66.0	50.5	3.65	3.6	4.4	4.2	83.0	80.5	5.6	2.9	47.7	5.6	7.1	---
225255	14.4	---	62.7	10.2	8.9	9.7	70.0	52.0	3.6	3.55	4.0	4.0	90.0	87.8	5.2	2.7	51.9	5.4	7.1	---
300694	14.8	---	---	10.4	9.2	10.7	---	---	3.55	3.6	4.15	4.1	85.5	83.8	5.7	3.0	52.6	---	---	---
Specimens	(12)	(9)	(11)	(12)	(12)	(12)	(11)	(11)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(11)	(10)	(4)
Totals	173.3	---	123.6	109.9	122.6	122.6	746.0	605.0	43.0	43.9	49.05	48.25	---	---	61.4	31.3	---	61.8	67.3	14.4
Averages	14.44	---	85.8	10.30	9.16	10.22	67.8	55.0	3.58	3.66	4.09	4.02	87.7	91.0	5.37	2.61	48.6	5.62	6.73	3.60
Minima	13.5	---	72.2	9.4	8.4	9.4	64.0	47.0	3.4	3.4	3.8	3.9	82.9	82.9	4.85	2.25	41.1	5.3	6.2	3.5
Maxima	15.3	---	93.6	10.8	10.0	11.3	72.0	64.0	3.8	3.9	4.4	4.2	92.7	93.7	5.7	3.0	56.3	6.1	7.1	3.7

SOUTHEAST ALASKA INDIANS: FEMALES

HAIDA

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium (Glabella ad maxium)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdlička's method)	Teeth, wear	Menton-Nasion Height (a) 1	Alveol. Pt.-Nasion Height (b)
304051	U.S.N.M.	Queen Charlotte Islands.	Adult.	.....	17.4	14.2	13.0	81.6	82.3	.....	14.87	1,240	.....	.....	7.0
304054	do.	do.	do.	.....	16.8	13.8	12.8	82.1	83.7	.....	14.47	1,130	.....	.....	6.8

TLINGIT

369465	U.S.N.M.	Near Wrangell.	45	.....	18.0	14.2	13.1	78.9	81.4	.....	15.10	.....	.....	11.9	7.2
242929	do.	Southeast Alaska.	Adult	.....	18.4	14.6	13.2	79.7	89.0	.....	15.40	.....	.....	.....	7.3
300865	do.	Admiralty Islands.	do.	.....	18.0	14.3	12.9	79.7	79.9	.....	15.07	1,310	.....	11.4	6.9
242899	do.	Southeast Alaska	do.	.....	17.0	13.9	13.2	81.8	85.0	.....	14.70	1,370	.....	.....	6.4
3486	State Mus.	Island northwest of Sitka.	do.	.....	17.4	14.4	13.0	82.8	81.8	.....	14.33	.....	.....	.....	7.1
300897	Seattle, U.S.N.M.	Prince of Wales Island	do.	.....	17.4	14.4	12.1	82.8	76.1	.....	14.63	1,450	.....	11.7	7.3
329755	do.	do.	35	.....	16.8	14.2	12.7	84.5	81.7	.....	14.57	.....	.....	10.7	6.5
369496	do.	Wrangell	60	.....	17.3	14.7	12.2	85.0	76.3	.....	14.73	.....	.....	12.2	7.1
329753	do.	Prince of Wales Island	25	.....	17.0	14.5	13.1	85.3	83.2	.....	14.87	.....	.....	11.1	6.7
Specimens	.....	.....	.....	.....	(9)	(9)	(9)	(9)	(9)	.....	(9)	(3)	.....	(6)	(9)
Totals	.....	.....	.....	.....	157.3	129.2	115.5	131.0	80.6	.....	131.0	4,130	.....	69.0	62.5
Averages	.....	.....	.....	.....	17.48	14.86	12.83	82.1	80.6	.....	14.89	1,377	.....	11.50	6.94
Minima	.....	.....	.....	.....	16.8	13.9	12.1	78.9	76.1	.....	14.57	.....	.....	10.7	6.4
Maxima	.....	.....	.....	.....	18.4	14.7	13.2	85.3	83.2	.....	15.40	.....	.....	12.2	7.3

1 Allowance made for wear of teeth, where needed.

SOUTHEAST ALASKA INDIANS: FEMALES—Continued

HAIDA

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{c}{a \times 100}\right)$	Facial Index, upper $\left(\frac{c}{b \times 100}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Ocular Index, right	Ocular Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index	Lower Jaw—Height at Symphysis
304051	13.3	---	52.6	9.1	8.2	9.6	72.0	60.0	3.3	3.4	4.0	3.4	82.5	89.5	4.7	2.3	48.9	4.8	6.2	77.4	---
304054	13.4	---	50.8	9.5	8.4	9.4	68.5	51.5	3.4	3.45	3.6	3.6	94.4	95.8	4.9	2.2	44.9	5.1	5.9	86.4	---

TLINGIT

369495	13.3	89.5	54.1	10.5	9.3	10.2	70.0	52.5	3.6	3.6	3.9	3.6	92.3	90.0	5.0	2.4	48.0	5.8	6.7	86.6	3.35	
242926	13.1	---	55.7	9.2	8.3	9.7	71.0	56.5	3.65	3.65	3.75	3.65	87.3	96.1	5.5	2.5	45.4	4.9	6.1	80.9	---	
300895	13.7	85.2	60.4	10.8	9.0	10.2	66.0	51.5	3.3	3.45	4.0	4.1	89.1	87.1	4.85	2.3	47.4	5.8	6.1	95.1	3.2	
242889	---	---	---	9.8	8.8	10.0	73.0	50.5	3.6	3.7	3.85	3.7	84.6	91.9	4.8	(2.0)	(60.1)	5.4	6.8	79.1	---	
3486	13.5	---	52.6	11.1	9.8	10.2	64.0	51.0	3.25	3.25	3.85	3.85	83.0	87.8	4.3	2.55	53.1	5.6	6.8	81.8	---	
300897	13.2	---	55.3	9.4	8.2	9.2	65.0	50.0	3.8	3.85	4.15	4.15	92.3	90.5	5.0	2.5	47.9	5.3	6.0	88.3	---	
329755	13.0	---	60.0	9.1	8.4	9.2	70.0	59.5	3.5	3.45	3.7	3.7	94.0	90.5	4.9	2.5	51.0	4.3	5.9	87.5	2.9	
369496	13.9	86.7	51.1	10.0	8.7	9.6	66.0	52.0	3.6	3.7	4.0	4.0	90.0	90.2	4.7	2.7	57.4	4.3	6.5	87.5	---	
329753	12.8	---	52.3	8.8	7.9	9.3	72.0	57.0	3.95	4.0	3.9	3.75	101.3	106.7	4.85	2.2	45.4	4.7	5.7	82.5	2.9	
Specimens	(8)	(6)	(8)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(8)	(8)	(9)	(9)	(9)	(9)	(5)
Totals	106.5	---	480.5	88.7	79.0	87.6	614.5	480.5	32.1	32.2	35.35	33.05	99.8	97.9	44.7	19.65	40.2	47.6	56.4	81.4	15.75	
Averages	13.25	---	52.7	9.86	8.78	9.73	68.3	53.4	3.58	3.58	3.93	3.89	90.8	91.9	4.97	2.46	49.2	5.29	6.27	79.4	3.15	
Minima	12.8	---	50.0	8.8	7.9	9.2	64.0	50.0	3.2	3.25	3.7	3.7	82.1	84.1	4.7	2.2	45.4	4.7	5.7	79.1	2.9	
Maxima	13.7	---	55.7	11.1	9.8	10.2	73.0	59.5	4.0	4.15	4.1	4.1	101.3	106.7	5.5	2.7	57.4	5.8	6.8	82.5	3.4	

SOUTH AND SOUTHWEST ALASKA INDIANS: MALES

COPPER RIVER

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabella ad maxim.)	Diam. lateral maxim.	Basion-Bregma Height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlička's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
379851.....	Dr. Chase.....	Near W. channel of Copper River.	55	-----	18.8	14.2	13.1	75.5	79.4	-----	15.37	-----	-----	12.7	7.8

CORDOVA

363604.....	(A.H.) U.S.N.M.....	Indian burials near Cordova.	40	-----	18.2	14.4	13.8	79.1	84.7	-----	15.47	-----	-----	12.7	7.5
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FRINCE WILLIAM SOUND ISLANDS

225040.....	U.S.N.M.....	Cordova region.....	55	-----	17.6	14.8	13.7	84.1	84.6	-----	15.37	1,525	-----	-----	-----
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KENAI PENINSULA

C-1.....	Nat. Mus. Can.	Kenai Peninsula.....	55	-----	18.0	14.8	14.0	82.2	85.4	-----	15.60	-----	-----	-----	7.9
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ILLIAMNA LAKE

363563.....	(A.H.) U.S.N.M.....	Knudsen Bay.....	60	-----	17.6	15.2	13.6	86.4	82.9	-----	15.47	-----	-----	12.2	7.2
Specimens			(5)		(5)	(5)	(5)	(6)	(5)		(5)			(5)	(4)
Totals			263		90.2	73.4	68.2				77.27			37.6	30.4
Averages			53.0		18.04	14.68	13.64	87.4	83.4		15.45			12.33	7.6

SOUTH AND SOUTHWEST ALASKA INDIANS: MALES—Continued

COPPER RIVER

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{c}{a} \times 100\right)$	Facial Index, upper $\left(\frac{c}{e} \times 100\right)$	Basion-Alveolar Pl.	Basion-Subnasal Pl.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Upper Alveolar Arch—	Lower Jaw—Height at Symphysis		
379354.....	13.5	94.1	67.8	10.8	9.2	10.0	62.0	48.0	3.4	(3.1)	3.85	3.9	88.3	(80.8)	5.45	2.8	51.4	5.8	6.2	93.5	3.7

CORDOVA

363604.....	14.5	87.6	51.7	9.7	8.8	10.0	70.0	60.5	3.75	3.8	3.9	3.9	95.2	97.4	5.2	2.25	43.3	5.3	6.5	81.6	3.8
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PRINCE WILLIAM SOUND ISLANDS

229040.....	15.0	-----	-----	-----	8.8	10.0	-----	-----	3.4	3.4	4.0	3.85	85.0	88.3	5.2	2.6	50.0	-----	-----	-----	-----	-----
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KENAI PENINSULA

C-1.....	14.2	-----	55.6	10.6	9.3	10.3	66.0	54.0	4.0	4.1	4.0	4.05	100.0	101.2	5.35	2.55	47.7	5.7	6.7	85.1	-----
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ILLIAMNA LAKE

363593.....	14.3	85.3	60.4	9.0	8.4	9.8	69.5	49.5	3.8	3.9	4.45	4.4	87.4	88.6	5.2	2.8	53.8	5.2	6.2	83.9	3.5
Specimens	(5)	(3)	(4)	(4)	(5)	(5)	(4)	(4)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(4)	(4)	(3)
Totals	71.5	-----	-----	40.7	41.5	50.1	237.5	212.0	18.35	18.3	20.2	20.1	293.4	293.4	22.0	25.6	220	22.0	25.6	11.0	
Averages	14.3	82.09	53.8	10.18	8.9	10.02	66.9	53.0	3.67	3.66	4.04	4.02	99.84	91.04	5.28	2.6	49.2	5.5	6.4	85.97	3.67

SOUTH AND SOUTHWEST ALASKA INDIANS: FEMALES
PRINCE WILLIAM SOUND ISLANDS

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabella ad maximum)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. (Hrdlička's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
339757	U.S.N.M.	Cordova region	60	---	17.8	14.9	12.2	85.71	74.62	---	14.57	---	---	7.4	7.4
339756	do	do	55	---	16.8	14.2	12.1	84.52	74.01	---	14.37	---	---	---	7.6

ILLIAMNA LAKE

203596	(A. I.) U.S.N.M.	Knudsen Bay	24	---	16.1	13.6	12.0	84.5	80.8	---	13.90	---	---	10.9	6.7
303594	do	do	35	---	16.9	14.4	12.2	86.2	78.5	---	14.43	---	---	12.1	7.4
Specimens	(4)				(4)	(4)	(4)	(4)	(4)		(4)			(2)	(4)
Totals	174				67.6	57.1	48.5	57.7	57.7		57.7			23.0	20.1
Averages	43.5				16.90	14.28	12.13	84.5	77.8		14.43			11.50	7.27

PRINCE WILLIAM SOUND ISLANDS

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total	Facial Index, upper	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxim.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—Synphysis	Lower Jaw—Height at
339757	13.0	---	56.9	10.2	9.1	9.8	65.0	58.0	3.6	3.65	3.8	3.9	94.7	93.6	4.8	2.85	59.4	5.0	9.9	76.0	---
339756	13.4	---	56.7	9.2	7.9	9.4	67.0	51.0	3.6	3.6	4.0	3.8	91.5	94.7	5.3	1.3	42.4	3.1	6.2	52.5	---

SOUTH AND SOUTHWEST ALASKA INDIANS: FEMALES—Continued

ILLIAMNA LAKE

363596.....	12.3	88.6	57.5	8.8	7.9	8.8	8.8	67.5	55.0	3.4	3.5	3.6	3.55	94.4	98.6	4.85	2.2	45.4	5.0	6.3	79.4	3.0
363594.....	12.9	93.8	57.4	9.1	8.3	8.3	9.1	56.0	61.5	3.35	3.25	3.55	3.55	94.4	91.6	5.05	2.45	48.6	5.2	6.7	77.6	3.7
Specimens.....	(4)	(2)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(2)
Totals.....	51.6	37.3	33.2	37.1	33.2	37.1	37.1	265.5	14.0	11.0	14.05	14.8	14.8	93.6	94.6	5.0	9.8	20.3	20.3	25.7	79.0	6.7
Averages.....	12.90	91.3	56.4	9.27	8.30	8.30	9.27	66.4	56.4	3.50	3.50	3.74	3.70	93.6	94.6	5.0	2.15	49.0	5.08	6.43	79.0	3.35

YUKON INDIANS: MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxym. (glabella ad maxym.)	Diam. lateral maxym.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pl.-Nasion Height (b)
345344.....	(A, H)	Above Greyling River	35		18.6	14.8	13.8	79.57	82.62		15.73		Slight	12.5	7.7
345335.....	U. S. N. M.	Near Holy Cross River	50		19.0	14.8	14.2	77.89	84.02		16.0		Medium	12.0	7.6
345314.....	do.	Ghost Creek	55		17.7	14.0	13.2	79.10	83.88		14.97		Medium to pronounced	13.3	7.5
345293.....	do.	do.	50		18.6	14.1	14.3	75.81	87.46		15.67		Medium	13.9	8.4
34574 (small).....	do.	do.	50		17.4	13.3	13.4	76.43	87.30		14.70		do.	11.6	7.1
345345.....	do.	Kozhircovski	55		18.3	13.6	13.5	74.93	84.64		15.13		do.	12.8	7.2
345346.....	do.	do.	50		17.8	13.6	13.7	76.40	87.26		15.03		Moderate	12.8	7.9
345223.....	do.	do.	60		18.7	14.0	13.2	74.87	80.52		15.30		Marked	12.9	7.3
345233.....	do.	do.	60		18.4	14.0	13.0	76.09	83.65		15.33		do.	12.8	7.7
345731.....	do.	do.	60		18.4	14.0	13.0	76.09	83.65		15.33		do.	12.8	7.7
363910 (probably Indian).....	do.	Above Russian Mission.	45		19.1	14.5	14.4	73.92	83.71		16.0		Moderate	13.9	8.2
Specimens.....			(10)		(10)	(10)	(10)	(10)	(10)		(10)			(10)	(10)
Totals.....			500		183.6	140.7	137.3	76.63	84.67		133.87			128.5	76.6
Averages.....			50		17.4	13.3	13.3	76.63	84.67		13.39			12.85	7.60
Minima.....			35		17.4	13.3	13.2	74.32	80.73		14.70			11.6	7.1
Maxima.....			60		19.1	14.8	14.4	79.67	87.46		16.0			13.9	8.4

Catalog No.	Diam. Bizygomatic	Facial Index, total	Facial Index, upper	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—	Lower Jaw—Height at Symphysis	
345344	14.4	81.68	62.49	10.5	9.2	10.0	64.0	55.0	3.3	3.4	3.85	3.8	85.71	89.47	5.15	2.3	44.69	5.8	6.5	89.23	3.9	
345345	14.8	81.08	61.95	10.3	9.2	10.5	70.0	54.0	3.5	3.6	3.9	3.9	89.74	92.51	5.5	2.6	47.27	5.7	7.1	80.23	3.8	
345346	13.8	96.88	61.95	9.5	8.4	9.8	69.0	55.0	3.7	4.15	4.05	4.05	85.54	91.96	5.2	2.5	48.08	5.1	6.3	80.96	4.1	
345347	13.3	97.90	58.71	10.4	9.2	10.4	66.0	57.0	3.5	3.65	3.9	3.9	89.74	93.69	5.55	2.65	47.75	5.7	6.8	83.82	4.8	
345348	13.7	88.55	61.90	9.9	8.9	10.0	70.0	57.5	3.3	3.3	4.1	4.0	80.49	82.60	5.0	2.55	51.0	5.1	6.0	82.99	3.6	
345349	12.7	109.8	56.60	10.2	8.8	10.0	68.0	45.0	3.4	3.5	3.85	3.95	88.31	88.61	5.2	2.4	46.15	5.6	6.6	84.85	4.0	
345350	14.0	91.89	56.73	10.5	9.4	10.6	68.5	56.5	3.5	3.6	3.9	3.8	89.74	94.74	5.55	2.5	45.05	5.8	6.7	86.67	3.9	
345351	14.1	91.49	57.77	9.8	8.6	9.9	68.5	54.0	3.65	3.65	4.1	4.0	89.02	91.25	4.95	2.5	50.51	5.6	7.1	78.87	4.5	
345352	14.2	90.14	54.93	10.3	8.8	10.3	69.0	51.5	3.65	3.65	4.1	4.1	89.02	89.02	5.35	2.6	48.60	5.6	6.5	86.15	3.7	
345353	13.7	101.5	53.85	10.2	9.0	10.2	66.0	55.0	3.65	3.65	4.2	4.2	86.90	86.90	5.65	2.35	41.59	5.6	7.5	86.15	4.1	
345390 (probably Indian)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
Specimens	139.1	89.86	55.07	10.14	8.96	10.17	67.9	50.5	35.0	35.7	40.05	39.7	87.59	89.92	5.31	2.50	46.99	55.6	66.1	84.11	40.4	
Totals	13.91	87.08	57.35	9.5	8.4	9.8	64.0	45.0	3.3	3.3	3.85	3.8	80.19	82.50	4.95	2.3	41.69	5.1	6.0	78.87	3.6	
Averages	12.7	101.5	59.85	10.5	9.4	10.6	70.0	57.5	3.65	3.7	4.2	4.2	89.74	94.74	5.65	2.65	51.0	5.8	7.1	89.23	4.8	
Minima	14.8																					
Maxima																						

1 Allowance made for wear of teeth, where needed.

2 Near.

YUKON INDIANS: FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (labella ad maxim.)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean <i>Height Index</i>	<i>Height-Breadth Index</i>	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a) ¹	Alveol. Pt.-Nasion Height (b)
345289	(A. H.)	Near Greyling River.	25		17.4	14.2	13.0	81.61	82.98		14.87		Very slight	11.3	6.8
345291	U.S.N.M.	Near Holy Cross	25		17.6	14.2	13.4	80.68	84.28		15.07		do	12.0	7.5
345716	do	do	50		17.6	13.5	12.0	76.70	77.17		14.37		Medium	11.9	7.0
345319	do	do	50		16.4	13.2	12.2	80.49	82.43		13.93		do	11.2	6.8
345312	do	Ghost Creek	35		16.9	12.8	12.2	75.74	82.15		13.97		Slight	11.9	7.3
345391	do	do	25		17.1	13.0	13.8	76.02	91.69		14.63		Very slight	11.2	7.0
345352	do	do	55		17.1	13.7	13.4	80.12	87.01		14.73		Medium to considerable	11.2	7.0
351349	do	Kozherevski	55		17.3	13.4	12.9	77.46	84.04		14.53		Considerable	12.8	7.5
Specimens			(8)		(8)	(8)	(8)	(8)	(8)		(8)			(7)	(7)
Totals			320		137.4	108.0	102.9				116.1			82.3	49.0
Averages			40		17.18	13.50	12.86	78.60	83.86		14.51			11.76	7.13
Minima			25		16.4	12.8	12.0	75.74	77.17		13.93			11.2	6.8
Maxima			55		17.6	14.2	13.8	81.61	91.69		15.07			12.8	7.5

KOBUK RIVER

300216	U.S.N.M.	Shungnak Village	50		17.3	13.4	13.5	77.5	87.9		14.73			11.9	7.1
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Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index $\left(\frac{a}{b \times 100}\right)$ total	Facial Index $\left(\frac{b}{c \times 100}\right)$ upper	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxim.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—Index	Lower Jaw—Height at Symphysis
345389	81	88.98	69.18	9.3	8.0	9.3	69.0	48.5	3.35	3.35	3.8	3.7	88.16	90.54	4.75	2.35	49.47	5.1	6.1	83.61	3.45
345391	121	92.81	67.69	10.1	9.2	10.2	68.5	60.5	3.7	3.65	3.8	3.7	97.37	98.65	5.3	2.45	46.23	5.3	6.1	86.89	3.4
345716	13.4	88.81	64.24	9.9	8.5	9.8	68.5	51.0	3.4	3.45	3.8	3.7	89.47	93.24	5.0	2.4	48.0	5.2	6.1	85.25	3.7
345719	12.2	91.80	66.74	9.8	8.7	9.6	68.0	52.0	3.35	3.35	3.75	3.75	89.53	89.33	4.9	2.3	46.94	5.2	6.2	83.87	3.45
345312	12.8	92.97	67.03	9.2	8.0	9.0	64.5	53.0	3.65	3.65	3.8	3.7	96.05	98.66	4.9	2.3	46.94	5.2	5.9	88.14	3.75
345391	13.0	86.16	65.85	10.3	9.2	10.2	68.5	52.0	3.5	3.4	3.9	3.75	89.74	90.67	5.0	2.4	48.0	5.6	7.3	76.71	3.45
345392	13.1	98.46	67.69	9.9	8.4	9.4	64.0	49.5	3.7	3.6	3.95	3.85	93.67	93.61	4.95	2.35	47.47	5.7	6.5	87.69	3.2
351349	13.0	98.46	67.69	9.9	8.4	9.4	64.0	49.5	3.4	3.4	4.3	4.1	79.07	82.93	5.25	2.6	49.52	5.7	6.5	87.69	3.8
Specimens	(S)	(7)	(7)	(7)	(8)	(8)	(7)	(7)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(7)	(7)	(7)	(S)
Totals	103.3	91.24	65.92	9.79	8.61	9.61	67.3	52.4	3.51	3.48	3.89	3.78	90.19	92.07	5.01	2.39	47.82	37.3	44.2	84.99	28.2
Averages	12.91	86.15	62.24	9.2	8.0	9.0	64.0	48.5	3.35	3.35	3.75	3.7	79.07	82.63	4.75	2.3	46.23	5.33	6.31	76.71	3.52
Minima	12.2	86.15	62.24	9.2	8.0	9.0	64.0	48.5	3.35	3.35	3.75	3.7	79.07	82.63	4.75	2.3	46.23	5.1	5.9	76.71	3.2
Maxima	13.4	98.46	67.69	10.3	9.2	10.2	69.0	60.5	3.7	3.65	4.3	4.1	97.37	98.66	5.3	2.6	49.52	5.7	7.3	88.14	3.8

KOBUK RIVER

300210	13.4	88.5	53.0	9.2	7.8	9.6	71.0	48.5	3.3	3.3	3.9	3.75	84.6	83.0	4.9	2.6	53.1	5.5	6.4	85.9	3.9
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1 Allowance made for wear of teeth, where needed.
2 Near.

SHAGELUK (YUKON) INDIANS: MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabelle ad maximum)	Diam. lateral max. (Basion-Bregma height)	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlička's method)	Teeth, wear	Men-ton-Nasion Height (a) 1	Alveol. Pt.-Nasion Height (b)
345378	(A. H.) U. S. N. M.	Refuge Creek above Greyling River.	55	-----	18.6	13.2	14.1	70.97	88.68	15.30	-----	Considerable	12.2	7.3
345369	do.	Near Shageluk	60	-----	18.3	13.1	13.8	71.58	87.90	15.07	-----	do.	12.8	7.9
345356	do.	do.	60	-----	18.3	13.0	14.8	75.17	91.96	15.73	-----	do.	13.4	8.3
345371	do.	Holokachakat	40	-----	18.6	14.0	13.0	75.97	79.75	15.20	-----	Slight	13.6	8.0
345379	do.	Near Shageluk	60	-----	18.3	13.8	13.6	76.41	84.74	15.23	-----	Considerable	12.6	7.6
Specimens			(5)	-----	(5)	(5)	(5)	(5)	(5)	(5)	-----	-----	(5)	(5)
Totals			275	-----	92.30	68.00	63.30	78.67	86.76	76.53	-----	-----	64.60	39.10
Averages			55	-----	18.46	13.60	13.86	75.67	86.76	13.81	-----	-----	12.92	7.82
Minima			40	-----	18.3	13.1	13.0	70.97	79.75	13.07	-----	-----	12.2	7.3
Maxima			60	-----	18.6	14.0	14.8	76.41	91.96	13.73	-----	-----	13.6	8.3

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxim.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—	Lower Jaw—Height at Symphysis	
345378	13.9	87.77	62.62	10.2	9.0	10.5	71.5	51.0	3.7	3.8	4.2	4.0	88.10	95.0	5.35	2.5	46.73	5.4	6.4	84.88	3.7	
345369	13.4	95.52	68.96	10.3	9.3	10.4	68.0	58.0	3.6	3.8	4.1	4.1	87.80	92.68	5.65	2.5	44.25	-----	-----	-----	4.0	
345356	13.8	87.10	60.14	-----	9.0	10.4	-----	-----	3.45	3.6	4.15	4.05	83.15	88.89	5.45	2.9	52.21	-----	-----	-----	4.1	
345371	13.7	89.27	68.39	10.5	9.0	10.0	64.0	52.0	3.25	3.3	3.65	3.6	89.04	91.67	5.15	2.05	59.81	-----	-----	-----	4.25	
345379	13.7	91.97	55.47	10.3	9.2	10.4	69.5	57.0	3.65	3.8	4.3	4.1	84.88	92.68	5.2	2.4	46.15	5.5	6.5	81.62	3.9	
Spectaculus	(5)	(5)	(5)	(4)	(5)	(5)	(4)	(4)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(3)	(3)	(3)	(5)	(5)
Totals	68.50	-----	-----	41.30	45.50	51.70	273.0	218.0	17.65	18.30	20.40	19.85	86.52	92.19	26.8	12.35	16.08	16.80	19.10	87.97	19.95	
Averages	13.70	94.51	57.08	10.33	9.10	10.34	68.25	54.50	3.53	3.66	4.04	3.97	83.13	88.89	5.36	2.47	56.08	5.00	6.37	84.88	3.99	
Minima	13.4	87.77	52.52	10.2	9.0	10.0	64.0	51.0	3.25	3.3	3.65	3.6	83.13	88.89	5.15	2.05	59.81	5.4	6.2	81.62	3.7	
Maxima	13.9	99.27	60.14	10.5	9.3	10.5	71.5	58.0	3.7	3.8	4.3	4.1	89.04	95.0	5.65	2.9	53.21	5.9	6.5	95.16	4.25	

* Near.

¹ Allowance made for wear of teeth, where needed.

SHAGELUK (YUKON) INDIANS: FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxm. (gabella ad maxm.)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
345364	U.S.N.M.	Near Shageluk	60	.....	17.6	12.8	13.4	72.72	88.16	.....	14.60	.....	Considerable	12.9	7.6
345380	do.	do.	35	.....	18.2	13.3	13.5	73.08	85.77	.....	15.0	.....	Moderate	12.2	7.7
345361	do.	do.	20	.....	18.1	13.4	13.4	74.03	85.08	.....	14.97	.....	.....	11.6	7.1
345382 (large)	do.	do.	65	.....	18.4	13.7	14.1	74.46	89.72	.....	15.50	.....	Considerable	12.3	7.0
345383	do.	do.	45	.....	17.6	13.2	12.8	75.0	83.12	.....	14.53	.....	Medium to considerable	13.0	8.1
345359	do.	Holokachak	20	.....	17.4	13.2	12.7	75.86	80.89	.....	14.43	.....	.....	12.1	7.6
345363	do.	Near Shageluk	28	.....	17.3	13.2	12.4	76.20	87.37	.....	14.30	.....	Slight	11.8	7.3
345366 (massive)	do.	do.	50	.....	18.4	14.1	13.8	76.63	84.93	.....	15.43	.....	Medium	12.4	7.3
345360	do.	do.	35	.....	17.2	13.2	13.6	76.74	89.47	.....	14.67	.....	Slight	11.4	7.1
345353	do.	do.	65	.....	17.4	13.4	13.4	77.01	87.01	.....	14.73	.....	Considerable	12.5	7.5
345370	do.	Near Greyling River (Refuge Creek)	50	.....	17.3	13.3	13.0	77.23	85.25	.....	14.50	.....	Medium	12.5	7.5
345377	do.	Near Shageluk	55	.....	17.6	13.7	13.2	77.84	84.87	.....	14.83	.....	Medium to considerable	13.0	7.6
345381	do.	do.	30	.....	16.8	13.6	12.6	80.95	82.89	.....	14.33	.....	Slight	13.1	8.1
Specimens			(13)	.....	13	13	13	13	13	.....	13	.....	.....	(12)	(13)
Totals			558	.....	229.3	174.10	172.2	.....	.....	.....	191.82	.....	.....	148.9	98.9
Averages			42.9	.....	17.64	13.39	13.25	75.62	85.37	.....	14.76	.....	.....	12.41	7.45
Minima			20	.....	16.8	12.8	12.4	72.73	80.89	.....	14.30	.....	.....	11.4	6.9
Maxima			65	.....	18.4	14.1	14.4	80.95	89.72	.....	15.50	.....	.....	13.6	8.1

Catalog No.	Diam. Blyzomatic maxm. (c)	Facial Index, total $\left(\frac{c}{a} \times 100\right)$	Facial Index, $\frac{c}{b}$ per cent	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxm.	Nasal Index	Upper Alveolar Arch—Length maxm.	Upper Alveolar Arch—Breadth maxm.	Upper Alveolar Arch—	Lower Jaw—Height at Symphysis
345364	12.9	100.0	58.91	10.1	6.7	64.5	45.5	3.8	3.9	4.1	3.8	3.8	92.68	95.12	5.4	2.6	48.15	6.2	86.71	3.6	
345365	12.9	94.57	59.69	10.2	10.4	69.0	54.5	3.7	3.75	4.0	3.95	3.95	92.50	94.04	5.3	2.4	45.28	6.4	85.94	3.45	
345366	12.9	92.67	59.17	9.6	8.8	71.0	62.0	3.4	3.5	3.7	3.6	3.6	91.89	97.22	5.0	2.2	44.0	5.1	86.44	3.25	
345367	12.9	93.55	57.56	9.9	9.0	74.0	58.0	3.3	3.55	4.1	3.9	3.9	89.49	89.74	5.1	2.6	50.98	6.5	83.68	3.9	
345368 (large)	13.3	102.30	60.90	10.2	8.6	64.0	48.5	3.8	3.55	4.1	3.8	3.8	92.68	93.42	5.35	2.3	42.99	6.4	89.06	4.1	
345369	13.3	93.50	58.91	9.1	8.4	63.0	55.5	3.75	3.8	3.8	3.75	3.8	98.68	101.9	5.3	2.2	41.51	6.5	80.0	3.45	
345370	12.5	94.49	58.40	10.1	8.0	66.5	51.5	3.45	3.45	3.9	3.8	3.8	87.18	90.79	5.1	2.4	47.06	6.0	91.67	3.45	
345371	13.5	91.55	54.07	9.8	10.1	71.0	58.0	3.45	3.5	4.2	4.0	4.0	82.14	87.50	5.0	2.5	50.0	6.6	86.80	3.75	
345372	13.5	84.44	52.59	9.7	10.3	71.0	52.0	3.3	3.5	3.55	3.85	3.85	83.54	90.91	5.15	2.4	47.06	6.2	88.71	3.45	
345373	13.0	65.08	53.08	9.4	9.4	68.5	60.0	3.0	3.5	3.8	3.05	3.05	88.80	88.61	5.2	2.3	44.23	6.5	81.63	3.5	
345374	13.0	100.0	60.0	9.4	8.5	66.0	60.0	3.0	3.6	3.8	3.8	3.8	88.80	88.61	5.2	2.4	47.06	6.1	88.52	3.85	
345375	13.0	100.0	58.46	9.4	8.4	66.0	58.46	3.0	3.6	3.8	3.8	3.8	94.74	94.74	5.2	2.4	47.15	6.7	80.60	3.7	
345376	12.8	102.3	63.23	9.3	8.0	64.5	53.5	3.8	3.9	3.9	3.9	3.9	97.44	102.6	5.3	2.3	41.82	6.6	80.50	3.9	
Specimens.....	(13)	(12)	(13)	(12)	(13)	(12)	(12)	(12)	(13)	(12)	(13)	(13)	(12)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
Totals.....	167.7	117.0	128.2	112.6	125.2	811.0	663.0	42.9	46.9	47.66	59.10	59.10	99.13	99.61	61.70	31.15	46.01	82.69	85.59	87.35	47.35
Averages.....	12.90	96.27	67.78	9.75	8.67	67.58	55.25	3.58	3.61	3.47	3.85	3.85	89.49	87.50	5.21	2.40	46.01	6.33	85.69	3.64	
Minima.....	12.0	84.44	52.59	9.3	8.0	63.0	45.5	3.3	3.45	3.7	3.6	3.6	80.49	87.50	5.0	2.2	41.51	5.9	80.0	3.25	
Maxima.....	13.5	102.3	69.99	10.2	9.0	74.0	62.0	3.8	3.9	4.1	4.1	4.1	98.68	102.6	5.5	2.6	50.98	6.7	91.67	4.1	

2 Near.

1 Allowance made for wear of teeth, where needed.

NORTHWEST CANADA INDIANS: MALES
(Dené)
TUKKUTHKUCHIN

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (gabella ad maxim.)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Men-tion-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
243446	U.S.N.M.	Fort McPherson, Peel River.	Adult		18.5	14.6	13.2	78.9	79.8		15.43	1,440		12.4	7.5
243448	do	do	do		19.1	15.3	13.3	80.1	77.3		15.90	1,550		12.4	7.5
HARES															
243986	do	Fort Good Hope	Adult		18.0	14.9	13.4	82.8	81.5		15.43	1,700		11.9	7.0
Specimens					(3)	(3)	(3)	(3)	(3)		(3)	(3)		(3)	(3)
Totals					55.6	44.8	39.9	46.77	46.90		46.77	4,690		36.7	22.0
Averages					18.53	14.03	13.30	80.6	79.5		15.59	1,563		12.23	7.33

TUKKUTHKUCHIN

Catalog No.	Diam. Bizygomatic maxm. (c)	Facial Index, total $\left(\frac{A \times 100}{c}\right)$	Facial Index, upper $\left(\frac{B \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxm.	Upper Alveolar Arch— Breadth maxm.	Upper Alveolar Arch— Index	Lower Jaw—Height at Symphysis
243440.....	15.3	81.0	49.0	10.4	9.3	10.3	68.0	54.5	3.45	3.5	4.1	4.05	87.1	86.7	5.4	2.4	44.4	6.2	7.0	88.6	4.2
243448.....	14.5	85.5	61.7	10.5	9.4	10.4	68.5	52.5	3.2	3.2	4.0	3.95	89.0	81.0	5.5	2.6	47.3	5.7	6.6	86.4	3.8

HARES

243996.....	14.4	82.6	48.6	10.3	9.3	9.9	67.0	52.5	3.25	3.2	4.1	4.05	79.9	79.0	5.2	2.45	47.1	5.7	6.9	82.6	3.65
Specimens.....	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Totals.....	44.2	83.0	49.8	31.2	28.0	30.6	203.5	159.5	9.9	9.9	12.2	12.05	81.1	82.2	16.1	7.45	45.3	17.6	20.5	83.0	11.65
Averages.....	14.73	83.0	49.8	10.40	9.33	10.20	67.8	53.2	3.30	3.30	4.07	4.02	81.1	82.2	5.37	2.48	45.3	5.87	6.83	83.9	3.88

NORTHWESTERN AND ALASKAN INDIAN CRANIA
(General Abstract)

Measurement	MALES						FEMALES					
	North-west coast	Southeast Alaska		South-west Alaska	Shageluk (Yukon) Indians	North-west Doné, Canada	North-west coast	Southeast Alaska		South-west Alaska	Yukon Indians	Shageluk (Yukon) Indians
		Haida	Tlingit					Haida	Tlingit			
Approximate mean age.....	{ 55.9 (11)	{ 17.75 (11)	{ 18.59 (18)	{ 53.0 (5)	{ 50.0 (10)	{ 55.0 (5)	{ 43.8 (16)	{ 17.10 (2)	{ 17.48 (11)	{ 43.5 (4)	{ 49.0 (8)	{ 42.9 (13)
Vault:												
Length.....	{ 17.74 (11)	{ 17.75 (2)	{ 18.59 (18)	{ 18.04 (6)	{ 18.36 (10)	{ 18.46 (5)	{ 17.01 (16)	{ 17.10 (2)	{ 17.48 (11)	{ 16.90 (4)	{ 17.18 (8)	{ 17.61 (13)
Breadth.....	{ 14.40 (9)	{ 14.90 (2)	{ 14.88 (18)	{ 14.68 (5)	{ 14.07 (10)	{ 13.60 (5)	{ 13.55 (16)	{ 14.0 (2)	{ 14.57 (11)	{ 14.28 (4)	{ 13.50 (8)	{ 13.39 (13)
Height.....	{ 13.39 (11)	{ 13.40 (2)	{ 13.72 (18)	{ 13.64 (5)	{ 13.73 (10)	{ 13.88 (5)	{ 12.50 (16)	{ 12.9 (2)	{ 12.95 (11)	{ 12.13 (4)	{ 12.86 (8)	{ 13.25 (13)
Cranial index.....	{ 81.2 (9)	{ 83.9 (2)	{ 80.0 (18)	{ 81.4 (5)	{ 76.6 (10)	{ 73.7 (5)	{ 81.1 (16)	{ 81.9 (2)	{ 82.2 (11)	{ 84.5 (4)	{ 78.6 (8)	{ 75.9 (13)
Mean height index.....	{ 83.6 (9)	{ 82.1 (2)	{ 82.0 (18)	{ 83.1 (5)	{ 84.7 (10)	{ 86.5 (5)	{ 83.6 (16)	{ 83.0 (2)	{ 81.3 (11)	{ 77.8 (4)	{ 83.0 (8)	{ 81.4 (13)
Module.....	{ 15.14 (9)	{ 15.35 (2)	{ 15.73 (18)	{ 15.45 (5)	{ 15.39 (10)	{ 15.31 (5)	{ 14.59 (16)	{ 14.67 (2)	{ 14.93 (11)	{ 14.43 (4)	{ 14.51 (8)	{ 14.76 (13)
Capacity.....	{ 1,500 (12)	{ 1,500 (2)	{ 1,568 (12)	{ 1,525 (1)	{ 1,539 (10)	{ 1,531 (5)	{ 1,559 (16)	{ 1,467 (2)	{ 1,493 (11)	{ 1,443 (4)	{ 1,451 (8)	{ 1,476 (13)
Face:												
Total height.....	{ 12.20 (3)	{ 12.44 (14)	{ 12.53 (14)	{ 12.92 (3)	{ 12.85 (10)	{ 12.92 (5)	{ 11.20 (4)	{ 11.85 (2)	{ 11.63 (7)	{ 11.50 (2)	{ 11.76 (7)	{ 12.41 (12)
Upper height.....	{ 7.60 (3)	{ 7.35 (17)	{ 7.63 (4)	{ 7.82 (10)	{ 7.66 (10)	{ 7.82 (5)	{ 6.99 (11)	{ 6.9 (2)	{ 6.99 (10)	{ 7.27 (4)	{ 7.13 (7)	{ 7.45 (13)
Maximum breadth.....	{ 14.28 (6)	{ 13.95 (2)	{ 14.65 (18)	{ 14.3 (5)	{ 13.91 (10)	{ 13.70 (5)	{ 14.73 (13)	{ 13.12 (2)	{ 13.39 (13)	{ 12.90 (1)	{ 12.91 (8)	{ 12.99 (12)
Facial index: Total.....	{ 87.5 (3)	{ 85.0 (14)	{ 85.0 (14)	{ 89.09 (4)	{ 89.9 (10)	{ 94.3 (5)	{ 83.0 (4)	{ 86.7 (2)	{ 86.7 (7)	{ 91.3 (2)	{ 91.2 (7)	{ 96.3 (12)
Facial index: Upper.....	{ 54.2 (3)	{ 52.7 (17)	{ 52.2 (4)	{ 55.1 (5)	{ 55.1 (10)	{ 57.1 (5)	{ 52.7 (11)	{ 51.7 (2)	{ 52.7 (9)	{ 56.4 (4)	{ 55.3 (7)	{ 57.8 (13)
Base, etc.:												
Endobasion-Prealveolar point.....	{ 10.30 (3)	{ 10.10 (18)	{ 10.31 (18)	{ 10.18 (4)	{ 10.14 (10)	{ 10.33 (5)	{ 9.98 (11)	{ 9.30 (2)	{ 9.93 (10)	{ 9.32 (4)	{ 9.79 (7)	{ 9.75 (12)
Endobasion-Subnasal point.....	{ 9.10 (5)	{ 9.20 (18)	{ 9.22 (5)	{ 8.9 (5)	{ 8.96 (10)	{ 9.10 (5)	{ 8.7 (14)	{ 8.30 (2)	{ 8.82 (10)	{ 8.30 (4)	{ 8.61 (8)	{ 8.67 (13)
Endobasion-Nasion.....	{ 10.29 (9)	{ 10.25 (18)	{ 10.31 (18)	{ 10.02 (5)	{ 10.17 (10)	{ 10.31 (5)	{ 9.75 (16)	{ 9.50 (2)	{ 9.76 (10)	{ 9.27 (1)	{ 9.61 (8)	{ 9.80 (13)
Facial angle.....	{ 69.7 (3)	{ 70.0 (17)	{ 68.9 (4)	{ 66.9 (4)	{ 67.9 (10)	{ 68.3 (5)	{ 63.6 (11)	{ 70.2 (2)	{ 67.90 (10)	{ 66.4 (4)	{ 67.3 (7)	{ 67.6 (12)
Alveolar angle.....	{ 53.3 (3)	{ 53.0 (17)	{ 55.56 (4)	{ 53.0 (4)	{ 54.1 (10)	{ 54.5 (5)	{ 50.9 (11)	{ 55.8 (2)	{ 53.20 (10)	{ 50.4 (4)	{ 52.4 (7)	{ 55.3 (13)

ALASKA PENINSULA: MALES
(Mixed Group: Eskimo-Koniag-Aleut)

Catalog No.	Collection	Locality	A. p. provi- mate acc of sub- ject	Deformation	Diam. antero-posterior maxim. (glabella ad maxim.)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
363559	(A. H.) U. S. N. M.	Kvichak River	65		18.7	14.2	12.8	75.94	77.81	---	15.23	---	---	12.7	7.3
363587	do	do	40		18.5	14.0	13.6	76.92	83.44	---	13.40	---	---	12.7	7.7
363582	do	Pawik, Naknok River	35		18.0	14.0	12.4	77.73	87.00	---	14.80	---	---	12.9	7.7
363578	do	do	60		17.5	13.8	13.4	78.89	87.02	---	14.90	---	---	---	---
363578	do	do	60		18.2	14.4	13.9	79.12	87.28	---	15.30	---	---	12.5	7.1
363589	do	Egegik	60		18.4	14.0	13.3	79.35	89.61	---	15.33	---	---	12.8	7.7
363568	do	Pawik	24		18.3	14.7	13.8	79.46	89.19	---	15.07	---	---	12.2	7.7
363548	do	Kvichak River	50		19.8	15.0	14.8	79.79	87.57	---	16.20	---	---	12.2	7.8
363562	do	do	21		17.8	14.2	13.7	79.79	85.69	---	15.23	---	---	11.6	7.1
363560	do	do	60		18.4	14.7	13.4	79.89	89.97	---	15.90	---	---	11.6	7.8
363589	do	do	60		17.4	14.1	12.7	81.09	89.63	---	14.73	---	---	13.3	7.8
363556	do	do	65		18.2	14.8	13.2	81.52	89.0	---	15.40	---	---	12.6	7.2
363557	do	do	45		17.6	14.4	13.8	81.82	83.25	---	15.27	---	---	13.0	8.1
363574	do	do	50		18.0	15.0	12.7	83.53	76.97	---	15.23	---	---	12.8	7.6
363502	do	Pawik	65		17.7	14.8	13.7	83.62	84.91	---	15.40	---	---	12.6	7.6
363522	do	Egegik	45		17.4	14.6	12.8	83.91	82.0	---	14.93	---	---	12.8	7.8
363579	do	Kvichak River	35		17.2	14.9	13.7	85.63	85.96	---	15.27	---	---	12.8	7.5
363577	do	do	35		17.5	15.2	13.3	83.86	81.55	---	15.33	---	---	12.8	8.6
363588	do	Egegik	65	Moderate lateral ocell- pial flattening.	17.8	15.4	14.6	---	---	---	15.93	---	---	14.5	8.6
Specimens			(19)		(18)	(18)	(18)	(18)	(18)	(18)	(19)			(18)	(18)
Totals			890		323.8	261.5	241.0	---	---	---	291.36	---	---	229.7	136.8
Averages			46.8		17.99	14.53	13.39	80.77	82.65	---	15.33	---	---	12.70	7.6
Minima			21		17.2	13.8	12.4	76.94	76.97	---	14.73	---	---	11.6	6.9
Maxima			65		18.8	15.2	14.8	86.86	87.67	---	16.20	---	---	14.5	8.6

Catalog No.	Diam. Bizygomatic		Facial Index, total		Facial Index, upper		Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right		Orbits—Height, left		Orbits—Breadth, right		Orbits—Breadth, left		Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxm.	Upper Alveolar Arch— Breadth maxm.	Upper Alveolar Arch— Index	Lower Jaw—Height at Symphysis
	(c)	(a)	(c)	(a)	(c)	(a)						(18)	(19)	(18)	(19)	(18)	(19)	(18)	(19)									
363559	13.1	96.96	55.73	91.91	10.0	71.5	55.0	3.8	4.1	4.0	92.68	95.0	5.5	2.45	44.65	4.9	6.3	77.78	3.35									
363587	14.8	85.81	52.03	82.51	10.0	66.0	44.5	3.5	4.0	3.8	87.50	92.11	5.55	2.5	45.05	5.7	7.2	79.17	3.7									
363582	13.8	93.48	65.83	93.48	10.3	63.5	52.5	3.6	4.0	4.0	90.0	90.0	5.2	2.2	42.31	5.5	6.6	83.33	3.9									
363570	13.6	91.91	62.21	91.91	9.8	69.5	54.5	3.65	4.0	3.8	90.0	92.11	4.7	2.1	44.63	5.3	6.8	77.94	3.4									
363589	14.3	82.51	53.85	82.51	10.1	67.0	56.5	3.55	4.2	3.8	84.52	86.76	3.85	2.3	42.99	5.5	6.7	82.09	3.55									
363568	14.2	85.92	64.23	85.92	11.1	75.0	53.0	3.65	4.1	4.1	89.02	90.24	5.2	2.35	45.19	6.0	6.7	89.65	3.6									
363548	14.5	88.23	63.79	88.23	10.6	72.0	57.0	3.6	4.0	3.7	85.90	90.24	5.2	2.2	44.26	5.7	7.0	81.43	3.7									
363562	13.8	84.06	51.45	84.06	10.0	77.0	52.5	3.65	4.15	4.1	84.52	86.76	3.7	2.3	42.99	5.5	6.7	82.09	3.6									
363560	14.3	90.01	54.45	90.01	10.9	70.0	46.0	3.5	4.0	3.9	93.59	97.44	5.2	2.2	45.19	6.0	6.7	85.07	3.7									
363589	13.9	88.49	44.64	88.49	9.5	69.0	53.5	3.35	4.0	4.15	84.34	86.76	6.1	2.7	44.26	5.3	7.1	74.65	3.3									
363556	14.0	92.0	61.45	92.0	9.6	73.0	60.5	3.6	4.0	3.9	83.75	82.31	4.9	2.6	41.84	5.5	6.5	78.09	3.6									
363557	13.9	92.62	68.27	92.62	10.2	71.0	61.0	3.75	4.2	4.3	87.86	88.37	5.3	2.6	49.06	5.1	6.4	79.69	3.45									
363574	14.7	87.07	51.70	87.07	10.8	72.0	60.0	3.45	4.1	4.1	89.26	92.68	5.25	2.5	47.62	5.9	6.2	85.51	3.5									
363592	15.5	81.29	49.03	81.29	10.2	65.0	56.0	3.6	4.0	3.8	88.46	88.16	5.1	2.3	45.10	5.9	6.9	85.51	3.55									
363552	13.5	94.81	67.28	94.81	9.1	69.0	50.0	3.5	4.0	4.0	87.87	91.95	5.55	2.5	46.73	5.1	6.4	70.69	3.45									
363579	14.4	88.85	62.68	88.85	9.7	69.0	54.0	3.5	4.0	3.8	97.37	102.6	5.7	2.5	42.17	4.8	7.3	76.19	3.6									
363577	14.3	89.51	63.15	89.51	9.3	69.5	65.5	3.8	3.85	3.9	98.70	98.79	5.3	2.4	47.17	5.5	6.6	81.32	3.9									
363583	15.2	95.39	66.38	95.39	8.8	71.0	61.0	3.55	4.0	4.0	88.76	88.75	5.7	2.35	47.23	5.3	7.4	71.63	4.2									
Specimens	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)
Totals	255.8	89.50	58.27	89.50	105.4	1,256.5	1,043.0	67.95	69.05	73.20	87.50	92.11	101.5	46.3	44.65	97.3	121.6	77.78	68.35									
Averages	14.21	93.60	65.46	93.60	10.28	69.5	55.7	3.58	3.63	3.96	87.77	89.75	5.34	2.39	44.73	5.41	6.76	80.02	3.60									
Minima	13.1	81.29	49.03	81.29	9.6	63.5	44.5	3.35	3.35	3.7	83.75	89.75	4.7	2.03	40.74	4.8	6.3	73.76	3.3									
Maxima	15.5	96.39	68.27	96.39	11.4	77.0	65.5	3.8	3.9	4.3	58.70	102.6	6.1	2.7	50.0	6.0	7.4	89.65	4.2									

1 Allowance made for wear of teeth, where needed.

ALASKA PENINSULA: FEMALES
(Mixed Group: Eskimo-Koniag-Aleut)

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium (glabela ad maximum)	Diam. lateral maxium.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a) ¹	Alveol. Pt.-Nasion Height (b)
363549	(A. H.) U. S. N. M.	Kvichak River	35		17.6	13.2	12.2	75.0	79.22		14.33				
363587	do.	Egegik	24		18.0	13.8	13.2	76.67	82.02		15.0			11.8	7.3
363567	do.	Pavik	55		17.7	13.6	12.9	76.81	82.47		14.73			11.8	7.0
363591	do.	Egegik	60		17.2	13.6	13.0	79.07	84.42		11.61			10.8	6.3
363598	do.	Near Iliamna	50		16.8	13.3	12.5	79.17	83.66		11.29			10.8	6.3
363588	do.	Kvichak River	70		17.3	13.8	13.0	79.77	83.60		11.70				
363558	do.	do.	60		17.1	13.8	13.0	80.23	86.45		11.63			11.6	6.8
363600	do.	Near Iliamna	45		17.1	13.7	13.4	80.59	87.80		11.70			12.4	7.2
363547	do.	Kvichak River	65		17.1	13.8	13.0	80.70	84.14		11.63			11.4	6.6
363575	do.	Pavik	60		17.5	14.3	13.1	81.71	82.39		11.97			12.5	7.2
363555	do.	do.	25		16.6	13.6	13.0	81.93	86.09		11.49			11.2	7.0
363576	do.	Kvichak River	24		17.2	14.2	12.8	82.50	81.53		14.73			10.5	6.1
363603	do.	Pavik	24		17.1	14.4	13.0	84.21	82.51		14.83			11.5	6.1
363561	do.	Egegik	55		16.4	15.0	13.1	86.21	80.89		15.17			12.0	7.9
363580	do.	Pavik	25		16.4	13.9	13.0	87.76	85.81		14.43			11.1	6.9
363573	do.	do.	50		16.8	14.6	13.7	87.99	85.85		15.03			11.7	6.8
363583	do.	do.	60		16.8	14.0	13.4	86.09	85.85		14.03			12.7	7.5
363551	do.	Kvichak River	60		16.9	14.8	13.6	87.57	85.37		15.19			11.5	6.5
363590	do.	Egegik	40		16.4	14.1	12.5	87.87	81.70		14.43			11.2	7.2
363584	do.	Pavik	55		16.5	14.8	12.8	89.70	81.79		14.79			12.7	7.5
Specimens			(20)		(20)	(20)	(20)	(20)	(20)		(20)			(18)	
Totals			942		311.5	281.2	263.6	82.34	83.70		291.4			211.1	123.2
Averages			47.1		17.08	14.06	13.03	75.0	79.22		14.72			11.73	6.96
Minima			24		16.4	13.2	12.2	75.0	79.22		11.20			10.9	6.1
Maxima			70		18.0	15.0	13.7	89.70	87.50		15.17			12.9	7.9

Catalog No.	Diam. Bizygomatic (g)	Facial Index, $\left(\frac{c}{a} \times 100\right)$		Facial Index, $\left(\frac{c}{b} \times 100\right)$, upper		Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right		Orbits—Height, left		Orbits—Breadth, right		Orbits—Breadth, left		Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index	Lower Jaw—Height at Symphys
		(15)	(18)	(15)	(18)						(15)	(18)	(15)	(18)	(17)	(17)	(17)	(17)									
363549	13.1	90.08	65.78	63.0	51.5	9.8	9.8	63.0	51.5	3.25	3.4	3.8	3.7	85.63	91.89	5.15	2.5	46.54	5.6	6.6	84.85	3.4					
363557	13.6	86.76	51.47	74.0	47.5	9.4	9.8	74.0	47.5	3.45	3.4	3.85	3.8	89.61	89.47	5.05	2.55	59.50	5.3	6.1	86.89	3.3					
363567	13.7	86.13	51.69	71.0	56.0	8.2	9.6	71.0	56.0	3.7	3.65	4.05	4.0	91.39	91.25	4.95	2.3	46.46	5.1	5.9	86.44	3.3					
363591	13.0	83.08	48.46	73.5	48.5	8.5	9.8	73.5	48.5	3.4	3.5	4.0	3.95	85.0	88.61	4.8	2.6	54.17	4.9	5.8	87.48	2.8					
363598	12.5					8.0	9.2			3.35	3.35	3.65	3.75	91.78	89.93	4.7	2.3	48.94				3.3					
363558	13.3	87.22	51.13	72.0	67.5	8.8	10.2	72.0	67.5	3.4	3.4	4.0	4.0	91.78	85.0	4.6	2.5	51.35	5.2	6.1	85.25	3.3					
363559	12.8	95.31	56.95	73.0	57.5	9.8	8.8	73.0	57.5	3.45	3.35	4.1	4.0	84.15	83.75	5.0	2.4	43.60	5.1	6.0	86.0	3.3					
363600	12.6	90.18	59.88	73.5	52.5	9.8	10.3	73.5	52.5	3.5	3.65	3.9	3.7	89.74	98.05	5.15	2.4	43.60	5.1	6.3	80.95	3.6					
363547	12.8	91.70	51.95	69.0	55.0	8.2	9.5	69.0	55.0	3.5	3.6	3.7	3.7	94.59	91.90	4.9	2.1	49.0	5.1	5.9	86.44	2.6					
363575	13.2	87.69	51.86	70.0	55.5	10.0	9.4	70.0	55.5	3.6	3.55	3.9	3.9	92.31	91.03	5.0	2.1	49.0	5.1	6.1	83.61	3.3					
363576	12.7	82.68	43.63	72.5	58.5	8.4	9.1	72.5	58.5	3.45	3.3	3.85	3.7	89.61	89.19	4.25	2.15	59.59	5.1	6.3	80.95	3.6					
363603	14.1	91.49	56.63	76.5	62.5	8.4	9.8	76.5	62.5	3.85	3.95	4.2	3.85	89.61	89.19	4.05	2.15	59.59	5.1	5.9	86.44	2.6					
363580	13.2	84.69	52.27	68.0	57.0	8.6	9.7	68.0	57.0	3.85	3.95	4.2	3.85	91.67	100.0	5.15	2.3	52.53	4.9	6.2	79.63	3.3					
363573	13.1	89.31	51.91	69.0	53.5	8.6	9.6	69.0	53.5	3.2	3.15	3.8	3.0	84.21	87.80	4.8	2.35	63.73	5.3	6.1	80.16	3.8					
363583	13.7	92.70	52.74	70.5	52.0	9.0	9.8	70.5	52.0	3.55	3.5	3.9	3.7	85.90	91.89	4.95	2.7	64.69	5.3	6.4	82.81	3.5					
363584	13.2	84.83	49.24	73.0	51.0	10.3	9.0	73.0	51.0	3.45	3.55	3.85	3.85	90.79	88.31	4.7	2.2	44.44	5.0	6.5	86.16	3.8					
363591	13.3	87.97	54.14	69.5	62.0	8.6	9.7	69.5	62.0	3.45	3.4	3.8	3.85	90.79	88.31	4.7	2.15	45.74	5.1	5.9	86.44	3.4					
363590	13.3	87.97	54.14	69.5	62.0	8.6	9.7	69.5	62.0	3.45	3.6	3.85	3.85	89.61	90.91	5.1	2.5	49.02	5.1	6.3	86.96	3.4					
363584	13.6	93.38	55.16			9.9	9.9			3.6	3.6	3.85	3.9	92.31	92.31	5.1	2.15	42.16	5.2	5.9	88.14	3.6					
Specimens	(18)	(17)	(17)	(17)	(17)	(20)	(18)	(17)	(17)	(15)	(18)	(15)	(18)	(15)	(18)	(19)	(19)	(19)	(19)	(17)	(17)	(17)	(17)	(17)	(19)		
Totals	237.6	163.8	154.9	1,208.0	937.5	1,196.6	98.35	1,208.0	937.5	51.95	62.70	58.35	69.0	89.09	90.87	93.25	45.15	88.3	104.4	88.3	104.4	88.3	104.4	63.15			
Averages	13.20	88.67	52.78	71.1	55.1	9.83	9.83	71.1	55.1	3.46	3.48	3.89	3.83	89.09	90.87	4.91	2.38	48.42	5.19	6.14	84.58	3.32					
Minima	12.5	82.68	48.03	63.0	47.5	8.0	9.2	63.0	47.5	3.2	3.15	3.65	3.6	84.15	83.75	4.25	2.1	42.0	4.9	5.8	79.03	2.75					
Maxima	14.1	96.31	56.25	76.0	67.5	10.6	9.4	76.0	67.5	3.85	3.95	4.2	4.0	94.59	100.0	5.15	2.7	54.65	5.6	6.6	90.16	3.8					

1 Allowance made for wear of teeth, where needed.

KODIAK ISLAND: KONIAGS, MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabelle ad max.)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a) 1	Alveol. Pt.-Nasion Height (b)
366720	(A. H.) U. S. N. M.	West shore, mouth of Uyak Bay.	50.		18.4	14.7	13.0	79.89	78.55	88.44	15.37				8.0
374762	do	Our Point, Uyak Bay.	28.		18.4	14.8	13.9	80.43	83.73	93.92	15.70			12.4	7.3
363606	do	do	24.		18.0	14.5	13.2	80.56	81.23	93.23	15.23			11.8	7.2
363608	do	do	18.1		18.1	14.7	13.3	81.22	81.10	90.48	15.37			12.2	7.3
367209	do	do	Y o u n g adult.		18.6	15.2		81.72							7.6
372886	do	do	45.		17.8	14.6	14.0	82.02	86.42	95.89	15.47			13.0	7.8
372893	do	do	30.		17.5	14.4	13.0	82.29	81.51	90.88	14.97			12.4	7.3
363625	do	do	40.		17.7	14.6	13.6	82.49	84.21	93.15	15.30			13.1	7.6
374784	do	do	30.		17.3	14.3	12.6	82.66	79.75	88.11	14.73			12.4	8.1
363621	do	do	50.		18.3	15.2	13.3	83.06	79.42	87.60	15.60			12.4	7.2
363636 (small)	do	do	Y o u n g adult.		17.3	14.4	13.0	83.24	82.02	90.28	14.90				8.0
366711	do	do	23.		17.3	14.4	13.5	83.24	85.17	93.75	15.07			12.3	7.7
374746	do	do	45.		18.0	15.0	13.4	83.53	81.21	89.39	15.47			12.8	7.8
362473	do	Karluk Lake	Aged		17.1	14.3	13.2	83.63	84.03	92.31	14.87				
374788	do	Our Point, Uyak Bay	40.		18.1	15.2	13.2	83.93	79.28	86.84	15.50				7.9
366640 (small)	do	do	30.		17.1	14.4	12.6	84.21	80.0	87.60	14.70				7.0
377706	do	do	24.		17.8	15.0	12.8	84.27	78.05	85.33	15.20			12.2	7.3
378252	do	do	50.		18.7	15.8	14.2	84.49	82.32	89.87	16.23				8.4
367263	do	Karluk	40.		17.8	15.0	13.2	84.83	86.32	96.32	15.70			13.2	8.0
377711	do	Our Point, Uyak Bay	55.		17.8	15.1	13.7	84.83	83.28	89.75	15.63			12.8	7.7
367217	do	Klavak	25.	Slight lateral oc- cipital flatten- ing.	17.1	14.6	13.8	85.98	87.06	94.32	15.17			12.2	7.2
372892	do	Our Point, Uyak Bay	35.		17.8	15.2	14.7	85.39	89.09	89.09	15.90			12.8	7.8
367236	do	do	45.		17.9	15.3	14.7	85.47	88.55	88.55	15.97				7.7
372826	do	do	35.		18.0	15.4	13.4	85.56	80.24	87.01	15.60				7.7
366601	do	do	45.	Slight lateral oc- cipital flatten- ing.	17.6	15.1	14.1	85.80	86.24	88.74	15.60				8.1
374761	do	do	23.		17.6	15.1	13.4	85.80	81.96	88.74	15.37			12.3	6.8
377715	do	do	30.		17.0	14.6	13.3	85.88	84.18	91.10	14.97				7.5
366657 (small)	do	do	50.		16.8	14.5	13.5	86.31	86.20	89.10	14.86				8.0

374750	do	do	17.6	15.2	13.6	86.36	84.93	89.47	15.47	12.7	7.9
363600	do	do	17.7	15.3	13.7	86.44	85.03	89.54	15.57	12.9	7.7
374760	do	do	17.9	15.5	14.3	86.59	85.63	92.23	15.90	13.4	8.4
	45	Y o u n g adult									
374749	do	do	16.8	14.6	13.0	86.30	84.80	89.04	14.80	11.4	6.5
363623	do	do	17.6	15.3	13.2	86.83	80.25	86.87	15.37	Face injured	7.3
377703(6)	do	do	17.9	15.0	13.4	87.15	80.0	85.90	15.63		
	24	do	17.2	15.0	13.5	87.21			15.40	12.3	7.0
372898	do	do	17.4	15.3	13.5	87.58	85.57	88.24	15.40	11.6	7.4
	21	Slight lateral occipital flattening.									
372887 (skel- ton)	do	do	16.7	14.7	12.8	88.02	81.53	87.07	14.73	12.8	7.5
198513	do	Near Wash Creek	17.9	15.9	14.0	88.83	82.84	88.05	15.93	13.0	7.6
3787163	do	Wash Creek, Uyak Bay.	17.6	15.7	13.8	88.80	82.83	87.9	15.70	12.8	7.5
363642	do	Our Point, Uyak Bay.	17.7	15.8	13.7	89.97	81.80	86.71	15.73	14.2	(9.1)
374748	do	do	16.8	15.0	12.8	89.29	80.50	85.83	14.87	12.4	7.3
372917	do	do	17.2	15.4	14.1	89.53	86.50	91.56	15.57	12.2	7.4
367225 (prob- ably small ♂)	do	West site, mouth of Uyak Bay.	16.3	14.6	13.0	89.67	90.61	95.89	14.97	12.0	7.1
372804	do	Our Point, Uyak Bay	18.0	16.2	14.2	90.0	85.04	87.65	16.13	12.4	7.5
366656	do	do	17.1	15.4	13.6	90.06	83.70	88.91	15.37	12.4	7.4
374752	do	do	16.8	15.2	12.9	90.48	80.63	84.87	14.97	12.3	7.3
374747	do	do	17.8	16.2	13.4	91.01	78.82	82.72	15.80	12.1	7.4
367204 (prob- ably small ♂, skele- ton)	do	do	16.3	14.9	13.5	91.41	86.54	90.60	14.90	12.7	7.5
363606	do	do	17.1	16.4	14.5	95.91	86.57	88.41	16.0	11.7	8.3
372888 (small)	do	do			13.0					11.8	6.7
364630	do	do								11.8	7.0
366724	do	Klavak	(hyperbrachycephalic)								7.6
367229	do	West site, mouth of Uyak Bay.	(17.6)	(15.7)	(13.9)	(89.20)	(83.48)	(88.54)	15.73	12.8	7.4
Specimens			(49)	(46)	(48)	(40)	(48)	(47)	(45)	(35)	(50)
Totals			860.3	738.7	649.6	65.87	63.01	738.96	3,150	436.4	376.7
Averages			17.56	15.08	13.53	79.89	73.05	82.72	15.40	12.47	7.53
Minima			16.3	14.3	12.6	85.91	80.61	82.72	14.70	11.4	6.5
Maxima			18.7	16.4	14.7	95.91	90.61	96.89	16.23	14.2	8.3

Footnotes on p. 37 at end of table.

KODIAK ISLAND: KONIAGS, MALES—Continued

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial total $\left(\frac{a \times 100}{c}\right)$	Facial index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index
366720	14.4	.....	99.99	11.1	8.6	10.5	64.5	52.5	3.8	3.8	4.05	3.9	93.84	97.44	5.0	2.9	61.79	5.8	6.7	86.67
371762	13.4	88.11	50.69	10.1	9.2	10.1	72.0	60.0	3.35	3.3	3.95	3.9	84.81	84.69	5.1	2.35	46.08	5.2	6.8	76.47
373006	13.4	88.06	63.73	10.4	9.1	10.5	67.5	52.0	3.0	3.0	3.5	3.6	91.71	91.71	4.85	(2.1)	(39.91)	5.7	6.4	89.06
383606	13.5	90.87	64.07	10.3	9.2	10.2	68.5	56.0	3.5	3.4	4.0	3.8	87.50	87.14	5.0	2.5	50.0	5.6	6.6	81.85
387209	13.6	.....	48.72	.....	.....	.....	.....	.....	3.56	3.56	.....	3.95	89.87	89.87	5.3	2.6	79.06	5.6	7.1	78.87
372886	14.6	80.01	68.42	10.4	9.5	11.0	73.0	61.0	3.65	3.65	4.1	4.1	85.68	85.68	5.0	2.75	45.45	5.4	7.0	77.14
372886	14.7	81.85	49.66	9.5	8.7	9.9	71.0	63.0	3.4	3.45	3.9	3.9	87.18	88.40	5.0	2.25	45.45	5.4	6.5	81.64
372893	14.3	91.61	68.14	10.2	9.2	10.2	68.0	58.0	3.4	3.4	4.0	4.0	86.75	86.25	5.3	2.2	50.91	5.7	6.9	82.61
369025	14.5	86.68	65.68	10.4	9.8	9.6	61.0	48.0	3.35	3.45	4.0	4.0	83.75	86.25	5.3	2.4	44.11	5.7	7.2	79.17
374784	15.0	82.67	68.0	10.5	9.4	10.4	69.0	53.5	3.4	3.3	3.5	3.5	86.0	84.62	4.15	2.4	50.19	5.5	6.5	81.69
373021	13.9	82.67	57.56	10.3	8.8	9.8	63.5	49.5	3.5	3.5	4.1	4.1	85.37	84.62	5.1	2.4	44.74	5.4	6.0	81.82
369580	14.2	86.62	54.82	9.8	8.6	10.2	70.5	55.5	3.5	3.5	4.1	4.1	86.37	85.37	5.2	2.4	43.08	5.5	7.0	78.37
366711	14.2	91.43	53.71	10.6	9.1	10.0	64.0	55.0	3.6	3.6	4.1	3.9	87.50	92.11	5.2	2.6	50.0	5.7	7.0	78.37
374746	14.1	.....	.....	.....	.....	.....	.....	.....	3.4	3.4	.....	3.8	87.50	89.16	5.2	2.3	40.0	5.7	7.0	81.43
362473	15.1	62.67	11.1	10.0	10.8	10.4	67.0	55.0	3.75	3.75	4.1	4.2	91.46	89.29	5.75	2.3	40.0	6.0	7.8	81.08
374788	15.0	47.91	47.91	10.6	9.2	10.0	69.5	61.5	3.6	3.6	3.8	3.8	94.74	94.74	5.5	2.4	42.64	6.3	8.4	77.61
366040	14.6	80.79	48.81	10.6	9.8	10.6	70.0	61.5	3.55	3.55	4.2	4.1	84.52	86.59	5.25	2.5	42.64	6.3	8.4	80.60
374706	15.1	80.79	48.81	10.8	9.8	11.0	68.5	61.0	3.45	3.5	4.1	4.1	84.15	85.37	5.8	2.3	39.66	5.8	7.2	85.71
375252	15.4	.....	54.65	.....	.....	.....	.....	.....	3.7	3.7	4.1	4.1	80.24	90.24	5.7	2.5	43.86	6.0	8.0	83.33
367203	14.6	87.67	52.74	10.1	9.0	10.2	68.5	54.0	3.7	3.6	3.9	4.0	84.87	90.0	5.6	2.4	42.86	5.4	6.8	79.44
377711	14.6	87.67	52.74	10.3	9.8	10.7	66.5	45.0	3.55	3.5	4.15	4.15	85.54	87.21	5.5	2.8	54.90	6.1	7.1	80.88
367217	14.6	83.56	49.59	11.3	9.9	10.8	72.5	56.0	3.75	3.75	4.2	4.3	91.67	87.21	5.5	2.5	46.04	5.7	7.2	80.88
372892	15.0	85.35	52.0	9.9	8.8	10.6	70.5	48.0	3.65	3.65	4.2	4.2	89.77	91.67	5.9	2.4	40.68	5.9	7.2	81.84
367246	15.1	.....	60.99	10.7	9.5	11.0	71.0	48.0	3.85	3.85	4.4	4.2	89.77	91.67	5.9	2.5	45.45	6.3	8.5	85.71
372826	14.0	.....	55.0	9.8	8.7	9.8	67.0	55.0	3.75	3.75	4.0	4.0	91.75	91.75	5.5	2.8	53.45	6.5	9.0	90.77
372826	14.7	.....	55.10	10.8	9.6	10.6	67.0	59.0	3.4	3.4	3.8	3.8	90.79	89.47	5.15	2.5	54.37	5.9	6.5	86.71
366901	14.7	.....	46.58	9.8	8.9	9.8	70.0	58.0	3.3	3.3	4.0	3.9	82.50	84.62	4.8	2.15	44.79	6.2	6.9	75.96
374701	14.2	86.62	52.82	10.5	9.3	10.5	69.5	53.5	3.0	3.05	4.3	4.2	90.70	94.05	5.3	2.6	49.06	5.0	7.0	85.71
377715	14.2	86.62	52.82	10.5	9.3	10.5	69.5	53.5	3.05	3.05	4.2	4.2	84.62	84.62	5.4	2.6	48.15	5.5	6.8	89.88
890557	14.3	86.39	55.04	10.1	8.6	9.0	68.0	46.5	3.3	3.4	4.3	4.2	76.74	80.95	5.6	2.5	44.94	5.7	7.2	79.17
374750	14.7	87.39	53.74	10.1	8.6	10.8	74.0	60.5	3.5	3.5	4.2	4.0	83.99	88.75	5.15	2.5	48.55	6.7	8.2	82.09
368609	14.8	87.16	52.03	10.0	9.0	10.8	74.0	60.5	3.7	3.7	4.2	4.0	83.10	88.75	5.15	2.5	48.55	6.7	8.2	82.09
374760	15.2	.....	55.29	11.2	10.0	11.2	77.0	60.5	3.4	3.4	4.2	4.2	83.10	88.75	5.15	2.5	48.55	6.7	8.2	82.09
374749	13.9	85.01	46.76	9.6	8.8	9.8	72.0	57.5	3.4	3.4	3.8	3.7	89.47	91.89	4.85	2.35	48.45	4.9	6.3	77.78
368623	14.6	.....	50.0	10.1	9.6	10.2	69.5	53.5	3.5	3.5	3.95	3.8	88.62	92.11	5.2	2.5	48.08	5.4	6.4	84.38
377708(a)	(14.1)	.....	.....	.....	.....	.....	.....	.....	3.9	3.9	3.95	4.1	88.73	95.12	5.2	2.5	48.08	5.4	6.4	84.38

374751	14.4	65.42	48.61	10.4	9.0	10.4	70.0	55.0	3.8	3.8	4.1	3.9	75.61	82.05	4.9	2.4	48.98	5.6	6.9	81.16
372895	23.0	85.29	54.71	10.4	8.8	9.9	64.5	47.0	3.5	3.5	3.95	3.9	86.44	98.72	5.3	2.0	49.09	5.6	6.6	83.35
372897	14.3	89.51	57.45	10.5	8.8	10.0	64.5	47.0	4.0	3.55	4.05	3.9	86.44	101.02	4.85	2.5	51.55	5.9	6.6	89.59
18981 ¹	24.1	92.50	53.60	9.8	8.8	10.0	68.5	58.5	4.0	3.95	3.8	3.95	105.30	100.0	5.2	2.55	49.04	5.4	6.2	87.10
378716 ²	23.0	92.05	58.60	10.0	8.6	9.6	65.0	49.0	4.0	3.85	3.9	4.0	103.90	97.60	5.2	(2.35)	(39.78)	5.9	7.9	88.52
363642	14.8	(65.66)	(61.49)	10.0	8.8	10.2	(64.0)	(59.5)	3.7	3.8	4.2	4.1	88.10	92.68	(5.9)			5.9	7.9	74.08
374748	14.1	84.94	51.77	8.8	7.8	9.2	60.0	57.0	3.55	3.5	3.8	3.7	93.42	94.59	4.95	2.35	47.47	5.2	6.5	80.0
372917	14.7	83.69	50.54	10.5	9.0	10.0	65.0	47.0	3.45	3.45	4.15	4.05	83.73	86.44	5.1	2.6	50.88	6.0	7.0	85.71
367225	14.2	84.51	50.0	10.0	9.2	10.0	70.0	57.5	3.6	3.65	3.9	3.8	92.31	96.05	5.45	2.3	42.21	5.4	6.9	78.26
372894	15.4	80.52	48.70	10.8	9.8	10.7	69.0	58.0	3.6	3.5	4.1	4.3	87.80	81.40	5.0	2.7	50.94	5.9	7.4	90.63
366656	13.7	90.51	54.01	10.4	9.0	10.0	68.0	50.0	3.55	3.4	3.85	3.9	86.59	91.02	5.0	2.4	48.0	5.8	6.4	79.73
374752	14.8	83.11	49.32	9.5	8.0	9.6	68.5	59.0	3.23	3.4	3.85	3.65	87.01	93.16	5.15	2.5	48.54	5.2	6.8	76.47
374747	15.2	79.01	48.68	10.7	9.6	9.8	62.5	57.5	3.55	3.6	4.0	4.0	86.59	90.0	4.9	2.65	51.08	5.7	7.3	78.08
367204	24.0	90.71	52.57	10.1	8.4	9.5	63.0	43.5	3.8	3.7	3.8	3.8	100.0	97.37	5.4	2.8	43.11	5.6	6.3	88.89
363606	15.6	82.99	47.18	10.9	9.6	10.4	64.0	46.5	3.35	3.3	4.1	3.8	87.50	91.71	5.1	2.3	45.10	5.4	6.4	84.33
372888	24.2	82.99	47.18	9.3	8.2	9.8	73.5	47.0	3.9	3.0	4.0	4.1	90.50	89.46	5.9	2.6	50.0	5.4	7.0	78.57
360630	15.2	77.63	46.05	10.6	9.9	10.6	74.0	55.0	3.3	3.3	4.3	4.1	90.50	89.46	5.9	2.5	47.62	5.2	6.5	80.0
360724	15.9	80.50	46.54	9.9	8.9	10.6	74.0	55.0	3.55	3.6	4.1	4.0	89.59	90.0	5.55	2.6	46.85	5.3	7.1	74.65
367226	15.9	80.50	46.54	9.9	8.9	10.6	74.0	55.0	3.55	3.6	4.1	4.0	89.59	90.0	5.55	2.6	46.85	5.3	7.1	74.65
Specimens	(33)	(48)	(48)	(49)	(47)	(47)	(45)	(45)	(50)	(48)	(50)	(48)	(50)	(48)	(48)	(48)	(48)	(50)	(50)	(50)
Totals	728.1	481.7	427.4	451.7	427.4	427.4	3,070.5	2,454.5	179.15	171.2	201.95	190.3	190.3	253.15	253.15	120.0	278.0	310.6	310.6	310.6
Averages	14.56	85.80	51.74	9.83	9.09	10.22	68.23	54.54	3.58	3.57	4.04	3.96	88.71	89.96	5.27	2.50	47.49	5.47	6.81	81.50
Minima	13.4	77.63	46.05	8.8	7.8	9.2	61.0	43.5	3.1	3.2	3.8	3.65	75.61	80.49	4.8	2.15	39.65	4.9	6.1	74.05
Maxima	15.9	92.20	57.55	11.3	10.0	11.2	74.0	63.0	4.0	3.95	4.4	4.3	105.30	100.0	5.9	2.9	54.99	6.1	7.9	90.77

¹ Allowance made for wear of teeth, where needed.

² Near.

³ It was discovered, while this paper was in proof, that these two numbers refer to the same specimen.—EDITOR.

KODIAK ISLAND: KONIAGS, FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabella ad max.)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Ptc.-Nasion Height (b)
363643	(A. II.)	Our Point, Uyak Bay	35		17.9	14.4	13.6	80.45	84.21	74.70	15.30			11.8	7.3
367454	U.S.N.M.	do	24		18.0	14.5	12.3	80.56	75.70	87.41	14.93			12.0	7.0
367219	do	Kiyak	25		15.7	12.9	12.5	82.17	87.41	96.90	13.70			11.6	6.9
367482	do	Our Point, Uyak Bay	Old		17.3	14.3	12.0	82.66	75.95	83.98	14.53				
367228	do	do	Old		17.9	14.3	13.3	82.68	81.85	89.86	15.33				
366040	do	Chief's Point, Uyak Bay	25		18.1	15.0	13.4	82.87	80.97	89.53	15.50				
362275	do	Our Point, Uyak Bay	25		16.8	14.0	13.2	83.93	85.71	94.99	14.67			11.7	7.2
193814	do	Neat Wash Creek	22		16.7	14.1	12.6	84.73	81.82	89.86	14.47	1,210		11.5	7.1
372887	do	do	46		17.0	14.4	13.0	84.77	82.80	90.56	14.80			12.3	7.3
378716	do	do	24		16.5	14.0	12.4	84.59	83.81	88.67	14.30	1,195		11.4	7.0
374789	do	do	26		17.0	14.5	13.2	86.29	88.81	97.05	14.90			11.5	7.1
377746	do	do	30		17.2	14.8	13.2	89.05	88.84	89.19	15.10			12.0	7.4
374766	do	do	30		16.7	14.3	13.0	86.63	85.87	90.91	14.67			11.4	7.0
360661	do	do	30		16.8	14.4	13.1	85.71	83.97	90.97	14.77			12.3	7.4
372889	do	do	35		17.2	14.8	13.3	86.05	85.75	89.86	16.10			12.0	7.1
372912	do	do	Young adult.		16.8	14.5	13.2	86.51	84.55	91.03	14.83			11.9	7.5
367222	do	do	28		17.0	14.8	12.3	87.06	77.86	83.11	14.70			11.9	7.5
367220	do	do	50		16.3	14.2	12.5	87.12	81.97	88.09	14.33			11.9	7.2
363633	do	do	35	Some occipital assymetry.	17.2	15.0	13.0	87.21	80.76	86.67	15.07				
367218	do	Kiyak	25		16.5	14.4	13.1	87.27	84.79	90.97	14.67				
367230	do	Spiridon Bay	26		16.9	14.8	13.4	87.57	84.54	90.64	15.03			12.2	7.3
374755	do	Our Point, Uyak Bay	25	Slight lateral occipital flattening.	16.8	14.8	13.2	88.10	85.54	89.19	14.93			11.3	6.9
372918	do	do	50		16.6	14.7	13.4	88.55	85.08	91.16	14.90				
374753	do	do	30		16.7	14.8	13.2	88.62	83.81	89.19	14.90			11.8	7.3
363043	do	Spiridon Bay	30-35		16.9	15.0	13.0	88.76	81.50	86.67	14.97			12.2	7.6
372922	do	Our Point, Uyak Bay	24		16.4	14.6	13.2	89.02	85.16	90.41	14.73			11.9	7.5
367202	do	Kariak	30		15.4	13.8	12.8	89.61	87.67	92.75	14.0			11.9	7.5
374757	do	Our Point, Uyak Bay	25		16.6	14.9	13.6	89.76	86.95	91.83	15.03			13.1	8.2
362817	do	Alltak Bay, Kodiak Island.	50		16.7	15.0	13.6	89.82	85.80	90.67	15.10				7.1

Specimens	Age	Sex	Site	Alveolar Angle	Facial Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max.	Nasal Index	Upper Alveolar Arch—Length max.	Upper Alveolar Arch—Breadth max.	Upper Alveolar Arch—Index
	(35)			(33)	(33)	(33)	(33)	(33)	(33)	(33)	(33)	(35)	(35)	(2)	(21)	(28)	
360689	do	do	Chief's Point, Uyak Bay.	16.2	14.6	12.2	90.12	83.66	14.33	0.9							
366723	do	do	West site, mouth of Uyak Bay.	16.6	15.1	13.6	90.96	86.08	15.10								
362818	do	do	Alitak Bay, Kodiak Island.	15.9	14.6	13.4	91.82	87.87	14.63								
367227	do	do	West site, mouth of Uyak Bay.	16.3	15.0	12.2	92.02	77.96	14.50	7.3							
366721	do	do	do	(15.8)	(14.9)	(13.0)	(94.30)	(84.69)	(87.85)	7.2							
366722	do	do	do	(16.5)	(14.2)	(13.0)	(88.06)	(84.69)	(91.65)	7.3							
Specimens				(33)	(33)	(33)	(33)	(33)	(33)	(33)	(33)	(35)	(35)	(2)	(21)	(28)	
Totals	3,282			554.7	479.8	423.0	86.50	82.94	89.41	11.90					249.8	201.2	
Averages	36.6			13.0	14.54	13.0	86.50	82.94	89.41	11.90					11.30	7.19	
Minima	20			13.4	12.9	12.0	80.45	73.70	81.53	6.2					11.3	6.2	
Maxima	70			18.1	15.1	13.6	92.02	87.87	96.90	13.1					13.1	8.2	

Footnotes on p. 40 at end of table.

KODIAK ISLAND: KONIAGS, FEMALES—Continued

Catalog No.	Diam. Bifurcomatic maxm. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max-Im.	Nasal Index	Upper Alveolar Arch—Length maxm.	Upper Alveolar Arch—Breadth maxm.	Upper Alveolar Arch—Index
372912	14.0	85.0	65.97	10.2	8.8	9.6	68.0	63.5	3.75	3.85	4.0	3.9	93.76	98.72	5.35	2.45	47.79	5.3	6.4	52.81
367222	13.4	88.81	53.73	8.9	8.0	9.3	68.0	63.5	3.65	3.6	3.8	3.7	96.05	97.30	5.05	2.3	45.55	4.7	6.4	73.44
367220	13.4	88.81	53.73	8.9	8.0	9.3	68.0	63.5	3.6	3.45	4.2	4.1	85.71	84.16	4.9	2.4	48.98	5.0	6.0	83.53
368363	12.5	91.73	49.60	9.5	8.2	9.2	63.0	69.5	3.2	3.2	3.7	3.6	86.49	88.89	4.7	2.55	56.67	5.6	6.2	90.32
367218	13.3	87.23	54.89	9.6	8.6	9.3	63.5	60.0	3.55	3.55	4.0	4.0	88.75	88.75	4.85	2.45	52.99	5.6	6.1	83.58
367284	13.6	83.09	50.73	10.0	8.4	9.3	63.5	43.5	3.35	3.45	3.9	3.8	85.90	88.46	4.85	2.85	48.45	5.3	6.3	90.43
374755	13.3	88.06	56.64	9.4	8.0	9.5	68.0	51.5	3.55	3.45	3.9	3.9	89.87	89.87	5.1	2.8	54.90	5.7	6.3	88.59
372918	13.4	88.06	54.48	10.2	8.5	9.0	66.5	48.5	3.75	3.55	3.75	3.75	96.0	97.53	5.3	2.4	50.71	5.4	6.1	88.52
374753	13.4	88.06	54.48	10.2	8.5	9.0	66.5	48.5	3.6	3.65	3.75	3.75	96.0	97.53	5.3	2.4	50.71	5.4	6.1	88.52
363043	13.3	91.04	48.87	9.4	8.4	9.3	71.0	52.0	3.35	3.35	3.8	3.7	88.16	90.54	4.75	2.15	42.16	5.2	6.0	86.67
372922	13.3	91.04	48.87	9.4	8.4	9.3	71.0	52.0	3.35	3.35	3.8	3.7	88.16	90.54	4.75	2.15	42.16	5.2	6.0	86.67
367292	13.4	97.76	61.15	9.0	7.8	8.9	64.5	53.0	3.95	4.0	4.1	4.0	95.34	100.0	5.1	2.2	46.0	5.5	6.8	80.58
371757	13.4	97.76	61.15	9.0	7.8	8.9	64.5	53.0	3.3	3.3	3.8	3.8	85.84	88.16	5.0	2.2	46.0	5.5	6.8	80.58
362947	12.7	366689	54.33	9.5	8.2	9.4	68.0	46.5	3.3	3.35	3.9	3.8	84.62	88.16	5.0	2.55	51.0	4.8	6.3	76.19
366723	13.4	88.81	54.48	9.6	8.5	9.0	62.5	57.0	3.4	3.4	3.9	3.7	97.15	91.89	4.7	2.45	52.12	5.3	6.5	81.54
367227	13.2	90.72	51.55	9.8	8.6	9.3	64.0	51.5	3.45	3.45	4.3	4.3	90.79	90.79	5.0	2.5	50.0	5.4	6.4	84.38
366721	13.9	97.76	52.52	9.9	8.9	10.4	72.5	57.5	3.65	3.65	4.3	4.3	84.88	84.88	5.1	2.2	47.05	5.4	6.4	84.38
366722	13.9	97.76	52.52	9.9	8.9	10.4	72.5	57.5	3.65	3.65	4.3	4.3	84.88	84.88	5.1	2.2	47.05	5.4	6.4	84.38
Specimens	(28)	(19)	(28)	(28)	(31)	(33)	(26)	(26)	(29)	(26)	(29)	(29)	(29)	(26)	(31)	(31)	(31)	(26)	(26)	(26)
Totals	373.2	373.2	272.6	272.6	265.2	317.7	1,749.0	1,348.5	101.7	91.5	113.8	90.8	89.37	91.68	154.1	74.85	136.8	106.1	6.39	82.56
Averages	13.39	89.02	53.91	9.74	8.55	9.63	67.27	51.87	3.51	3.52	3.92	3.84	89.37	91.68	4.97	2.41	48.57	5.26	6.39	79.44
Minima	12.5	83.09	43.87	8.9	7.8	8.9	62.0	42.0	3.2	3.2	3.6	3.5	83.33	83.33	4.7	2.0	37.74	4.7	5.8	73.44
Maxima	13.9	97.76	61.19	10.4	9.0	10.4	72.5	60.0	3.95	4.0	4.3	4.1	97.22	104.43	5.5	3.0	56.67	6.0	7.6	90.43

1 Allowance made for wear of teeth, where needed.

2 Near.

3 It was discovered, while this paper was in proof, that these two numbers refer to the same specimen.—Eboros.

KODIAK ISLAND: KONIAGS, CHILDREN AND ADOLESCENTS

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max (glabella ad maximum)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdlička's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
374702	(A. IL)														
372915	U.S.N.M.	Our Point, Uyak Bay	1½ years		15.8	13.4	12.2	84.81	89.56	91.04	13.80			8.3	5.6
372916	do	do	2-3 years		15.6	12.8									5.1
372920	do	do	3		15.9	13.6	12.2	85.53	89.71	89.71	13.90			9.1	5.8
374786	do	Spiridon Bay, Uyak Bay	3		14.5	13.3	11.0	91.72	79.14	82.71	12.57			7.9	4.7
363045 (♀)	do	do	3 or 4												
374766(a)	do	Our Point, Uyak Bay	4	Medium occipital flattening.	(15.6)	(14.9)								9.1	5.6
363655	do	do	5		15.1	14.0	12.4	92.72	85.81	88.57	13.83			9.5	5.9
372914	do	do	5-6		16.2	14.3	12.8	88.87	83.53	89.51	14.43			8.7	5.2
374785	do	do	6		16.9	14.3	12.0	84.63	76.92	83.99	14.40			9.8	16.0
363663	do	do	6		14.8	13.2	12.2	89.19	87.14	92.42	13.40			8.9	15.5
372913	do	do	6-7		15.8	13.7		86.71						10.0	6.0
363664	do	do	8		15.5	14.8	12.4	95.48	81.85	83.78	14.23			6.1	6.1
374710 (♂)	do	do	10		17.9	14.4	13.7	80.45	84.83	95.11	15.33			6.6	6.6
374787	do	do	10		16.4	14.9	12.8	90.85	81.79	85.91	14.70			6.2	6.2
363668 (♂)	do	do	10		17.6	15.2	12.1	86.86	78.05	79.61	14.97			6.5	6.5
367223 (♂)	do	do	10-12		13.6	14.8	12.3	94.87	80.99	83.11	14.23			9.8	5.9
372915	do	do	11		16.6	14.1	12.8	90.75	82.58	88.89	14.60			6.4	6.0
372921 (♀)	do	do	11		15.0	14.1	13.0	89.58	87.54	92.90	14.23			6.4	6.4
363657	do	do	12		16.3	14.0	12.8	84.95	83.54	91.43	14.43			6.7	6.7
372919 (♂)	do	do	15		17.8	14.6	12.8	82.03	79.01	87.67	15.07			6.7	6.7
374788 (probably ♀)	do	do	16	Slight lateral occipital flattening	16.6	14.8	12.7	89.16	80.89	85.81	14.70			11.5	6.9
374783 (♀)	do	do	17		16.3	13.6	12.9	80.95	84.87	94.85	14.43			10.8	6.4
374614 (♀)	do	do	Adolescent		17.7	14.8	12.8	83.62	78.78	86.49	15.10			11.1	6.5
363666	do	do	do		16.0	14.2		88.75							

KODIAK ISLAND: KONIAGS, CHILDREN AND ADOLESCENTS—Continued

Catalog No.	Diam. Bitygomatic maxim. (c)	Facial Index, total	Facial Index, upper $\left(\frac{b}{a} \times 100\right)$	Facial Index, lower $\left(\frac{c}{b} \times 100\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Upper Index	
374702	10.1	79.05	59.59	59.59	8.0	7.6	8.6	76.5	70.0	3.2		3.5		91.43		3.85	2.0	51.95		5.0		
372915	10.5		48.57							3.4	3.3	3.95	3.95	88.08	88.57	4.6	2.1	55.95		5.5		
372920	10.8		53.70				7.6			3.2	3.2	3.4	3.4	91.12	94.12	3.8	2.1	55.96		5.0		
374768(6)					7.4	7.1	7.4			2.0	2.0	3.2	3.2	90.63		(3.4)	2.0	(58.89)		5.2		
374706(2)										3.3	3.3	3.4	3.4	97.06	100.0	3.3	2.85	61.59		5.0		
374705	10.9		51.95		8.5	7.6	8.6	71.0	52.0	3.3	3.35	3.5	3.5	97.70	97.70	3.3	2.0	46.91		5.0		
374704	11.1		53.15		7.6	7.2	8.5	81.0	69.5	3.15	3.15	3.5	3.5	96.46	96.46	3.55	2.05	46.91		5.0		
374703	11.1		47.71		8.3	7.6	8.2	95.0	62.5	3.35	3.35	3.5	3.45	95.71	97.10	4.0	2.0	60.0		5.0		
374783	11.1		44.00		8.3	7.6	8.4	70.0	55.5	3.05	3.05	3.5	3.4	90.0	88.24	3.7	1.8	48.69		5.0		
365663	10.9		60.40		8.5	7.6	8.4			3.1	3.1	3.5	3.4	90.0	93.94	4.3	2.0	46.91		5.4		
372913	11.0		54.50		8.1	7.2	8.5	71.5	51.5	3.25	3.1	3.5	3.4	92.86	97.04	4.4	2.0	45.45		5.7		
365904	11.8		61.69		9.2	8.7	9.5	75.0	68.0	3.35	3.35	3.7	3.4	90.64	93.24	4.4	2.25	46.88		6.0		
374710(5)	12.5		62.80		9.1	8.4	9.5	69.0	61.0	3.5	3.45	3.7	3.6	94.59	100.0	4.4	2.0	45.45		6.0		
374787					8.9	8.0	8.7	67.0	58.5	3.6	3.6	3.7	3.5	97.90	102.86	4.4	2.2	50.0		5.7		
365968(5)	12.3		62.85		8.5	7.9	8.6	71.0	65.0	3.2	3.3	3.5	3.5	86.49	94.26	4.25	2.0	47.06		6.4		
367223(5)	11.9		49.58		8.5	8.0	8.9	72.0	61.5	3.25	3.25	3.95	3.95	82.28	82.28	4.25	2.15	60.59		5.9		
372915	11.7		61.26		8.7	8.0	8.9	70.0	57.0	3.2	3.25	3.65	3.7	87.67	87.64	4.4	2.3	62.87		6.2		
372916	12.1		62.89		8.5	8.2	9.2	70.0	55.0	3.2	3.25	3.65	3.7	87.67	87.64	4.4	2.3	62.87		5.9		
372917(9)	12.1		63.72		8.5	7.6	8.9	71.0	57.0	3.5	3.7	3.7	3.7	94.59	100.0	4.55	2.4	62.75		6.4		
365637	12.1		62.76		10.1	9.3	10.2	71.5	58.0	3.3	3.3	3.8	3.8	86.84	86.80	4.95	2.35	47.47		6.3		
372919(5)	12.7		62.76		9.5	8.6	9.6	69.5	59.0	3.3	3.35	4.0	3.9	81.26	89.90	4.8	2.1	45.76		6.4		
374758(prob. 9)	12.9		63.49		9.5	8.6	9.4	69.5	51.0	3.6	3.65	3.8	3.7	94.74	98.65	4.9	2.4	48.85		6.3		
374783(2)	12.8		60.0		9.5	8.3	9.4	69.5	55.5	3.6	3.65	3.8	3.7	94.74	98.65	4.9	2.4	48.85		6.0		
374614(9)	13.2		49.24		9.2	8.4	9.2	69.5	55.5	3.6	3.65	3.8	3.7	94.74	98.65	4.9	2.4	48.85		6.5		
365966					9.2	8.4	9.2	69.5	55.5	3.6	3.65	3.8	3.7	94.74	98.65	4.9	2.4	48.85		6.5		

1 Near.

KODIAK ISLAND INDIANS: CHILDREN
(Pre-Koniag)¹

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabela ad max.)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdlička's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
377712	U.S.N.M.	Our Point, Uyak Bay	5		16.7	12.4	12.7	74.85	87.29	102.42	13.93			9.3	5.8
372837 (♂)	do	do	9		15.6	13.0	12.2	83.33	86.91	93.85	13.60				6.0
372829 (♂)	do	do	9-10		17.4	13.6	13.6	73.16	87.74	100.0	14.87				6.4
372782 (♀)	do	do	15		17.8	13.6		76.40							6.2

"BLUE"

374674	U.S.N.M.	Our Point, Uyak Bay	16		16.9	13.2	13.0	73.11	86.38	98.48	14.37					6.7
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"RED"

Catalog No.	Diam. Bizygomatic max. (c)	Facial Index, total $\left(\frac{c}{a \times 100}\right)$	Facial Index, upper $\left(\frac{c}{b \times 100}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits-Height, right	Orbits-Height, left	Orbits-Breadth, right	Orbits-Breadth, left	Orbital Index, right	Orbital Index, left	Nose-Height	Nose-Breadth max. im.	Nasal Index	Upper Alveolar Arch—Length max.	Upper Alveolar Arch—Breadth max.	Upper Alveolar Arch—
377712	110.8	86.11	53.70	9.0	8.0	8.4	65.0	50.0	3.2	3.2	3.35	3.4	95.62	94.42	4.1	2.0	48.78	5.6		
372837 (♀)	116.6		56.60	8.2	7.4	8.4	71.0	58.0	3.2	3.45	3.45	3.45	100.0	100.0	4.25	2.1	49.41	5.7		
372829 (♂)	111.5		55.65	9.5	8.6	9.4	69.5	53.0	3.6	3.7	3.6	3.6	98.65	100.0	4.75	2.15	45.26	5.7		
372782 (♀)	112.4		56.0						3.3	3.6	3.6	3.6	91.67		4.4	2.2	50.0	6.3		

"BLUE"

374674						9.4			3.25	3.4	3.7	3.6	87.84	94.44	4.5	2.2	46.89	5.0	5.9	84.76
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¹ Specimens recovered from the upper and supposedly more recent portion of the excavations were marked with a red pencil and those from below with a blue pencil, and thus came to be known as "red" and "blue," respectively.

² Near.

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth, max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch—
374765	9.2	90.22	54.55																	
374716	10.1		65.45						3.4			3.15		107.95	3.8	2.0	52.63		4.8	
363065	10.2	87.06	60.78			1 8.7		3.5	3.4		3.4		192.94	4.15	2.0	48.19		5.3		
366713	11.1	83.78	50.45	8.5	8.0	8.7	73.5	57.0	3.3	3.3	3.5	3.4	92.86	3.9	2.1	63.85		5.9		
366718																			5.6	
365719																				
374680	11.1	87.59	62.25	8.3	7.8	8.6	72.5	66.5	3.1	3.15	3.4	3.4	91.18	4.2	2.3	64.76		5.9		
374711	11.3		68.16					3.25	3.25	3.45	3.45	3.45	94.20	3.95	2.0	60.63		5.9		
374707																				
363662																				
366065																				
366091																				
363658																				
363669																				
366034																				
366091	11.6	85.21	52.45			9.0		3.4	3.4	3.6	3.7	3.6	94.44	4.7	2.4	61.06		5.6		
363669								3.25	3.25	3.3	3.3	3.3	97.84	4.5	2.1	46.67		5.9		
366034								3.15	3.15	3.3	3.3	3.3	95.45	3.9	2.0	51.28		3.3		
374628 (Q)	10.9	89.91	55.21						3.0			3.35		89.58	4.2	2.0	47.62		0.0	
363667	11.3		59.29	9.4	8.6	9.4	69.0	59.5	3.2	3.6	3.6	3.35	88.50	4.2	2.0	46.49		0.0		
366009									3.25	3.3	3.5	3.3	92.86	100.0	4.75	45.49		0.0		
366009																			0.0	
366013																			0.0	
374625	11.8	65.59	51.69	8.4	8.4	9.4		3.4	3.3	3.5	3.5	3.5	94.29	4.3	2.05	47.13		0.0		
374630	11.9	94.21	56.90	9.6	8.4	9.4	67.5	53.0	3.4	3.45	3.8	3.7	86.47	54.29	4.5	2.3	46.31	6.4	6.4	83.84
374672	12.7	89.08	54.69	9.8	8.8	10.2	74.5	53.0	3.1	3.15	3.4	3.6	91.18	87.50	4.8	2.3	47.62	4.9	6.2	79.03
366015	11.6		52.19	9.6	8.5	9.4	62.0	52.5	3.1	3.15	3.4	3.65	91.85	97.26	4.85	2.15	43.43	6.1	6.3	80.65
374615			58.62					3.35	3.3	3.4	3.4	3.4	98.53	100.0	4.9	2.2	44.88	5.0	5.6	57.50
374617				9.2	8.4	9.6	71.5	62.0	3.4	3.35	3.8	3.6	80.47	82.05	4.9	2.2	44.80	4.0	6.3	79.87
374677 (P)	13.2		53.79			10.6			3.7	3.7	3.8	3.9	94.87	5.25	2.1	40.0		6.3		6.3

1 Near.

KODIAK ISLAND: PRE-KONIGAG, "RED" MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maximum (gibbella ad)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Men-tion-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
367298	(A. H.)		40		19.5	13.8		70.77	91.97	108.95	15.20				7.7
368015	U.S.N.M.	Our Point, Uyak Bay.	65		18.1	13.2	14.3	72.55	88.07	104.56	15.70				8.4
372895	do	do	50		18.9	13.8	14.3	73.02	88.07	104.56	15.70				
369678	do	do	60		18.2	13.4	14.5	73.63	95.67	110.46	15.47				
367216	do	do	50		18.2	13.5	13.7	74.18	86.44	101.48	15.13			13.8	8.5
374621	do	do	45		18.5	13.9	13.0	75.14	86.80	100.0	15.43			13.2	8.0
374609	do	do	24		18.0	14.0	14.2	75.27	95.25	101.43	15.60			13.1	8.0
374627	do	do	55		17.5	13.2	14.2	75.43	92.61	107.68	14.97			12.0	7.3
368655	do	do	30		18.0	13.6	14.7	75.58	95.04	108.09	15.43			12.7	8.0
374616	do	do	45		19.3	14.6	13.4	75.65	79.06	91.78	15.77			13.6	8.2
367206	do	do	65		18.0	13.7	14.5	76.11	91.48	105.84	15.40			12.7	7.9
372810	do	do	50		18.0	13.7	13.7	76.11	86.43	100.0	15.13			12.7	7.9
372810	do	do	30		18.0	13.7	14.0	76.17	82.95	95.24	16.0			12.9	7.7
372896	do	do	55		19.3	14.7	13.9	76.24	87.15	100.78	15.27			13.4	7.9
377786	do	do	55		17.7	13.5	13.5	76.27	86.54	100.0	14.83			13.4	7.3
369617	do	do	45		18.0	14.2	13.8	76.34	84.15	97.18	15.53			12.9	8.0
369611	do	do	40		18.6	14.2	13.8	76.34	84.40	97.18	15.50				
374685	do	do	45		18.5	14.2	14.2	77.01	89.43	102.78	15.9			13.6	8.3
372836	do	do	35		17.4	13.4	14.2	77.01	82.21	105.97	15.0			13.4	8.1
374682	do	do	50		18.7	14.4	14.8	77.05	82.72	95.04	15.97			7.4	7.4
369612	do	do	50	Mid-aged	18.3	14.1	13.4	77.42	87.27	100.0	15.80			8.4	8.3
369624	do	do	35	Mid-aged	18.6	14.4	14.4	77.72	86.85	99.30	15.63			13.4	8.4
369618	do	do	35		18.4	14.3	14.2	77.84	90.74	109.65	16.17			13.0	7.7
369622	do	do	25		18.1	14.1	14.2	77.90	88.82	101.42	15.50			12.9	7.8
374606	do	do	40		17.7	13.8	14.0	77.97	88.89	101.45	15.17			13.2	7.9
367221	do	do	45		17.4	13.6	13.2	78.16	85.16	97.66	14.73			13.2	7.5
374675 (some- what C-like but proba- bly ♂)	do	West side mouth of Uyak Bay.	40		17.4	13.6	14.0	78.16	90.32	102.84	15.0			13.0	7.5
372817	do	Our Point, Uyak Bay.	50		18.4	14.4	14.0	78.26	85.97	97.22	15.60			13.1	7.8
362915	do	Chief's Point, Uyak Bay.	50		17.6	13.8	13.8	78.41	87.90	100.0	15.07				7.4
369620	do	Our Point, Uyak Bay.	30		18.3	14.4	14.4	78.69	88.07	100.0	15.70			13.1	7.9
362913	do	Chief's Point, Uyak Bay.	40		17.9	14.1	14.0	78.77	87.50	99.29	15.33				7.6

372910	do	Our Point, Uyak Bay	55	18.4	14.5	13.6	78.80	82.68	93.79	15.50	12.7	7.7
372813 (some- what ♀-like but ♂-skele- ton)	do	do	23	17.6	13.9	13.0	78.98	82.54	93.53	14.83	12.3	7.5
366652	do	do	Y o u n g adult.	18.0	14.3	14.0	79.44	86.69	97.90	15.43		
372911	do	do	40	18.0	14.3	14.0	79.44	86.69	97.90	15.43	13.3	8.0
374688	do	do	35	17.7	14.0	14.7	79.69	92.15	104.26	15.50		8.3
367297	do	do	Old	17.4	13.9	13.5	79.89	86.46	97.12	14.93		
374622	do	do	65	17.9	14.3	14.4	79.89	89.44	100.70	15.53	12.3	7.4
374612	do	do	55	16.8	13.5	13.6	80.36	89.77	100.74	14.63	12.8	7.6
366660 (♂ skeletal cranium)	do	do	Aged	18.1	14.6	14.2	80.66	86.85	97.26	15.63		
374676	do	do	50	18.1	14.6	13.5	80.66	82.67	92.47	15.40	12.9	7.9
362916	do	Chief's Point, Uyak Bay.	40	17.6	14.2	14.2	80.68	89.31	100.0	15.33		7.4
372891	do	Our Point, Uyak Bay	65	18.0	14.6	12.6	81.11	77.90	86.30	15.07		
374610	do	do	60	17.2	14.0	14.0	81.40	89.74	100.0	15.07	12.5	7.3
377714 (some- what ♀-like but ♂-skele- ton)	do	do	19	16.9	13.9	13.7	82.25	88.96	98.56	14.83	12.9	7.7
372811	do	do	35	17.5	14.4	14.0	82.29	87.77	97.22	15.30	13.5	8.1
363619 (mix- ed?, red- Koring?)	do	do	50	17.4	14.4	14.4	82.76	90.57	100.0	15.40		7.7
362914	do	Chief's Point, Uyak Bay.	60	(17.0)	(13.9)	(13.6)	(81.76)	(88.03)	(97.84)	14.83		7.8
366710	do	Our Point, Uyak Bay	50	(16.9)	(13.8)	(14.4)	(81.66)	(93.81)	(104.85)	15.03		8.0
367201	do	Middle Goose Island	55	(16.3)	(14.1)	(13.2)	(86.80)	(86.84)	(93.62)	14.53		7.1
374698	do	Our Point, Uyak Bay	55	(18.2)	(15.1)	(13.5)	(82.97)	(81.08)	(89.40)	15.60	13.7	8.2
374674 (a typ- ical extra- necous?)	do	do	50	(17.8)	(15.1)	(14.0)	(84.83)	(84.83)	(92.72)	15.63	13.6	7.8
378251	do	do	50	(17.5)	(15.0)	(14.3)	(85.71)	(88.00)	(95.83)	15.60	13.5	8.4
Specimens			(54)	(48)	(46)	(48)	(40)	(46)	(46)	(52)	(33)	(48)
Totals			865.4	672.1	643.1	77.66	87.85	99.77	796.33	432.5	432.5	378.0
Averages			18.03	14.0	13.98	14.0	77.30	86.30	15.31	13.11	13.11	7.88
Minima			16.8	13.2	12.6	70.77	77.30	86.30	14.53	12.0	7.3	7.3
Maxima			19.5	14.7	14.8	82.76	93.67	110.45	16.00	14.3	14.3	8.5

Footnotes on P. 49 at end of table.

KODIAK ISLAND: PRE-KONIAG, "RED" MALES—Continued

Catalog No.	Diam. Bizygomatic (c)	Facial Index, total $\left(\frac{c}{a \times 100}\right)$	Facial Index, upper $\left(\frac{c}{b \times 100}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index
3672908									3.75		4.0		83.75		2.8	52.83		5.1	6.5	78.46
363615	14.0		60.0	11.4																
3728915	14.3			10.6																
3728916	14.0			11.2																
366678	13.8	98.67	61.59	10.4	9.4	10.6	71.5	60.5	3.65	3.7	4.0	3.9	91.25	94.87	2.45	41.58	5.6	6.7	83.58	
367216	14.4	103.62	61.59	10.2	8.9	10.4	64.0	54.0	3.8	3.85	4.1	4.0	92.68	96.25	2.5	46.30	6.2	7.1	87.52	
374621	14.4	91.67	55.56	10.7	9.4	10.6	66.0	55.0	3.9	4.0	4.1	4.0	85.12	100.0	2.55	48.11	5.7	6.9	82.61	
374600	13.7	95.62	58.39	10.5	9.4	10.7	69.0	56.5	3.65	3.65	4.2	4.1	86.90	89.02	2.35	46.72	5.4	6.9	78.26	
374627	13.3	60.83	54.89	10.6	9.5	10.6			3.7	3.55	3.9	3.8	94.87	93.42	2.5	46.72				
363635				11.7	10.4	11.4	67.5	50.5	3.7	3.65	4.1	4.0	90.24	91.25	2.45	42.24	5.9	7.0	84.29	
374610	14.9	91.88	55.03	10.8	9.8	10.6	66.5	62.0	3.6	3.65	4.1	4.0	88.89	88.46	2.4	40.0	6.0	7.2	83.33	
372906	15.0	96.67	57.66	10.9	9.6	11.1	68.0	54.0	4.0	3.45	4.5	3.9	94.74	94.74	2.4	42.59	5.8	7.2	80.66	
372808	13.7	92.73	58.93	10.3	9.3	10.3	66.0	55.5	3.8	3.75	4.2	4.2	89.29	89.29	2.6	47.27	5.5	6.7	82.09	
372810	13.2	97.73	58.93	10.9	9.9	10.8	68.0	60.5	3.6	3.7	4.3	4.1	88.72	90.24	2.3	49.06	5.9	7.0	84.29	
372806	13.5	92.41	53.68	10.3	9.6	10.8	73.5	63.0	3.8	3.9	4.0	4.0	95.0	97.5	2.5	49.07	5.4	6.7	80.66	
377756	13.6	94.85	58.82	10.3	8.8	10.2	68.0	46.0	3.8	3.9	4.0	4.0	95.0	97.5	2.5	43.10	5.4	6.7	80.66	
363611				10.6	9.4	10.6	67.0	58.0	3.5	3.5	4.1	3.8	85.97	85.97	2.7	49.00	5.6	7.3	76.71	
374685	14.6	103.62	64.39	10.2	9.3	10.8	70.0	62.0	3.5	3.45	4.1	3.8	89.85	90.79	2.7	49.00	5.7	7.3	86.07	
372886	13.2	103.62	64.39	10.2	9.3	10.8	70.0	62.0	3.5	3.45	4.1	3.8	89.85	90.79	2.7	49.00	5.7	7.3	86.07	
374682	14.0	95.71	57.86	11.1	10.0	11.5	72.5	68.0	3.6	3.6	4.2	4.2	92.86	93.18	2.65	50.0	5.2	6.8	75.94	
363612	14.5	91.04	57.04	9.6	8.6	10.2	68.0	58.0	3.5	3.5	4.1	4.1	93.90	93.90	2.3	46.66	5.8	6.9	85.26	
363621	14.8	96.76	56.76	10.7	9.6	11.0	69.5	61.0	3.7	3.85	4.1	4.2	94.09	91.67	2.5	50.91	5.8	7.2	77.58	
374607	14.6	91.78	56.85	10.8	9.6	10.4	64.5	52.5	3.7	3.6	3.8	3.7	87.97	87.97	2.4	46.90	5.8	7.2	80.66	
363618	14.2	91.65	54.22	10.3	9.0	10.4	69.0	52.5	3.5	3.5	4.1	4.1	85.97	85.97	2.7	47.89	5.5	6.9	79.71	
363622	14.6	96.55	54.22	10.3	9.0	10.4	69.0	52.5	3.5	3.5	4.1	4.1	85.97	85.97	2.7	47.89	5.5	6.9	79.71	
363622	14.2	91.65	54.22	10.3	9.0	10.4	69.0	52.5	3.5	3.5	4.1	4.1	85.97	85.97	2.7	47.89	5.5	6.9	79.71	
374606	13.7	92.35	57.66	10.4	9.3	10.6	69.5	60.0	3.6	3.6	4.0	3.9	92.35	92.35	2.6	47.27	5.3	7.0	77.14	
367221	13.8	95.65	54.55	9.8	8.6	10.1	69.5	57.5	3.65	3.65	4.0	3.9	92.35	92.35	2.6	47.27	5.3	7.0	77.14	
374675	14.9	94.89	54.74	10.5	9.2	10.2	70.0	54.0	3.4	3.5	4.1	3.9	85.0	84.77	2.5	45.71	5.3	7.8	77.14	
372817	14.9	87.92	52.55	10.6	9.3	10.5	68.0	47.5	3.7	3.7	4.0	3.9	86.0	84.77	2.5	45.71	5.3	7.8	77.14	
362915	14.2	92.11	52.11	10.0	8.6	9.8	70.0	53.0	3.45	3.45	3.9	3.9	90.79	94.67	2.9	49.06	3.8	6.7	84.68	
363620	14.8	88.51	53.58	10.6	9.6	10.9	70.5	60.5	3.9	3.8	4.4	4.3	88.64	88.37	2.4	46.30	3.4	6.8	74.41	
362913	14.3	93.16	53.16	10.0	8.6	9.7	69.0	58.0	3.4	3.45	4.05	3.96	85.96	87.54	2.2	48.08	3.0	6.0	76.75	
372910	15.0	84.67	51.53	10.4	9.2	10.4	68.5	55.0	3.25	3.35	4.1	4.0	79.27	83.56	2.8	52.34	6.0	7.5	80.0	

KODIAK ISLAND: PRE-KONIG, "BLUE" MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabella ad maxim.)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth wear	Men's Height (a) Nasion	Alveol. Pl.-Nasion Height (b)
360692	(A. II.)	Our Point, Uyak Bay.	50		18.8	13.2	(High)	70.21						14.0	8.4
360620	U.S.N.M.	do.	Sub-adult		17.6	12.9		73.30						12.9	7.5
360623	do.	do.	65		18.0	13.2		73.35						12.5	7.8
372776	do.	do.	18		18.5	13.6	13.2	73.51	82.24	97.06	15.10				7.8
360697	do.	do.	60		18.5	13.7	(High)	74.05							7.2
360648	do.	do.	35		18.0	13.8	13.6	76.67	85.55	98.55	15.13				8.0
360694	do.	do.	50		18.0	14.6	13.7	76.84	81.65	95.84	15.77				7.8
366701	do.	do.	19.0		17.5	13.6	14.2	77.71	91.32	104.41	15.10				7.8
374569	do.	do.	60	Mid-aged	17.9	14.0	13.8	78.21	86.52	98.57	15.23				8.0
377703	do.	do.	35		17.5	13.8	13.4	78.86	85.62	97.1	14.90				8.1
374560	do.	do.	60		18.2	14.4	13.6	79.12	83.44	94.44	15.40				7.6
360717	do.	do.	26		18.1	14.4	14.0	79.56	86.16	97.22	15.50				
374578	do.	do.	30		18.6	14.8	14.6	79.57	87.43	93.65	16.0				
374696	do.	do.	40		18.2	14.5	13.8	79.67	84.40	95.17	15.50				7.2
377713	do.	do.	60		17.3	13.8	13.7	79.77	83.10	89.28	14.93				7.3
360695 (probably small ♂)	do.	do.	35		16.7	13.4	13.4	80.24	89.03	100.0	14.50				
374552	do.	do.	25		17.6	14.2	13.8	80.68	86.79	97.18	15.20				8.1
360619	do.	do.	19		17.7	14.5	14.0	81.92	86.96	96.55	15.40				7.6
374568	do.	do.	65		17.8	14.6	13.4	82.02	82.72	91.78	15.27				8.0
360016A	do.	do.	Sub-adult												
360624	do.	do.	30												
360633	do.	do.	35												
Specimens					(oblong)	(oblong)	(oblong)								
Totals	(22)		883		341.5	19	(15)	(19)	(15)	(15)	(15)			(11)	(15)
Averages			40.1		205.0	19	206.2				228.93			142.0	116.5
Minima			18		16.7	12.9	13.2	77.60	85.81	97.26	15.26			12.9	7.8
Maxima			65		19.0	14.8	14.6	82.02	91.32	104.41	16.0			11.9	7.2

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxim.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—
366682									4.0	3.8	4.0	4.0	95.0		5.75	2.45	42.61	6.1	7.1	85.92
366620									3.9	3.70	3.9	(High)	96.15		5.15	2.2	42.73	5.5	7.2	76.89
366623															5.7	2.5	48.86			
372776	13.5	92.69	67.78																	
366687									4.1	3.45	4.1	4.1	84.15		4.9	2.6	58.06	5.9	6.9	85.61
366648	14.0	100.0	67.72	10.6	9.5	10.4	68.5	56.0	4.4	3.69	4.4	4.1	82.96		5.8	2.8	48.28	6.0	6.8	88.84
366694	13.8	92.08	66.52	10.4	8.9	10.0	68.5	53.0	4.1	3.55	4.1	3.9	86.69		5.5	2.6	47.27	5.6	6.2	90.32
366701	14.2		66.34	10.0	9.0	10.4	70.0	60.5	4.0	3.55	4.0	3.9	83.75		5.3	2.75	52.58	5.7	6.6	86.86
374569	13.8	97.83	68.70	9.9	9.0	10.7	72.5	63.0	4.4	4.2	4.4	4.3	96.45		5.2	2.45	46.23	5.5	6.1	90.16
377703																				
374566									3.7	3.25	3.7	3.7	88.84		5.0	2.4	42.86	5.3	6.7	79.10
366717	13.7	89.78	65.47	9.8	9.0	10.2	70.5	61.0	3.3	3.3	3.7	3.7	89.19		5.2	2.7	51.92	5.3	6.5	81.64
374578																				
374666									4.0	3.9	4.1	4.0	95.12		5.2	2.4	46.15	5.3	6.5	81.54
377713	13.6	87.50	68.94		8.8	10.0	69.5	59.5	3.55	3.45	4.0	3.8	86.25		4.86	2.56	42.68	5.3	6.4	92.16
366695	13.8	87.68	68.90	9.9	8.9	10.0	68.5	59.0	4.0	3.5	4.0	3.9	87.60		5.3	2.5	47.17	5.9	6.4	92.16
374552	13.5	97.01	60.0	10.7	9.6	10.4	65.5	60.0	3.6	3.3	3.7	3.75	91.56		5.3	2.15	40.67	5.6	6.3	86.16
366619	13.3	94.74	67.14	10.5	9.5	10.5	66.0	63.0	3.3	3.3	3.7	3.7	88.08		5.3	2.25	42.46	5.6	6.0	84.86
374568	13.8		67.97	10.6	9.3	10.2	64.5	55.0	3.25	3.25	3.9	3.8	83.34		5.3	2.25	42.46	5.6	6.0	84.86
366816A																				
366824	14.5			10.0	9.2															
366833																				
Specimens	(13)	(9)	(12)	(11)	(12)	(10)	(10)	(10)	(13)	(10)	(10)	(10)	(13)	(10)	(16)	(16)	(16)	(16)	(16)	(16)
Totals	179.9		112.7	102.9	123.0	679.5	584.0	46.70	52.3	40.15	40.15	40.15	89.89	90.04	85.3	40.0	46.89	89.70	105.7	105.7
Averages	13.8	93.27	66.41	10.2	9.15	10.3	67.95	58.40	4.0	3.6	4.0	4.0	82.96	85.63	4.85	2.5	46.89	5.6	6.6	84.86
Minima	13.3	87.50	61.43	9.8	8.8	10.0	63.5	53.0	3.7	3.25	3.7	3.7	82.96	85.63	4.85	2.15	40.67	5.3	6.1	76.39
Maxima	14.5	100.0	60.0	10.7	9.6	10.7	72.5	63.0	4.4	4.2	4.4	4.4	96.15	100.0	5.8	2.8	53.06	6.1	7.2	92.19

! Allowance made for wear of teeth, where needed.
 † Near.

KODIAK ISLANDS: PRE-KONIG, "RED" FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (gabella ad maxim.)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a) 1	Alveol. Pt.-Nasion Height (b)
374652	(A. II.)	Our Point, Uyak Bay	35		18.2	12.8	14.0	70.85	90.32	109.87	15.0				7.9
368632	U.S.N.M.	do	Mid-aged		17.5	12.6	13.4	72.0	89.04	106.55	14.50				7.5
374658	do	do	Elderly		18.3	13.2		72.13							
374635	do	do	35		17.3	12.5		72.85						11.7	7.0
372830	do	do	25		17.6	12.8	14.0	72.73	92.11	109.87	14.80				7.2
374611 (slightly like but probably ♀)	do	do	25		18.0	13.1	13.0	72.78	83.60	99.24	14.70				7.1
374614	do	do	Sub-adult.		17.9	13.1	13.1	73.18			14.60				
369639	do	do	30		17.7	13.0		73.45	85.34	100.77					
377704	do	do	50		18.0	13.3	13.7	73.89	87.54	103.01	15.0				
372834	do	do	30		17.5	13.0	14.0	74.29	91.80	107.69	14.83				7.6
372827	do	do	60		17.8	13.6	13.7	76.10	87.86	100.74	15.03				
372828	do	do	50		17.9	13.6	13.6	74.80	87.18	102.26	14.93				
374001	do	do	40		18.3	13.7	14.2	74.92	85.90	100.74	15.29				7.6
374614	do	do	40		17.6	13.1	13.0	74.65	84.70	99.24	14.57				7.2
372812	do	do	20		17.8	13.3	12.4	74.72	73.75	83.83	14.50				6.7
369693	do	do	60		17.8	13.4		75.28							
377702	do	do	75		17.8	12.6	12.6	75.23	80.77	94.63	11.60				8.2
363627	do	do	Sub-adult.		17.4	13.1	14.0	75.29	91.80	106.87	11.83				7.2
374692	do	do	30		17.0	12.5	13.4	75.29	89.63	104.69	14.40				7.4
369651	do	do	Near mid-aged		17.5	13.2		75.43							7.5
366703	do	do	Young adult or near.		18.0	13.6		75.56							6.8
366709	do	do	50		17.7	13.4	14.3	75.71	91.91	106.72	15.13				7.7
374662	do	do	Young adult.		17.8	13.5		75.83							
369648	do	do	40		17.4	13.2	13.8	75.86	90.20	104.55	14.80				7.7
377728	do	do	25		17.0	12.9	13.9	75.83	92.88	107.75	14.60				7.6
374626	do	do	30		17.5	13.3	(High)	76.0							8.0
374683	do	do	Mid-aged		17.6	13.4	13.5	76.14	87.10	100.75	14.83				8.0
374687	do	do	30		16.8	12.8	12.8	76.16	86.49	100.0	14.13				8.9
374686	do	do	Mid-aged		17.3	13.2	12.6	76.30							7.7
374651	do	do	Old		18.0	13.8	12.6	76.67	79.25	91.50	14.80				

374655	do	do	18.0	13.8	14.0	76.67	88.06	101.46	15.27	11.9	7.2
374657	do	do	17.6	13.5	12.5	76.70	80.89	92.59	14.53	12.0	7.4
374658	do	do	17.8	13.7	12.8	76.87	81.87	93.45	14.77	12.1	7.3
374659	do	do	17.2	13.3	12.8	77.32	84.99	96.21	14.43	11.7	7.2
374660	do	do	17.7	13.7	13.7	77.40	87.39	100.00	15.03	12.8	7.7
374671	do	Elderly	17.8	13.8	12.8	77.68	81.01	92.75	14.80	11.8	7.3
374682	do	do	16.5	12.8	12.8	77.68	87.37	100.0	14.03	11.8	7.3
383326	do	do	17.4	13.5	13.4	77.69	86.79	93.56	14.77	13.0	8.0
372983	do	do	18.0	14.0	13.8	77.78	86.95	98.67	15.27	12.0	7.3
377729	do	do	17.1	13.3	13.4	77.78	88.16	100.75	14.60	12.0	7.3
374624	do	do	17.6	13.7	13.3	77.84	87.79	97.08	14.87	11.9	7.2
374625	do	do	17.2	13.4	13.8	77.91	90.80	102.99	14.80	11.9	7.3
368444	do	do	17.2	13.4	13.8	77.91	90.80	102.99	14.80	12.0	7.2
368708	do	do	17.2	13.4	13.2	77.91	86.97	98.51	14.60	12.0	7.2
374654	do	do	17.7	13.8	13.8	77.97	87.63	100.0	15.10	12.0	7.9
377791	do	do	17.3	13.5	13.1	78.03	84.48	96.30	14.60	12.0	7.6
369512	do	Aged	17.3	13.5	13.1	78.03	83.06	97.04	14.63	12.0	7.4
374619	do	do	17.8	13.9	13.9	78.09	87.70	100.0	13.20	12.0	7.4
374635	do	Elderly	17.3	13.9	14.0	78.11	93.02	106.06	14.70	12.0	7.4
367235	do	do	16.9	13.2	14.0	78.11	93.02	106.06	14.70	12.0	7.4
374604	do	do	17.4	13.6	13.2	78.16	85.16	97.06	14.73	6.9	6.9
372838	do	do	17.0	13.3	12.6	78.24	82.26	94.74	14.30	7.2	7.2
366672	do	do	17.5	13.7	13.2	78.29	84.62	96.35	14.80	7.4	7.4
372835	do	do	17.1	13.4	13.1	78.38	85.60	97.76	14.53	11.9	7.7
374603	do	do	17.1	13.4	13.1	78.38	92.46	105.22	14.87	12.4	7.6
374683	do	do	17.1	13.4	13.6	78.38	89.18	101.49	14.70	12.3	7.7
374613	do	do	18.1	14.2	13.8	78.45	85.45	97.18	15.37	7.4	7.4
367792	do	do	16.8	13.2	13.6	78.57	90.67	103.63	14.53	6.2	6.2
367229	do	do	17.3	13.6	12.2	78.61	78.97	89.71	14.37	12.4	7.6
374665	do	do	16.9	13.3	12.6	78.70	83.44	94.74	14.27	8.0	8.0
374683	do	do	17.5	13.8	14.6	78.86	93.89	105.80	15.30	6.6	6.6
367210	do	do	17.2	13.6	12.7	79.07	82.47	93.58	14.50	6.6	6.6
374639	do	do	16.4	13.0	13.2	79.37	89.80	101.54	14.20	7.4	7.4
374634	do	do	16.9	13.4	13.5	79.39	89.11	100.75	14.60	7.6	7.6
374546	do	do	16.9	13.4	13.5	79.40	87.37	90.26	14.63	12.4	7.4
374584	do	do	17.0	13.6	13.2	79.53	85.90	97.06	14.63	7.1	7.1
366674	do	do	17.1	13.6	13.6	79.53	88.60	100.0	14.77	12.3	7.0
372815	do	do	17.1	13.6	13.6	79.68	83.02	99.27	14.83	12.1	7.4
374673	do	do	17.2	13.7	13.1	79.76	86.75	97.76	14.43	12.8	7.7
366664	do	do	16.8	13.4	14.3	79.78	80.57	100.70	15.43	11.9	7.2
366671	do	do	17.8	14.2	14.3	79.78	80.57	100.70	15.43	11.9	7.2
363629	do	do	16.0	12.8	13.0	80.0	90.28	101.56	13.93	7.3	7.3
393384	do	do	17.0	13.6	13.8	80.0	90.80	101.47	14.80	11.1	6.7
366675	do	Aged	17.5	14.0	13.2	80.0	85.81	94.29	14.90	13.2	7.9
372905	do	do	17.5	14.0	13.8	80.0	87.62	98.67	15.10	10.9	6.6
374657	do	do	17.0	13.6	13.6	80.0	88.89	100.0	14.73	7.0	7.0
396631	do	do	17.5	14.1	14.0	80.11	93.64	105.29	14.63	7.0	7.0
368331	do	do	16.6	13.3	13.6	80.12	93.64	105.29	14.63	7.0	7.0
372816	do	do	17.2	13.8	13.6	80.83	87.74	98.55	14.87	12.3	7.1
374615	do	do	17.2	13.8	13.6	80.83	87.74	98.55	14.87	12.3	7.1

(Asymmetry)

KODIAK ISLANDS: PRE-KONIAG, "RED" FEMALES—Continued

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabella ad maximum)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
366549	do	do	22		17.8	14.3	13.0	80.54	81.0	90.91	15.03			11.6	7.2
374620	do	do	20		16.1	13.0	12.8	80.75	87.57	98.46	13.97			12.2	6.8
368513	do	do	20		17.3	14.0	13.3	80.92	95.0	84.98	14.87			11.9	7.4
366068	do	do	24	Mid-aged	16.3	13.2	13.8	80.58	93.56	101.55	14.43			11.2	6.8
366010	do	do	19		16.5	13.4	12.8	81.21	91.79	14.07	14.93			11.9	7.5
363044	do	do	30		17.2	14.0	13.0	81.48	87.18	97.14	14.37			7.8	7.8
366004	do	do	35		16.6	13.2	13.3	81.48	80.26	100.76	14.37			7.8	7.8
374635	do	do	30	Elderly	17.2	14.0	13.4	81.60	85.90	95.71	14.87			7.3	7.3
374661	do	do	30		16.7	13.6	13.3	81.61	87.79	97.79	14.53			12.1	7.0
377730	do	do	30		17.4	14.2	13.4	81.61	84.81	94.37	15.0			12.6	7.6
374670	do	do	30		16.9	13.5	13.2	81.66	91.20	101.65	14.90			12.0	7.0
372814	do	do	25	Elderly	16.5	13.5	13.2	81.82	88.0	97.78	14.47			12.0	7.0
363630	do	do	24		16.6	13.6	13.5	81.93	89.10	99.96	14.57			11.9	7.1
366082	do	do	24		16.9	13.8	13.5	82.14	86.77	95.95	14.60			6.8	6.8
377734	do	do	35		16.8	13.4	13.2	82.49	89.31	100.66	14.30			7.1	7.0
374617	do	do	30		17.5	14.4	14.3	82.59	86.65	99.71	14.80			12.1	7.8
363014	do	do	25		17.0	14.0	13.4	82.59	88.59	97.56	14.80			11.8	7.1
374653	do	do	40	(Asymmetry)	17.0	14.0	13.7	82.55	86.45	95.71	14.63			11.8	7.5
374648	do	do	55		17.0	14.0	12.4	82.46	78.73	87.84	14.63			7.1	7.1
366002	do	do	17		17.4	14.1	12.4	82.46	85.05	94.50	14.30			7.5	7.5
374611	do	do	55		16.7	13.8	13.0	82.63	85.05	94.50	14.30			7.1	7.1
374659	do	do	30		16.8	13.9	13.4	82.74	87.74	96.40	14.70			7.7	7.7
377735	do	do	16		16.8	13.9	13.4	82.74	87.50	87.50	14.70			6.0	6.0
377737	do	do	30		16.8	13.9	13.6	82.74	88.60	97.84	14.77			7.2	7.2
374681	do	do	16		16.9	14.0	13.7	82.84	88.67	97.86	14.87			7.5	7.5
366707	do	do	24		17.0	14.1	13.8	82.94	88.74	97.87	14.87			7.1	7.1
366673	do	do	35		16.5	13.7	13.4	83.03	88.74	97.81	14.53			7.9	7.9
374655	do	do	40		17.8	14.8	13.2	83.15	80.68	89.19	15.27			7.9	7.9
367207	do	do	45		16.8	14.1	14.2	83.53	91.91	100.71	15.03			7.6	7.6
363628	do	do	40	Badly crushed	(long and narrow) (oblong)										
363645	do	do	40												
Specimens			(110)		(108)	(108)	(95)	(108)	(95)	(95)	(95)			(51)	(91)
Totals			4335		1,865.6	1,461.7	1,273.4	78.55	87.06	98.90	1,399.51			615.7	669.9
Averages			40		17.27	13.53	13.40	78.55	87.06	98.90	14.73			12.07	7.36
Minimum			18		16.00	12.5	12.2	70.53	78.73	87.84	13.93			10.8	6.2
Maximum			75		18.3	14.8	14.6	83.95	93.64	109.87	15.43			13.2	8.2

Catalog No.	Diam. Bizygomatic maxlm. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxlm.	Nasal Index	Upper Alveolar Arch—Length maxlm.	Upper Alveolar Arch—Breadth maxlm.	Upper Alveolar Arch—
374652						10.8			3.8	3.55	4.0	3.65		95.0	5.6	2.3	41.07			Upper Alveolar Arch—
363632	12.3		60.98			10.7			3.55	3.55	3.6	3.65		97.26						
374658									3.25	3.35	3.7	3.6	87.84	88.06	4.8	2.35	48.96	5.1	5.8	87.98
366635									3.4	3.8	3.8	3.8	86.84	89.47	5.1	2.3	45.10	5.1	6.1	82.56
372830	12.5		57.60	9.8	9.0	10.1	65.0	3.3	3.25	3.8	3.8	3.8	55.53	5.0	2.4	48.0	3.3	6.7	82.09	
366611	13.0	90.0	54.62																	
366614																				
366639																				
377704	14.0	90.71	54.29	10.7	9.8	11.2		3.65		3.95			92.41	5.45	2.5	45.87	5.6	6.3	88.89	
372834	12.0					10.4	74.0													80.00
372827	12.1					10.3	73.0	3.45	3.7	3.7	3.7	3.7	93.24	5.1	2.2	43.14	5.3	6.7	79.10	
372828	12.1	62.81	62.81	10.1	8.9	10.4	60.0	3.45	3.5	3.7	3.7	3.7	93.24	5.1	2.2	43.14	5.3	6.7	79.10	
374601	13.0	66.92	63.25	10.0	8.8	10.1	68.5	3.4	3.35	3.9	3.9	3.9	87.18	5.2	2.3	44.28	5.6	6.4	87.60	
374604	12.8	86.38	66.25	10.0	8.9	10.0	69.5	3.56	3.45	3.9	3.8	3.8	91.03	5.15	2.2	44.28	5.2	5.9	88.14	
372812	12.5	86.40	63.60	9.8	8.8	9.5	67.5	3.4	3.4	3.7	3.8	3.8	91.89	4.75	2.1	44.22	5.2	6.0	86.67	
360663																				82.09
377702	13.6	60.29	60.29	9.8	9.0	10.2	69.0	3.55	3.65	4.3	4.2	4.2	82.56	5.5	2.8	60.91	5.6	6.7	83.68	
363627	12.9	93.80	65.81	10.5	9.4	10.4	69.0	3.5	3.55	3.7	3.6	3.6	94.69	5.1	2.2	43.14	5.6	6.7	83.68	
374602	13.2	90.91	56.06	9.9	8.7	9.8	67.5	3.5	3.65	3.95	3.8	3.8	83.61	4.95	2.4	43.48	5.4	6.6	81.82	
366651																				
366703																				
366709	12.8	100.0	60.16	10.4	9.2	10.5	69.0	3.7	3.6	3.5	3.6	3.6	105.71	5.2	2.2	44.0	5.1	6.1	83.61	
374662																				
366668	13.0	100.81	69.23	9.9	8.8	10.0	68.5	3.4	3.35	3.7	3.6	3.6	91.89	5.2	2.55	45.04	5.3	6.7	79.10	
377728	12.8	61.79	61.79	10.2	8.8	10.1	67.5	3.45	3.55	3.8	3.7	3.7	90.79	4.95	2.45	49.49	5.5	6.6	83.35	
374626	12.3	86.88	62.60	10.8	9.4	10.0	62.5	3.35	3.5	4.0	3.85	3.8	82.75	5.4	2.3	42.59	5.5	6.0	81.67	
374683	13.3	87.74	60.15	10.8	9.4	10.0	62.5	3.5	3.55	3.9	3.8	3.8	89.74	5.15	2.55	49.51	5.9	7.1	83.10	
374687	12.3	91.06	66.10	10.2	9.0	9.8	66.5	3.35	3.4	3.8	3.7	3.7	88.16	4.45	2.25	50.66	5.6	6.1	91.60	
374686								3.7	3.7	4.0	4.0	4.0	92.50	5.4	2.5	46.30	5.1	6.3	80.96	
374651	13.4					10.0	74.0	3.65	3.75	3.8	4.0	4.0	96.05	5.4	2.5	46.30	5.1	6.3	80.96	
374656	13.1	90.84	54.96	9.7	8.6	10.4	74.0	3.65	3.8	3.8	4.0	4.0	96.05	5.4	2.5	46.30	5.1	6.3	80.96	
374667	12.8	93.75	57.81	10.0	8.8	9.8	66.0	3.15	3.75	3.5	3.5	3.5	107.14	5.3	2.4	47.53	4.9	6.5	75.88	
374625	13.2	91.67	55.30	10.4	9.2	10.0	66.0	3.7	3.9	3.9	3.9	3.9	90.77	5.3	2.35	43.40	4.9	6.1	82.81	
374629	13.1	89.91	54.96	9.4	8.8	10.2	74.5	3.15	3.3	3.9	4.0	4.0	92.50	4.75	2.35	40.47	4.6	6.7	93.58	
372832	12.9	89.22	59.69	9.5	8.5	9.9	70.0	3.7	3.7	3.7	3.7	3.7	95.90	5.35	2.45	45.79	5.0	6.3	81.37	

KODIAK ISLANDS: PRE-KONIG, "RED" FEMALES—Continued

Catalog No.	Diam. Bizygomatic	Facial Index, total	Facial Index, upper	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index
374071	13.0	90.77	55.15	10.3	9.2	8.6	52.0	3.25	3.35	3.9	3.8	82.39	88.16	5.3	2.3	43.40	5.5	6.5	84.02	
374032	13.7	102.36	62.90	10.2	9.2	10.6	60.5	3.65	3.55	4.1	4.1	89.02	86.58	5.1	2.3	42.59	5.4	6.3	85.71	
383626	13.2	97.53	61.96	10.5	9.4	10.6	58.0	3.6	3.8	4.1	4.1	92.68	92.68	5.45	2.5	45.87	5.5	6.2	88.71	
372531	13.2	93.31	56.15	10.8	9.6	9.5	53.0	3.3	3.4	3.65	3.6	90.41	94.44	5.0	2.5	50.0	5.7	6.4	89.06	
377229	13.0			10.8	9.2	10.5		3.35	3.6	3.9	3.7	91.03	97.50	5.0	2.45					
374021	13.0			10.1	9.2	10.5	62.0	3.4	3.4	3.7	3.9	91.89	94.89	4.85	2.5	51.55	5.4	6.4	84.38	
363343	12.6	95.50	55.40	9.4	8.6	9.8	71.0	3.5	3.5	3.8	3.9	92.11	89.74	5.4	2.65	49.07	5.3	6.4	82.81	
395708	12.5							3.5	3.5	3.5	3.5			4.8	2.2	45.83	5.3	6.6	80.30	
374054				(11.6)	(9.9)	10.0	(58.0)	3.7	3.5	3.7	3.7	87.37	100.0	5.1	2.35	43.74				
377731						8.0	65.0	3.6	3.7	3.9	4.0	87.80	92.60	5.1	2.4	47.06				
386612	12.8	93.33	56.30	10.6	8.9	10.2	55.0	3.6	3.7	4.1	4.0	88.75	90.0	5.4	2.65	49.07				
374019	13.5			10.2	8.9	9.9	58.5	3.5	3.6	4.1	4.0	91.74	93.60	5.1	2.4	45.91				
374645	12.9	100.0	61.67	9.9	8.8	10.0	52.5	3.85	3.75	3.85	3.7	100.0	101.95	4.9	2.3	45.94	5.0	2.6.7	71.63	
307235	12.0			10.0	8.8	10.0	63.5	3.7	3.7	3.9	3.9	94.37	94.37	5.05	2.35	46.53	5.3	6.2	85.48	
374064	13.0			10.0	8.8	10.0	49.0	3.7	3.7	3.9	3.9	94.37	94.37	5.05	2.35	46.53	5.0	6.2	80.65	
372833	13.0			10.1	9.1	10.2	56.5	3.45	3.6	4.1	3.9	84.15	92.81	5.05	2.4	47.53	5.3	6.3	84.13	
306672	13.2			9.5	8.6	10.0	61.0	3.5	3.55	3.8	3.7	92.41	95.95	5.05	2.2	43.27	5.1	6.6	77.87	
372532	13.1			9.7	8.8	10.2	71.5	3.5	3.55	4.0	3.8	90.39	103.94	5.2	2.3	44.93	5.1	6.2	82.66	
3734003	13.2	90.15	58.33	9.7	8.8	10.2	70.5	3.85	3.95	4.0	3.7	90.39	103.94	5.2	2.3	44.93	5.4	6.4	81.88	
374033	12.6			9.8	8.8	10.2	67.5	3.6	3.65	3.8	3.7	91.74	93.60	5.0	2.2	45.0	5.4	6.5	80.0	
374013	13.0			10.2	9.2	10.8	61.0	3.4	3.5	3.8	3.6	89.46	90.82	5.2	2.2	44.31	5.2	6.5	80.0	
377732	12.7			10.3	8.9	10.2	50.5	3.25	3.5	3.6	3.6	89.46	90.82	5.0	2.4	45.9	5.2	6.5	80.0	
387229	12.0			9.6	8.4	9.4	63.5	3.55	3.55	3.7	3.5	95.99	101.43	4.35	2.4	48.9	5.3	6.1	82.91	
374055	13.4	92.64	55.72	9.6	8.8	10.4	69.0	3.35	3.5	4.1	3.9	81.71	89.74	5.1	2.35	46.03	5.3	6.2	87.10	
374065	13.3			9.4	8.4	10.4	73.0	3.6	3.55	4.0	3.8	90.0	93.42	5.35	2.6	48.61	5.3	6.1	82.81	
377210	13.6			9.4	8.6	10.2	69.0	3.65	3.65	4.1	3.9	85.37	95.39	5.15	2.3	44.67	5.3	6.1	82.81	
375649	12.0			9.7	8.8	9.6	69.0	3.6	3.5	3.6	3.6	100.0	97.82	4.8	2.0	41.67	5.1	5.9	86.44	
374031																				
374046	13.6	94.41	54.41	10.2	9.0	9.9	66.0	3.45	3.55	4.0	3.9	86.35	91.03	5.4	2.6	48.15	5.2	7.0	74.89	
374084	13.0	95.38	58.46	9.8	8.6	9.8	68.0	3.65	3.75	3.9	3.8	93.59	98.68	5.4	2.2	40.74	5.4	6.4	84.38	
309574	12.9			9.6	8.8	9.8	57.0	3.4	3.4	4.0	3.8	85.0	89.47	5.0	2.35	47.0	5.0	6.3	79.37	
372815	13.3	92.43	52.63	10.0	8.6	10.2	71.5	3.45	3.7	3.95	3.9	87.34	94.37	4.85	2.1	49.49	5.6	6.6	84.55	
374073	12.6			9.6	8.6	10.2	63.0	3.15	3.15	3.6	3.7	87.59	95.14	5.1	2.7	52.91	5.5	6.5	81.62	
365664	12.5	102.40	61.60	10.2	8.8	9.9	65.5	3.7	3.85	3.8	3.8	90.37	101.32	4.95	2.3	46.47	5.7	6.8	83.82	
396871	13.1	90.84	54.96	9.8	8.8	9.8	68.5	3.25	3.3	3.6	3.5	90.28	92.98	4.9	2.55	52.04	5.4	6.6	81.82	

363984	13.3	54.89	8.3	10.0	3.5	3.35	4.1	4.0	85.37	83.75	5.0	2.5	50.0	6.8	76.57
366975	12.5	53.69	8.4	9.6	3.45	3.45	3.7	3.5	93.29	98.57	4.6	2.3	60.0	5.2	76.57
367205	13.3	59.09	9.4	9.6	3.75	3.63	4.05	3.9	92.59	97.69	5.2	2.45	47.12	5.4	80.60
374567	12.4	57.90	10.1	10.1	3.35	3.4	3.7	3.6	90.54	94.44	3.7	2.3	48.94		
369331	12.8	51.69		10.2	3.6	3.65		3.65	100.0	100.0	4.8	2.5	52.08		
372816	12.8	71.72			3.7	3.7		3.8			4.7	2.25	60.0		60.01
369519					3.9	3.85					4.85	2.4	49.49		53.35
374920	13.0	52.31	10.4	9.6	3.3	3.3	3.85	3.8	86.81	86.84	4.75	2.4	49.49		53.35
363913	13.4	55.22	10.3	9.1	3.55	3.5	3.8	3.8	92.42	92.11	4.3	2.35	48.95		56.25
366903	12.1	56.20	9.3	9.4	3.25	3.25	3.45	3.4	92.75	95.59	4.8	2.3	47.92		56.25
369510	12.9	58.14	10.1	9.8	3.45	3.5	3.9	3.7	88.46	94.69	5.3	2.1	45.28		82.09
369514	13.1	59.54	10.3	10.2	3.75	3.75	3.95	4.0	94.94	93.0	5.6	2.3	43.0		82.55
369691	12.5	61.80	10.6	9.2	3.5	3.6	3.7	3.6	94.59	100.0	5.6	2.2	44.67		90.32
371635	13.6	63.68	10.2	9.2	3.55	3.35	3.9	3.9	92.11	95.91	5.2	2.45	47.11		
374661	12.6	55.66	9.2	8.4	3.5	3.55	3.8	3.7	92.11	95.91	4.8	2.15	44.79		77.42
377730	13.0	58.46	9.5	9.6	3.6	3.55	4.25	4.1	84.71	86.58	5.2	2.3	44.23		76.12
374670	13.2	53.03	9.8	9.8	3.45	3.45	3.95	3.85	87.34	89.61	4.7	2.65	56.33		
372814	13.4	89.55	9.9	10.2	3.4	3.3	3.8	3.8	89.47	85.84	5.0	2.1	42.0		
363630	12.7	55.91	10.1	8.8	3.3	3.3	3.8	3.8	86.84		5.2	6.3	82.54		
366982	12.4	57.26	9.3	8.3	3.35	3.3	3.7	3.7	90.51	89.19	4.85	2.2	45.37		85.48
377631	12.0	57.71	9.7	9.6	3.4	3.45	3.75	3.7	90.67	93.24	5.2	2.4	49.15		78.79
374617	13.5	53.59	9.5	9.8	3.6	3.6	3.95	3.8	91.14	94.74	5.05	2.4	47.53		75.0
363914	12.5	56.0	9.2	9.0	3.7	3.55	3.9	3.9	94.87	95.05	4.65	2.2	47.32		82.26
374653	13.0	60.0	10.0	10.0	3.7	3.7	4.1	3.9	90.24	94.87	5.25	2.3	43.82		
374948					3.75	3.7					5.1	2.4	47.05		
369602	13.2	53.79	9.5	8.2	3.5	3.6	3.8	3.8	100.0	97.37	5.2	2.6	50.0		84.85
374611	12.9	58.14	9.9	9.8	3.5	3.6	3.8	3.7	92.11	97.39	5.6	6.6			
374659					3.7	3.7					5.4	6.6			81.82
377735	12.9	59.69	10.0	8.8	3.4	3.4	3.8	3.5	89.77	105.71	4.8	2.5	52.08		
377937	13.3	63.38	10.0	9.9	3.5	3.5	3.7	3.6	91.89	98.61	4.9	2.2	41.90		81.51
374681	12.7	54.35	9.8	8.8	3.45	3.75	3.75	3.6	97.39	102.78	4.95	2.5	50.51		85.25
366707	12.6	57.14	9.6	9.4	3.65	3.75	3.8	3.6	82.99	90.26	5.05	2.5	49.51		75.76
366073	12.4	60.48	9.3	8.3	3.15	3.25	3.5	3.5	91.24	98.72	5.1	2.45	48.04		50.0
374655	14.2	83.10	69.0	10.2	3.7	3.8	4.1	3.85	91.02	98.72	5.1	2.3	41.82		87.10
367207	13.4	58.95	9.9	9.8	3.55	3.55	3.9	3.9	91.02	91.02	5.5	2.3	45.0		
363628					3.5	3.5					5.0	2.6	49.06		83.26
363645					3.4	3.5					5.3	2.3			
Specimens	(87)	(81)	(73)	(91)	(85)	(89)	(85)	(89)	(85)	(89)	(93)	(93)	(93)	(79)	(79)
Totals	1,125	724.4	4,979.0	907.6	2,97.95	315.2	327.95	335.85	99.85	93.85	471.8	232.2	420.3	506.9	28.32
Averages	12.93	55.88	68.21	9.97	3.51	3.54	3.86	3.77	80.77	83.75	4.45	2.37	45.67	5.32	6.42
Minima	12.0	88.10	51.67	9.2	3.15	3.45	3.45	3.4	105.71	107.14	5.8	2.0	37.89	4.8	5.5
Maxima	14.2	102.40	64.80	10.8	3.9	3.95	4.3	4.2			7.1	2.8	56.53	5.9	91.80

¹ Allowance made for wear of teeth, where needed.

² Near.

KODIAK ISLANDS: PRE-KONIAG, "RED" OR "BLUE" FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. anteroposterior maximum (gabella ad maximum)	Diam. lateral maximum.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Men Lon-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)					
377707 (some-what ♂-like, but a strong ♀)	U.S.N.M.	Our Point, Uyak Bay.	30		17.7	13.5	13.4	76.87	85.90	90.96	14.87			12.1	7.3					
378640	do	do	Young adult		18.1	14.0		77.55												
Catalog No.	Diam. Bizygomatic	Facial Index, total $\left(\frac{c}{a \times 100}\right)$	Facial Index, upper $\left(\frac{c}{b \times 100}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maximum.	Upper Alveolar Arch— Breadth maximum.	Upper Alveolar Arch—
									8.5	3.6	4.1	4.0	85.27	90.0	4.9	2.5	51.02	5.7	6.5	87.69

1 Allowance made for wear of teeth, where needed.

2 N ear.

KODIAK ISLAND: PRE-KONIG, "BLUE" FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxm. (glabella ad maxm.)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c.c. (Hrdlička's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
366636	U.S.N.M.	Our Point, Uyak Bay	45	---	17.9	12.8	13.4	71.51	85.55	100.75	14.93	---	---	12.0	7.3
374560	do	do	60	---	18.1	13.3	13.8	73.48	87.90	102.99	15.07	---	---	8.0	8.0
377747	do	do	70	---	18.0	13.4	13.4	74.44	87.90	102.99	15.07	---	---	7.0	7.0
366666	do	do	Sub-adult	---	18.1	13.7	13.4	75.69	81.83	97.81	15.07	---	---	12.1	7.6
366696	do	do	Near mid-aged	---	16.6	12.6	11.9	75.90	81.51	94.44	13.70	---	---	---	---
374553	do	do	30	---	17.3	13.2	13.8	76.80	90.50	104.55	14.77	---	---	12.2	7.8
374558	do	do	25	---	17.3	13.2	12.2	76.80	80.0	92.42	14.23	---	---	11.5	6.8
363610	do	do	35	---	17.7	13.6	13.2	76.84	81.55	97.06	14.83	---	---	11.2	7.1
366920	do	do	Mid-aged	---	17.7	13.6	13.6	76.84	86.90	100.00	14.97	---	---	---	---
374557	do	do	65	---	18.3	14.1	13.5	77.05	90.60	108.55	14.43	---	---	---	7.7
374567	do	do	60	---	16.8	13.0	12.8	77.78	84.81	96.24	14.40	---	---	---	7.0
372780	do	do	30	---	17.1	13.3	12.8	77.78	84.81	96.24	14.40	---	---	---	6.5
374060	do	do	Young adult	---	18.0	14.0	13.0	78.00	87.70	100.00	15.20	---	---	---	7.0
372781	do	do	20	---	17.8	13.9	13.2	78.00	85.16	97.06	14.73	---	---	---	---
374064	do	do	Elderly	---	17.4	13.6	13.2	78.00	85.16	97.06	14.73	---	---	---	---
366683	do	do	Mid-aged	---	18.0	14.1	13.6	78.83	84.74	96.45	13.23	---	---	---	7.2
366702	do	do	Somewhat aged	---	17.7	13.9	13.1	78.65	82.91	94.24	14.90	---	---	---	7.5
366606	do	do	25	---	17.1	13.5	13.2	78.95	86.87	97.78	14.00	---	---	12.6	7.8
366025	do	do	23	---	16.4	13.0	12.7	79.27	86.87	97.78	14.00	---	---	---	6.8
377727	do	do	30	---	16.8	13.4	13.2	79.76	87.42	98.51	14.47	---	---	---	7.2
374566	do	do	60	---	16.9	13.5	13.2	79.88	86.84	97.78	14.53	---	---	12.3	7.6
372779	do	do	55	---	17.2	13.8	13.9	80.23	89.68	100.72	14.97	---	---	---	7.9
372778	do	do	60	---	16.6	13.4	13.0	80.72	86.67	97.01	14.33	---	---	11.9	6.9
366637	do	do	23	---	17.8	14.4	13.2	80.80	81.99	91.67	15.13	---	---	12.5	7.5
374551	do	do	Elderly	---	16.8	14.2	13.2	84.62	81.99	91.67	15.13	---	---	12.0	7.0
372881	do	do	35	---	(oblong)	---	---	---	---	---	---	---	---	---	7.9
374575	do	do	Near adult	---	---	---	---	---	---	---	---	---	---	11.8	7.3
Specimens			(27)	---	(25)	(25)	(20)	(25)	(20)	(20)	(20)	---	---	(11)	(23)
Totals			1126	---	435.4	338.5	265.1	77.74	85.74	98.04	294.49	---	---	132.10	168.5
Averages			41.7	---	17.42	13.54	13.26	77.74	85.74	98.04	14.72	---	---	12.01	7.32
Minima			20	---	16.4	12.6	11.9	71.51	80.0	91.67	13.70	---	---	11.2	6.5
Maxima			70	---	18.3	14.4	13.9	84.62	90.60	104.55	15.23	---	---	12.6	8.0

KODIAK ISLAND: PRE-KONIGAG, "BLUE" FEMALES—Continued

Catalog No.	Diam. Blyzomatic	Facial Index, total $\left(\frac{a \times 100}{e}\right)$	Facial Index, upper $\left(\frac{c}{b \times 100}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index	
																					(19)
366636	13.3	90.23	54.89	10.1	8.9	10.2	69.5	53.0	3.9	3.65	4.3	4.1	90.70	89.02	5.1	2.7	52.94	5.3	6.4	82.81	
374560						11.0									5.0	2.45	49.0	5.4	6.4	81.98	
377747						9.9									3.3	2.9	97.71	5.4	6.4	81.10	
366666						9.1									3.4	2.8	51.55	5.4	6.4	83.87	
366996	12.8	94.63	59.28	9.9	8.7	10.3	63.5	52.0	3.8	3.5	3.9	3.7	89.74	102.7	5.0	2.9	51.02	5.4	6.4	83.83	
374563	12.6	96.83	61.90	9.8	8.8	9.6	67.5	52.5	3.3	3.3	3.6	3.5	91.67	94.29	4.9	2.5	51.02	5.0	6.0	83.83	
374555	12.7	90.55	53.54	9.6	8.6	10.0	72.0	57.0	3.6	3.7	4.05	3.9	88.90	84.87	5.0	2.4	48.0	5.0	6.0	83.83	
366910	13.1	85.60	54.20	9.6	8.6	11.0															
366626						11.0															
374557	12.7		60.63			9.8															
374567	13.1		53.44			9.8															
374580	12.8		50.78			9.6		45.0	3.3	3.4	3.8	3.8	84.62	89.47	4.65	2.4	44.01	5.0	6.2	80.05	
374680						9.6															
372781	11.8		59.32			10.0															
374664	13.0					10.0															
366993						10.0															
366906	13.5		55.66			10.0															
366702	13.1		59.54			10.0															
366625						10.0															
377327	12.4		58.06			10.0															
374566	13.4		56.72			10.1															
374560	12.5		63.20			10.3															
372778	12.5		55.20			8.2															
366537	13.0		99.60			9.3															
366537	13.0		96.15			9.6															
374581	13.3		57.69			8.8															
374581	13.3		52.63			8.8															
372884	13.3		80.23			9.6															
374575	13.3		59.40			8.5															
Specimens.....	(19)	(10)	(18)	(11)	(14)	(20)	(11)	(11)	(14)	(14)	(14)	(14)	(14)	(14)	(23)	(23)	(23)	(16)	(16)	(16)	
Totals.....	244.9		108.0	108.0	122.7	199.9	746.0	585.0	49.4	49.55	64.6	53.5	90.48	92.62	117.4	54.85	84.20	102.3	84.20	102.3	
Averages.....	12.80		57.96	9.87	8.76	10.0	67.82	53.18	3.53	3.54	3.90	3.82	90.48	92.62	5.10	2.85	46.72	5.25	6.30	82.31	
Minima.....	11.8		52.63	9.1	8.2	9.3	63.5	43.0	3.3	3.3	3.6	3.5	84.62	87.18	4.6	2.0	37.71	5.0	5.8	75.76	
Maxima.....	13.5		96.83	10.5	9.2	11.0	72.0	59.5	3.9	3.8	4.3	4.1	97.44	102.7	5.45	2.8	56.52	5.7	7.0	89.66	

* Allowance made for wear of teeth, where needed.

ALEUTS: MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxm. (glabella ad maxm.)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
242924	U. S. N. M.	Černovskii	Adult		18.4	14.7	13.0	79.9	78.6		15.37	1,580.0		12.9	7.9
342818	do.	Umalaska	do.		18.3	14.7	13.0	80.3	78.8		15.33	1,475.0			7.4
242863	do.	Adak Island	do.		18.0	14.5	12.4	80.6	76.8		14.97				7.3
365731	do.	Veseli Island	40		18.2	14.7	13.4	80.8	81.5		15.43				7.8
378300	do.	Černovskii	60		18.2	14.7	12.9	80.8	78.4		15.27			13.5	8.0
378305	do.	do.	65		18.6	15.1	12.6	81.2	74.8		15.43				7.9
7764	Moscow Mus.	Umnak	55		18.2	14.8	13.2	81.3	80.0		15.40				7.3
365727	U. S. N. M.	Veseli Island	60		18.2	14.8	12.6	81.3	76.4		15.20				
378461	do.	Shiprock near Umnak	28		18.9	15.4	13.0	81.5	75.8		15.77	1,470.0		12.3	7.5
242980	do.	Černovskii	Adult		17.8	14.5	12.6	81.5	78.0		14.97	1,360.0			
7785	Moscow Mus.	Umnak	do.		18.4	15.0	13.8	81.5	82.6		15.73				7.5
7795	do.	do.	55		18.4	15.0	12.6	81.5	82.6		15.33			13.0	7.7
7788	do.	do.	35		17.9	14.6	12.7	81.6	79.5		15.07				7.7
374827	U. S. N. M.	Kanaga	35		17.4	14.2	12.7	81.6	78.2		14.77			12.6	7.5
378273	do.	Kashega	45		17.4	14.2	12.5	81.6	80.4		14.70				7.6
7821	Moscow Mus.	Umnak	50		18.0	14.7	13.0	81.7	79.5		13.23				7.0
225966	U. S. N. M.	Umalaska	Adult		17.6	14.4	12.7	81.8	79.4		14.90	1,420.0		11.6	6.6
378464	do.	Shiprock	25		17.6	14.4	11.8	81.8	73.8		14.60			12.0	7.0
378911	do.	Umnak	50		18.3	15.0	13.4	82.0	80.5		15.57	1,505.0		12.5	7.7
242880	do.	Černovskii	Adult		18.4	15.1	13.3	82.1	79.4		15.60	1,630.0			8.4
7791	Moscow Mus.	Umnak	45		18.0	14.8	12.8	82.2	78.1		15.20				7.2
7783	do.	do.	55		18.0	14.8	13.4	82.2	81.7		15.40				7.2
242868	U. S. N. M.	Amchitka	Adult		18.6	15.3	12.2	82.2	72.4		15.37	1,440.0		12.7	7.6
378349	do.	Ilak	25		18.2	15.0	11.5	82.4	71.1		15.0				7.4
242940	do.	Černovskii	Adult		18.9	15.6	12.8	82.5	74.2		15.77	1,700.0			7.8
352456	do.	Umnak	40		17.7	14.6	12.7	82.5	73.64		15.00				7.4
378270	do.	Kashega	35		17.8	14.7	12.7	82.6							7.3
242982	do.	Černovskii	Adult		18.4	15.2	12.9	82.6	76.8		15.50	1,510.0		12.4	7.5
378486	do.	Shiprock	35		18.5	15.3	12.4	82.7	73.4		15.40				

ALEUTS: MALES—Continued

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabelle ad maxim.)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a) 1	Alveol. Pt.-Nasion Height (b)
7808	Moscow Mus.	Umnak	70		17.4	14.4	12.0	82.8	75.5		14.60			12.2	7.5
7818	do	do	60		18.0	14.9	12.8	82.8	77.8		15.23			12.6	6.9
378703	U. S. N. M.	Shiprock	50		18.0	14.9	12.8	82.8	77.8		15.23			12.6	7.3
7810	Moscow Mus.	Umnak	55		17.5	14.5	12.1	82.9	75.6		14.70			12.3	7.2
365730	U. S. N. M.	Vesel Island	24		18.1	15.0	13.0	82.9	78.6		15.37			7.4	7.4
378303	do	Cernovski	55		18.1	15.0	12.9	82.9	78.0		15.33			8.0	8.0
322-1	Leningrad Mus.	Secondarily from Commander Islands.	Adult		18.1	15.0	12.8	82.9	77.3		15.30			12.4	7.2
5215	do	do	do												
249869	U. S. N. M.	Atka	17.8		17.8	14.8	13.5	82.8	82.8		15.37			12.8	7.8
352246	Moscow Mus.	Umnak	55		17.6	14.7	11.8	83.3	80.0		15.40	1,600.0		12.4	6.5
7936	U. S. N. M.	do	50		17.7	14.8	11.8	83.5	73.1		14.70			7.4	7.4
242209	Moscow Mus.	do	60		18.4	15.4	13.5	83.7	79.9		15.10			12.2	7.4
378481	U. S. N. M.	Atka	18.4		17.8	14.9	13.2	83.7	79.9		15.77	1,680.0		11.3	6.7
378462	do	do	55		10.3	16.2	11.9	83.9	67.0		15.30	1,680.0		7.4	7.9
378304	do	Cernovski	45		18.1	15.2	13.6	84.0	81.7		15.63			7.4	7.4
378476	do	Shiprock	60		17.6	14.8	12.8	84.1	79.0		15.07			13.0	7.5
17479	do	Four Mountains Islands.	Adult		18.2	15.3	13.0	84.1	77.6		15.50	1,710.0		12.6	7.6
378717	do	Cernovski	55		18.4	15.5	12.0	84.2	70.8		16.30			12.4	7.4
242922	do	do	Adult		18.2	15.4	12.8	84.6	76.2		15.47	1,620.0		11.5	7.2
242871	do	Unga	do		18.2	15.4	12.3	84.6	73.2		15.30	1,550.0		11.6	6.8
242910	do	do	do		18.2	15.4	12.6	84.6	75.0		15.40	1,510.0		7.5	7.5
242900	do	Four Mountains Islands.	35		18.5	15.8	12.2	84.9	70.83		15.53			7.7	7.7
7798	Moscow Mus.	Umnak	55		18.0	15.3	13.2	85.0	79.3		15.50			13.2	7.5
378368 (some what ♀-like)	U. S. N. M.	Agatu	35		18.0	15.3	12.2	85.0	75.3		15.17			13.0	7.6
7817	Moscow Mus.	Umnak	55		17.4	14.8	13.6	85.1	84.5		15.27			12.0	6.8
242872	U. S. N. M.	Atka	Adult		18.1	15.4	13.0	85.1	85.1		15.13			7.2	7.2
5215	Leningrad Mus.	Secondarily from Commander Islands.	do		17.5	14.9	13.0	85.1	80.8		15.13			12.0	7.0

242915	U. S. N. M.	do	18.4	15.7	12.6	85.5	75.0	15.57	1,580.0	11.9	7.5
7825	Moscow Mus.	Umnak	18.0	15.4	12.8	85.6	76.7	15.40		13.6	7.9
365728	U. S. N. M.	Vesell Island	18.1	15.5	13.2	85.6	78.6	15.60			7.8
17485	do	Four Mis. Islands	18.0	15.5	12.9	86.1	77.9	15.37		11.8	7.6
378480	do	Shiprock	17.3	14.9	12.6	86.1	78.5	14.93		11.3	7.1
5215	Leningrad Mus.	Secondarily from Commander Islands.	18.1	15.6	13.2	86.2	78.5	15.63		12.3	7.0
378693	U. S. N. M.	Armitka	18.3	15.8	13.1	86.5	76.8	15.73	1,450.0	13.5	7.9
378694	do	do	18.4	16.0	12.6	87.0	78.3	15.67	1,625.0	12.5	7.5
378708	do	Shiprock	17.7	15.4	13.6	87.0	82.2	15.57	1,560.0		7.1
242937	do	Alentian Islands	18.1	15.8	13.6	87.7	80.2	15.83			
5215	Leningrad Mus.	Secondarily from Commander Islands.	17.1	15.0	13.2	87.7	82.2	15.10		11.8	7.3
378079	U. S. N. M.	Umnak	17.6	15.5	12.6	88.1	76.1	15.23	1,490.0		7.5
7762	Moscow Mus.	do	17.4	15.4	14.1	88.5	86.0	15.63			
242912	U. S. N. M.	Unga	17.6	15.7	12.8	89.2	76.9	15.33	1,610.0	12.5	7.7
Specimens			(71)	(71)	(69)	(71)	(69)	(69)	(23)	(36)	(65)
Totals			1,281.1	1,070.4	886.2	88.55	77.55	1,057.11	35,715.0	447.5	483.1
Averages			18.04	15.08	12.84	79.9	67.0	15.32	1,562.8	12.43	7.43
Minima			17.3	14.2	11.8	79.9	67.0	14.60	1,360.0	11.3	6.5
Maxima			19.3	16.2	14.1	89.2	86.0	15.83	1,710.0	13.6	8.4

1 Allowance made for wear of teeth, where needed.

2 Near.

322-1	13.9	89.2	51.8	9.9	8.6	9.2	62.5	50.0	3.4	3.4	4.0	3.9	85.0	87.2	5.0	2.6	62.0	5.3	7.2	73.6
5215	14.2	89.1	51.9	10.1	8.9	9.5	64.5	55.5	3.6	3.6	4.0	3.9	90.0	92.5	5.25	2.6	49.5	5.5	6.6	83.9
242869	14.5	89.2	52.0	10.2	9.0	9.6	65.0	56.0	3.5	3.5	3.9	3.9	89.7	89.7	4.8	2.7	66.2	5.4	6.8	79.4
7711	14.3	86.7	51.8	10.3	8.6	9.4	61.5	51.0	3.65	3.7	4.1	4.0	86.0	92.5	4.9	2.7	55.1	5.6	6.5	86.2
352246	14.5	82.4	50.0	10.4	8.6	9.5	64.0	49.0	3.5	3.7	3.0	3.9	96.1	97.9	5.5	2.45	44.0	5.5	6.4	85.9
7735	14.7	79.6	47.2	9.8	8.2	9.8	66.0	43.0	3.4	3.4	3.8	3.8	89.5	89.5	5.0	2.75	55.0	5.7	6.6	87.4
242909	14.2	89.2	51.9	10.3	9.0	9.5	68.0	58.0	3.75	3.85	3.0	3.8	96.2	101.9	5.1	2.5	49.0	5.3	6.4	82.8
378481	14.1	82.4	54.9	11.3	9.3	10.0	59.5	41.0	3.75	3.75	4.4	4.2	81.9	87.2	4.8	2.6	48.1	5.2	6.7	92.5
378504	13.8	89.4	53.6	11.1	9.8	10.0	61.5	54.0	3.55	3.6	3.0	3.0	86.9	91.2	5.2	2.65	51.9	5.6	7.0	96.6
378476	14.2	91.0	52.8	9.7	8.4	9.4	61.5	50.5	3.65	3.65	4.2	4.0	88.0	97.6	5.3	2.35	45.6	5.6	7.0	90.0
17479	15.3	82.4	49.7	10.2	8.8	9.7	63.5	48.5	4.0	4.0	4.3	4.1	82.0	87.6	5.3	2.45	47.2	5.3	6.8	80.8
378717	14.2	87.3	52.1	10.0	8.9	9.5	64.0	56.0	3.4	3.7	4.1	4.0	82.0	87.6	5.0	2.45	49.0	5.4	6.3	85.7
242922	14.8	77.7	43.6	10.6	9.4	9.9	64.0	50.0	3.6	3.6	4.0	3.8	90.9	94.7	5.2	2.6	50.0	5.0	6.1	81.8
342871	14.6	79.5	46.6	10.0	8.8	9.6	66.5	44.0	3.6	3.7	4.2	4.2	86.7	88.1	5.2	2.6	50.0	5.4	6.7	80.6
242910	14.9	80.0	50.3	10.0	8.6	10.2	69.5	47.0	3.9	4.0	4.2	4.0	82.6	100.0	5.4	2.4	44.4	5.5	6.7	82.1
242900	14.7	82.4	52.4	10.1	8.8	9.4	62.0	52.5	3.55	3.65	4.1	4.0	91.5	93.7	5.2	2.35	45.2	5.7	6.8	8.83
7768	14.5	91.0	51.7	10.7	9.4	10.4	67.0	52.0	3.75	3.75	3.5	3.9	92.4	93.6	5.7	2.25	43.3	5.7	6.4	89.1
378308	14.6	89.0	52.1	10.2	9.0	9.6	63.0	55.5	3.65	3.65	3.95	3.9	92.4	93.6	4.9	2.4	49.0	5.5	6.5	84.6
7817	13.3	81.6	51.1	9.7	8.5	9.6	69.0	50.0	3.3	3.25	3.9	3.9	84.6	83.3	4.8	2.5	62.1	5.2	6.3	82.5
242872	14.4	83.3	50.0	11.1	9.8	10.2	64.0	50.0	3.5	3.5	3.9	3.9	89.7	89.7	5.3	2.9	54.7	5.8	6.9	84.1
5215	14.4	80.4	48.6	10.7	9.6	10.3	66.0	55.0	3.3	3.4	3.8	3.75	95.9	95.9	5.7	2.65	54.6	5.7	6.6	86.4
242916	14.8	80.4	50.7	10.7	9.6	10.3	66.0	55.0	3.3	3.4	3.9	4.0	84.6	85.0	5.3	2.8	52.8	5.6	6.3	88.9
7825	14.5	93.8	51.5	10.8	9.4	10.2	64.0	52.5	3.7	3.7	4.2	4.1	88.1	90.2	5.25	2.65	50.5	5.8	6.4	94.6
365728	15.1	80.5	51.7	10.5	9.3	10.5	68.0	56.0	3.5	3.6	4.1	4.0	85.4	90.0	5.2	2.5	48.1	5.4	7.0	77.1
17485	14.6	80.8	52.1	10.3	8.9	9.7	63.5	47.0	3.9	3.6	4.2	4.1	92.9	87.8	5.4	2.2	40.7	5.4	6.4	82.8
378480	13.5	83.7	52.6	9.9	8.9	9.5	60.5	53.0	3.85	3.8	4.1	4.0	93.9	95.0	5.2	2.55	49.0	5.3	6.4	82.8
5215	14.7	83.7	47.6	10.6	9.2	9.8	64.0	48.5	3.5	3.5	4.1	3.8	84.2	82.1	4.7	2.6	55.3	5.3	6.4	82.8
374893	14.5	91.2	53.1	9.8	8.9	9.7	65.5	52.0	3.4	3.25	3.7	3.7	91.9	92.7	5.2	2.4	46.2	5.9	7.1	83.1
378094	13.5	92.6	55.6	10.7	9.2	9.7	61.5	60.0	3.6	3.5	3.95	3.95	91.1	88.6	4.8	2.55	53.1	5.8	6.9	84.1
378708	14.3	89.6	49.7	9.6	8.6	10.2	73.5	57.0	3.4	3.5	3.7	3.7	91.9	88.6	5.0	2.5	50.0	5.2	6.3	82.5
242937	14.0	84.3	52.1	10.1	8.6	9.7	65.5	47.0	3.3	3.35	4.05	3.95	81.5	84.8	5.0	2.95	52.8	5.4	6.4	81.4
5215	14.8	80.7	50.7	10.4	9.2	9.6	62.5	53.5	3.55	3.5	4.15	3.9	85.5	89.7	5.0	2.65	50.5	5.6	6.5	86.2
7762	14.4	82.2	50.6	10.6	9.2	9.8	62.0	48.5	3.5	3.0	3.7	3.8	89.7	91.7	4.9	2.35	48.0	5.0	6.4	81.4
242912	15.2	82.2	50.6	10.6	9.2	9.8	62.0	48.5	3.7	3.7	4.2	4.2	88.1	88.1	5.4	2.5	46.5	6.0	7.5	80.0
Specimens	(86)	(36)	(63)	(63)	(67)	(67)	(62)	(67)	(67)	(66)	(67)	(66)	(67)	(66)	(69)	(69)	(69)	(61)	(61)	(61)
Totals	951.6	657.6	615.0	667.4	615.0	667.4	4,012.5	3,214.0	237.35	235.65	263.85	261.5	356.3	356.3	173.35	173.35	342.0	342.0	404.4	404.4
Averages	14.42	86.46	51.62	10.44	9.18	9.96	64.72	51.84	3.54	3.57	4.03	3.96	76.90	90.11	5.16	2.54	49.22	5.62	6.63	81.72
Minima	13.30	77.7	46.5	9.6	8.4	9.0	59.0	41.0	3.0	3.05	3.7	3.7	80.3	80.3	4.6	2.2	40.7	5.0	6.1	73.6
Maxima	15.30	96.4	57.9	11.6	10.2	10.8	73.5	62.0	4.0	4.05	4.4	4.2	97.6	101.3	5.8	3.05	53.1	6.4	7.5	96.4

* Near. * In one isolated case = 66.3.

ALEUTS: MALES
(Kagamil Caves)

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (labelle ad max.)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c.c. (Hrdlicka's method)	Teeth wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
377910	(A.H.)	Kagamil Island	45	.....	18.1	14.4	12.9	79.6	79.4	.....	15.13	1,415.0	.....	12.7	7.7
377901	do	do	45	.....	18.2	14.6	13.4	80.2	81.7	.....	15.30	1,545.0	.....	12.8	7.7
377815	do	do	55	.....	18.6	15.0	12.5	80.6	73.2	.....	15.30	1,480.0	.....	12.8	7.5
377900	do	do	30	.....	18.6	15.0	12.5	80.6	74.4	.....	15.37	1,480.0	.....	12.8	7.7
377852	do	do	28	.....	17.7	14.3	13.2	80.8	82.5	.....	15.07	1,417.0	.....	12.1	7.4
377835	do	do	50	.....	18.0	14.6	12.8	81.1	78.6	.....	15.13	1,440.0	.....	7.3	7.3
377845	do	do	40	.....	18.7	15.2	13.3	81.3	78.5	.....	15.73	1,780.0	.....	7.7	7.7
377856	do	do	40	.....	17.9	14.6	13.0	81.6	80.0	.....	15.17	1,425.0	.....	.....	7.8
377853	do	do	35	.....	17.6	14.4	12.6	81.8	78.8	.....	14.87	1,425.0	.....	.....	7.7
377858	do	do	23	.....	18.2	14.9	12.6	81.9	76.1	.....	15.23	1,425.0	.....	.....	7.7
377917	do	do	55	.....	18.2	14.9	13.7	81.9	82.8	.....	15.60	1,530.0	.....	13.0	8.0
377847	do	do	65	.....	18.3	15.0	13.4	82.0	80.5	.....	15.57	1,680.0	.....	7.7	7.7
377916	do	do	55	.....	18.0	14.8	13.2	82.2	80.5	.....	15.33	1,565.0	.....	13.0	7.7
377906	do	do	55	.....	18.5	15.2	13.3	82.2	78.9	.....	15.07	1,530.0	.....	13.2	8.3
377851	do	do	24	.....	17.6	14.5	12.8	82.4	79.7	.....	14.97	1,480.0	.....	12.4	7.6
378401	do	do	55	.....	18.2	15.0	12.2	82.4	73.5	.....	15.13	1,500.0	.....	13.4	8.2
378411	do	do	35	.....	18.4	15.2	12.4	82.6	73.8	.....	15.33	1,500.0	.....	.....	7.75
37850	do	do	70	.....	17.4	14.4	12.7	82.8	79.9	.....	14.83	1,380.0	.....	.....	7.5
377810	do	do	65	.....	17.8	14.8	12.7	83.1	82.2	.....	15.33	1,380.0	.....	13.0	7.5
377809	do	do	24	.....	18.3	15.2	12.8	83.1	76.4	.....	15.43	1,500.0	.....	.....	7.5
377817	do	do	24	.....	18.5	15.4	13.5	83.2	79.7	.....	15.80	1,500.0	.....	12.8	8.1
377839	do	do	50	.....	18.0	15.0	13.6	83.5	83.6	.....	15.67	1,500.0	.....	7.4	7.5
377833	do	do	50	.....	18.2	15.2	13.1	83.5	81.4	.....	15.50	1,650.0	.....	.....	7.5
377843	do	do	35	.....	18.2	15.2	13.0	83.5	78.1	.....	15.47	1,520.0	.....	.....	7.55
377846	do	do	30	.....	18.2	15.2	13.0	83.5	77.8	.....	15.47	1,520.0	.....	.....	7.55
377850	do	do	60	.....	18.3	15.3	12.8	83.6	76.2	.....	15.47	1,600.0	.....	.....	7.5
377859	do	do	20	.....	17.8	14.9	13.7	83.7	83.8	.....	15.47	1,600.0	.....	12.3	8.0
377834	do	do	50	.....	18.1	15.2	13.1	84.0	78.7	.....	15.47	1,580.0	.....	.....	8.3
377807	do	do	.....	.....	17.6	14.8	13.0	84.1	80.3	.....	15.13	1,500.0	.....	13.6	8.3
377816	do	do	45	.....	17.6	14.8	13.0	84.1	80.3	.....	15.13	1,500.0	.....	.....	8.3

378410	do	18.5	15.6	13.4	84.5	78.6	15.83	1,470.0	13.1	8.2
377903	do	18.0	15.2	11.9	84.4	71.7	15.03		13.0	7.9
377857	do	18.0	15.2	12.3	84.4	74.1	15.17		13.1	7.6
377909	do	18.2	15.4	13.9	84.6	82.7	15.83	1,605.0	13.1	7.9
377838	do	17.9	15.2	12.7	84.9	76.7	15.27	1,380.0	12.9	7.3
377919	do	18.3	15.6	12.8	85.2	75.5	15.57	1,600.0	12.0	7.6
377848	do	17.8	15.3	13.7	86.0	82.8	15.60	1,720.0	13.0	7.75
377833	do	18.4	15.9	12.2	86.4	71.1	15.50	1,500.0	13.0	7.9
377842	do	17.1	14.8	12.7	86.6	79.6	14.87	1,525.0	12.7	7.3
377812	do	18.0	15.6	14.2	86.7	81.5	15.93	1,630.0	12.7	7.7
377837	do	18.4	16.0	13.1	87.0	76.2	15.88	1,555.0	12.7	7.4
377849	do	16.8	14.7	12.6	87.5	80.0	14.70	1,405.0	13.0	7.4
377854	do	17.6	15.4	12.0	87.5	72.7	15.00	1,405.0	13.0	8.0
Specimens		(42)	(42)	(42)	(42)	(42)	(42)	(32)	(21)	(37)
Totals		758.2	632.1	545.6	632.2	48,802.0	645.3	48,802.0	293.9	285.65
Averages		18.05	15.05	12.90	83.37	73.49	15.36	1,525.1	12.85	7.72
Minima		16.5	14.3	11.9	79.6	71.1	14.70	1,380.0	12.0	7.3
Maxima		18.7	16.0	14.2	87.5	84.5	15.93	1,750.0	13.6	8.3

ALEUTS: MALES—Continued
(Kagamil Caves)—Continued

Catalog No.	Diam. Bizygomatic (c) max.	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max.	Nasal Index	Upper Alveolar Arch—Length max.	Upper Alveolar Arch—Breadth max.	Upper Alveolar Arch—	Upper Alveolar Arch—
377010	14.2	89.4	74.2	10.5	9.0	10.0	69.0	50.0	3.35	3.45	3.9	3.8	89.9	90.8	5.1	2.95	62.0	4.4	6.3	85.7	
377011	14.5	88.3	63.1	11.0	8.8	10.6	66.5	40.0	3.7	3.75	4.3	4.2	86.1	89.9	5.1	2.6	61.0	5.8	6.7	86.6	
377012	14.5	87.0	61.7	10.2	9.0	10.3	69.0	56.5	3.65	3.75	4.0	4.1	87.3	91.5	4.9	2.45	57.0	5.3	6.5	81.5	
377013	14.5	89.6	63.8	10.4	9.4	10.4	67.5	59.0	3.5	3.55	3.9	3.8	84.7	88.7	5.4	2.3	49.6	5.6	6.6	84.8	
377014	13.9	87.1	63.2	10.1	8.8	9.6	64.5	51.5	3.5	3.55	3.8	3.8	84.7	88.7	5.05	2.2	43.6	5.6	6.6	84.8	
377015	14.4	87.8	60.7	10.7	9.5	10.3	66.5	52.5	3.7	3.7	4.1	4.0	87.8	92.4	5.0	2.5	50.0	5.8	6.6	87.9	
377016	14.1	88.5	54.6	10.3	9.6	10.0	59.5	53.0	3.45	3.6	4.0	3.9	85.3	92.3	5.2	2.45	47.1	5.5	7.1	77.5	
377017	14.0	87.5	64.9	10.2	9.0	9.7	62.0	55.5	3.9	3.9	4.35	4.35	89.7	89.7	5.25	2.3	49.5	5.6	6.9	81.2	
377018	14.2	89.0	67.9	11.5	10.4	11.0	69.0	57.5	3.45	3.45	3.7	4.1	84.2	84.2	5.6	2.7	44.9	5.6	6.6	84.8	
377019	13.3	89.0	64.8	10.9	9.6	10.0	62.0	55.0	3.45	3.45	4.1	4.1	84.2	84.2	5.6	2.55	45.2	5.5	6.7	82.1	
377020	14.9	88.4	62.4	9.8	8.8	10.0	68.5	55.0	3.6	3.65	3.8	3.9	84.7	84.7	4.9	2.45	43.0	5.2	7.1	73.2	
377021	14.7	90.4	66.8	11.9	10.2	10.5	59.5	49.0	3.5	3.55	4.1	4.1	85.4	89.0	5.4	2.6	43.2	5.4	7.0	91.1	
377022	14.6	90.4	66.8	11.9	10.2	10.5	59.5	49.0	3.5	3.55	4.2	4.1	85.4	89.0	5.4	2.6	43.2	5.4	7.0	91.1	
377023	13.2	93.9	67.6	10.1	8.6	9.4	62.0	49.0	3.9	3.95	4.2	4.1	83.9	96.3	5.0	2.3	46.0	3.7	6.1	90.9	
377024	14.3	93.7	67.9	10.0	8.7	9.2	59.5	53.0	3.85	3.9	4.1	4.0	83.9	87.6	5.5	2.65	49.5	3.7	6.3	91.7	
377025	13.7	96.6	66.6	10.5	9.4	10.2	66.0	56.5	3.95	4.05	4.2	3.9	84.1	103.8	5.35	2.75	52.9	3.7	6.2	91.0	
377026	14.0	90.9	69.2	10.6	9.2	10.2	68.0	51.0	3.6	3.6	4.3	4.3	83.7	84.9	5.2	2.45	49.2	5.2	6.5	87.7	
377027	14.1	87.3	60.3	10.7	9.4	10.5	68.0	51.0	3.6	3.8	4.2	4.15	83.0	91.6	5.3	2.45	49.2	5.2	6.5	87.7	
377028	14.0	87.3	60.3	10.7	9.4	10.5	68.0	51.0	3.6	3.8	4.2	4.15	83.0	91.6	5.3	2.45	49.2	5.2	6.5	87.7	
377029	14.9	86.5	64.7	10.9	9.4	10.0	62.5	49.0	3.65	3.7	4.1	4.1	89.0	90.2	5.0	2.6	62.0	6.1	91.8	91.8	
377030	15.2	86.5	64.7	11.5	10.2	10.9	65.0	54.0	3.7	3.7	4.1	4.1	100.0	93.9	5.5	2.4	43.6	6.2	6.4	96.9	
377031	14.8	86.5	64.7	11.5	10.2	10.9	65.0	54.0	3.7	3.7	4.1	4.1	100.0	93.9	5.5	2.4	43.6	6.2	6.4	96.9	
377032	15.4	87.7	68.7	11.5	10.4	10.8	65.5	57.5	3.55	3.5	4.2	4.1	84.5	85.4	5.1	2.3	45.1	5.4	6.3	83.7	
377033	14.7	88.7	68.7	11.5	10.4	10.8	65.5	57.5	3.55	3.5	4.2	4.1	84.5	85.4	5.1	2.7	52.9	6.0	6.7	83.6	
377034	14.5	89.1	62.1	10.7	9.3	10.4	67.0	50.0	3.5	3.55	3.75	3.7	93.5	96.0	5.2	2.45	47.1	5.3	6.3	83.9	
377035	14.4	89.1	62.1	10.7	9.3	10.4	67.0	50.0	3.5	3.55	3.75	3.7	93.5	96.0	5.2	2.45	47.1	5.3	6.3	83.9	
377036	14.4	85.4	62.1	10.9	9.6	10.1	65.5	53.0	3.65	3.65	4.0	4.3	91.2	91.2	5.4	2.6	43.2	5.5	5.8	94.8	
377037	14.4	85.4	62.1	10.9	9.6	10.1	65.5	53.0	3.65	3.65	4.0	4.3	91.2	91.2	5.4	2.6	43.2	5.5	5.8	94.8	
377038	14.2	86.3	66.3	11.1	8.9	10.5	60.0	36.0	3.4	3.4	3.9	3.8	86.5	89.5	5.35	2.35	43.7	5.4	6.3	86.7	
377039	14.1	86.3	66.3	11.1	8.9	10.5	60.0	36.0	3.4	3.4	4.4	4.15	92.5	93.8	5.45	2.35	43.7	5.4	6.3	86.7	
377040	14.1	86.3	66.3	11.1	8.9	10.5	60.0	36.0	3.4	3.4	4.4	4.15	92.5	93.8	5.45	2.35	43.7	5.4	6.3	86.7	
377041	15.1	89.7	64.5	11.1	9.7	10.5	64.0	52.5	3.75	3.85	4.1	4.1	91.6	93.8	5.7	2.55	46.7	6.0	6.9	87.0	
377042	14.6	89.7	64.5	11.1	9.7	10.5	64.0	52.5	3.75	3.85	4.1	4.1	91.6	93.8	5.7	2.55	46.7	6.0	6.9	87.0	
377043	14.4	90.3	62.8	11.3	8.5	9.9	59.0	50.5	3.75	3.7	4.3	4.0	87.9	92.6	5.35	2.5	44.7	6.3	6.7	94.0	
377044	14.4	90.3	62.8	11.3	8.5	9.9	59.0	50.5	3.75	3.7	4.3	4.0	87.9	92.6	5.35	2.5	44.7	6.3	6.7	94.0	
377045	14.4	89.1	63.7	10.7	9.4	10.2	63.0	50.5	3.8	3.8	4.3	4.0	82.7	86.5	5.4	2.25	41.7	5.6	6.8	82.4	
377046	14.7	89.1	63.7	10.7	9.4	10.2	63.0	50.5	3.8	3.8	4.3	4.0	82.7	86.5	5.4	2.25	41.7	5.6	6.8	82.4	

ALEUTS: FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (gabella ad maxum)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
374827	U. S. N. M.	Kanaga	40		17.4	14.1	12.6	81.0	80.0		14.70			11.4	7.5
5022.6	Leningrad Mus.	Atka	Adult		17.5	14.2	12.6	81.1	79.5		14.77			11.4	7.0
375719	U. S. N. M.	Kanaga	27		17.0	13.8	12.6	81.2	81.8		14.47			11.4	6.9
7752	Moscow Mus.	Umnak	60		17.6	14.3	12.9	81.2	80.9		14.98			11.4	6.8
375695	U. S. N. M.	Amehitka	20		17.6	14.3	12.9	81.2	80.9		14.98			11.4	6.8
378271	do	Kashega	40		17.7	14.4	12.9	81.4	79.8		14.97			11.4	6.6
379205	do	Hog Island	17.2		17.2	14.0	11.8	81.4	75.6		14.33	1,400.0		12.2	7.5
378350	do	Agatu	18		17.3	14.1	12.2	81.5	77.7		14.53			11.2	6.7
378369	do	Agatu	24		16.8	13.7	12.2	81.6	80.0		14.23			11.1	7.0
242866	do	Unga	Adult		17.4	14.2	11.9	81.6	75.3		14.50	1,300.0		11.3	7.1
242939	do	do	do		17.4	14.2	11.9	81.6	75.3		14.50	1,380.0		11.3	6.7
7778	Moscow Mus.	Umnak	70		18.0	14.7	12.8	81.7	78.9		15.17			7.0	
242874	U. S. N. M.	Atka	Adult		17.6	14.4	12.3	81.8	76.9		14.77	1,300.0		7.0	
7767	Moscow Mus.	Umnak	60		17.0	13.9	11.8	81.8	76.1		14.23			6.7	
50223	Leningrad Mus.	Atka	Adult		17.2	14.1	11.9	82.0	76.0		14.40			7.1	
378301	U. S. N. M.	Cernovski	65		17.3	14.2	12.8	82.1	81.3		14.77			7.1	
242914	do	do	Adult		17.4	14.3	12.0	82.2	75.7		14.57	1,330.0		11.1	6.8
225296	do	Amoknak	55		17.4	14.3	12.6	82.2	79.5		14.77			6.7	
378374	do	Agatu	50		18.0	14.8	13.2	82.2	80.5		15.33	1,375.0		12.3	7.2
60255	Moscow Mus.	Umnak	40		17.6	14.5	12.3	82.4	76.6		14.80			7.1	
378331	Leningrad Mus.	Umalaska	Adult		17.1	14.1	12.2	82.5	78.2		14.47			7.1	
378331	U. S. N. M.	Amliia	70		17.2	14.2	13.0	82.6	82.8		14.80			7.1	
60255	do	do	Adult		17.2	14.2	12.6	82.6	80.2		14.67			7.2	
378331	Leningrad Mus.	Umalaska	50		17.8	14.7	12.0	82.6	73.7		14.83			7.0	
60254	U. S. N. M.	Amoknak	Adult		17.4	14.4	12.2	82.8	76.7		14.67	1,330.0		11.4	7.0
242853	Leningrad Mus.	Umalaska	do		17.4	14.4	11.4	82.8	71.7		14.40			7.3	
60251	do	Umalaska	do		17.4	14.4	12.2	82.9	76.3		14.73			7.2	
374826	U. S. N. M.	Kanaga	20		17.5	14.5	12.2	82.9	76.3		14.73			11.9	7.2
242944	do	Cernovski	Adult		17.0	14.1	11.5	82.9	74.0		14.20	1,250.0		11.6	7.0
377754	do	Amoknak	30		17.0	14.0	12.4	83.0	77.0		14.87			7.2	
378248	do	Ilak	60		17.6	14.6	12.7	83.0	78.7		14.97			6.9	
378350	do	do	40		17.6	14.6	13.0	83.0	80.7		15.07			7.3	
378653	do	Umnak	40		17.6	14.6	12.1	83.0	73.2		14.77			6.4	
7886	Moscow Mus.	do	60		17.1	14.2	12.0	83.0	76.7		14.43			6.4	
378299	U. S. N. M.	Cernovski	40		17.2	14.3	12.4	83.1	78.7		14.63			11.7	6.8
378275	do	Kashega	60		18.0	15.0	12.2	83.3	73.9		15.07			6.8	

378482	do	Shiprock	70	17.7	14.8	11.8	85.6	72.6	14.77	6.8
378277	do	Kashaga	30	17.9	15.0	12.0	85.8	73.0	14.97	7.0
7835	Moscow Mus.	Umnak	60	16.7	14.0	12.6	85.8	73.0	14.87	6.8
7794	do	do	30	17.4	14.6	12.6	83.9	78.8	14.87	7.0
242918	U.S.N.M.	Adult	17.0	14.3	12.5	84.1	79.9	10.3	14.60	10.3
378302	do	do	30	17.0	14.3	12.4	84.1	79.2	14.57	11.9
377756	do	do	17.0	14.3	13.1	84.1	83.7	11.9	14.80	11.9
378306	do	Little Kiska	17.0	14.3	13.1	84.1	83.7	11.9	14.80	11.9
378306	do	Cernovski	60	16.4	13.8	12.8	84.2	84.8	14.33	6.6
242901	do	Cernovski	70	16.6	14.0	11.8	84.5	77.1	14.13	6.6
378483	do	Amoktnak	35	17.2	14.5	12.4	84.5	78.2	14.70	7.1
378483	do	Shiprock	35	17.2	14.5	12.4	84.5	78.2	14.70	7.1
378332	do	Amla	30	16.6	14.0	12.1	84.5	79.1	14.23	7.1
242879	do	Cernovski	17.0	14.4	12.6	84.7	80.2	7.2	14.67	7.2
378696	do	do	20	17.7	15.0	12.8	85.0	78.5	15.17	7.2
279204	do	Amechitka	20	17.4	14.8	12.2	85.1	75.8	14.80	7.4
279204	do	Hog Island	17.4	14.8	12.2	85.1	75.8	7.4	14.80	7.4
243976	do	do	16.8	14.3	11.5	85.1	74.0	6.3	14.20	6.3
378371	do	Alka	16.8	14.3	12.5	85.1	80.1	10.8	14.53	10.8
7781	do	Agatu	17.0	15.0	12.9	85.2	73.7	7.3	14.93	7.3
377752	Moscow Mus.	Umnak	55	17.6	14.0	11.3	85.4	87.0	14.07	7.4
378723	U.S.N.M.	Amoktnak	23	16.4	14.0	11.3	85.4	87.0	14.07	7.4
378723	do	Amla	60	16.3	14.0	13.1	85.3	86.3	14.47	6.7
242886	do	Cernovski	Adult	17.2	14.8	12.6	86.0	78.8	14.87	7.3
242920	do	do	do	17.3	14.9	11.9	86.1	73.7	14.70	7.3
378309 ?	do	do	do	16.6	14.3	12.0	86.1	73.7	14.70	7.3
279206	do	Hog Island	do	17.0	14.7	12.0	86.5	75.7	14.57	11.4
378718	do	Kanaga	55	16.4	14.2	13.0	86.6	85.0	14.56	11.7
378370	do	Agatu	40	17.3	15.0	11.9	86.7	73.7	14.73	6.9
7827	do	Umnak	19	16.6	14.4	11.8	86.8	76.1	14.27	6.2
242877	Moscow Mus.	Umnak	19	16.6	14.4	11.8	86.8	76.1	14.27	6.2
378705	U.S.N.M.	Cernovski	Adult	17.4	15.1	11.8	86.8	72.6	14.77	7.8
378705	do	do	55	16.8	14.6	12.0	86.9	73.0	14.07	7.0
378373	do	Shiprock	50	17.6	15.3	12.0	86.9	73.0	14.07	7.0
378249	do	Agatu	40	16.1	14.0	12.9	87.0	86.7	14.33	6.2
5022-4	do	Ilak	40	16.6	14.5	13.0	87.3	83.6	14.70	6.2
378247	do	Alka	65	16.6	14.5	13.2	87.6	87.4	14.47	7.3
37799	do	Ilak	65	16.1	14.1	13.2	87.6	87.4	14.47	7.3
37799	U.S.N.M.	Umnak	30	17.3	15.2	12.6	87.9	77.5	15.03	6.5
378606	Moscow Mus.	Umnak	30	17.3	15.2	12.6	87.9	77.5	15.03	6.5
378606	do	do	50	16.7	14.7	11.9	88.0	76.8	14.43	7.0
279203	do	Hog Island	17.2	15.2	12.3	88.4	76.9	11.5	14.90	7.7
279203	do	do	17.2	15.2	12.3	88.4	76.9	11.5	14.90	7.7
Specimens	(47)	do	(70)	1,203.4	1,000.4	814.2	83.88	77.99	(66)	(59)
Totals	2063	do	1,203.4	1,000.4	814.2	83.88	77.99	967.4	23,090.0	414.1
Averages	43.9	do	17.19	14.42	12.34	83.88	77.99	14.66	1,358.2	7.02
Minima	18	do	16.1	13.7	11.4	81.0	71.7	14.07	1,215.0	6.2
Maxima	70	do	18.0	15.3	13.2	88.4	87.4	15.33	1,490.0	7.8

1 Allowance made for wear of teeth, where needed. * Cremated.

ALEUTS: FEMALES—Continued

Catalog No.	Diam. Bizygomatic	Facial Index, total	Facial Index, upper	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth	Nasal Index	Upper Alveolar Arch—Length maxm.	Upper Alveolar Arch—Breadth maxm.	Upper Alveolar Arch—
374827	14.0		68.9	10.3	8.8	9.7	63.0	45.5	3.3	3.35	3.0	3.8	84.6	88.2	5.1	2.4	47.1	6.0	6.9	80.95
50226	13.1	87.0	65.4	9.2	8.0	9.6	71.0	50.0	3.6	3.35	3.55	3.85	83.6	92.2	5.0	2.5	52.1	5.4	6.2	85.7
373719	12.7		64.3	10.0	8.9	9.6	66.0	53.0	3.3	3.35	3.75	3.65	83.0	90.0	4.2	2.5	52.1	5.4	6.3	91.4
7782	13.5		64.1						3.6	3.6		4.0	93.4	90.0	4.9	2.45	62.0	5.2	6.3	82.5
37-695	12.7	89.8	65.5	9.3	8.7	9.4	69.5	65.0	3.55	3.55	3.8	4.0	87.4	90.7	4.7	2.45	62.0	5.2	6.1	86.9
37-271	13.2		67.6	9.8	8.6	9.8	67.0	55.5	3.4	3.85	3.75	3.75	86.7	90.7	4.9	2.2	44.9	5.2	5.7	91.83
279205	12.5		69.0	9.2	8.1	8.9	63.0	56.0	3.4	3.5	3.9	3.8	87.2	92.1	5.1	2.15	45.2	5.0	6.3	91.9
37-580	13.2	84.9	60.8	10.1	8.6	9.6	69.5	51.5	3.7	3.8	4.1	4.0	82.5	89.5	5.05	2.6	45.9	5.0	6.3	92.0
37-8369	13.4		68.0	8.8	8.0	8.8	66.5	58.0	3.6	3.9	3.8	3.8	91.0	94.7	5.1	2.3	46.1	5.0	6.7	92.0
242860	13.4	84.3	63.0	10.5	9.3	9.6	64.0	48.0	3.7	3.7	4.0	4.0	92.5	92.5	5.1	2.4	47.1	5.3	6.7	92.0
242939	13.1		61.2	9.8	9.0	9.6	68.0	48.0	3.5	3.7	3.8	3.8	92.1	97.4	5.0	2.05	41.0	5.0	5.9	84.7
7779	13.9																			
242974	13.4		52.2	10.5	9.4	9.6	64.5	53.0	3.4	3.5	3.7	3.7	91.9	94.6	4.9	2.6	63.1	5.2	6.2	83.9
7767	13.4		60.0	9.9	8.4	9.2	63.5	45.0	3.2	3.3	3.8	3.9	84.2	84.6	4.6	2.15	46.7	5.4	6.1	88.6
50223	12.2	92.6	66.2	8.0	9.0	9.0	64.5	50.5	3.45	3.55	3.7	3.6	83.2	95.6	4.75	2.1	44.2	4.9	6.1	80.3
37-891	13.0			10.2	8.2	9.2	65.0	53.5	3.7	3.8	4.1	4.0	90.2	95.0	4.95	2.55	61.5	5.3	6.4	82.8
242914	13.8	80.4	69.3	10.2	9.2	9.6	70.0	49.5	3.35	3.6	4.0	3.9	87.5	92.3	4.9	2.7	55.1	5.3	6.4	82.8
229266	13.7		67.9	9.8	8.6	9.8	65.0	55.5	3.4	3.45	3.9	3.9	88.5	85.9	4.8	2.35	49.0	5.1	6.1	89.6
37-8374	13.0		69.8	9.9	8.8	10.0	69.5	55.5	3.4	3.35	3.9	3.9	87.2	85.9	4.95	2.2	44.4	5.1	6.2	82.3
7814	13.2		65.8	9.9	8.5	9.0	61.0	46.5	3.3	3.3	4.0	4.0	82.5	86.5	4.9	2.5	61.0	5.1	6.2	82.3
50255	13.6		69.2	9.9	8.8	9.8	68.0	53.5	3.3	3.3	3.8	3.8	86.8	82.5	5.05	2.35	46.5	5.2	6.2	83.9
37-8381	12.5		61.5	8.9	7.8	9.2	68.0	54.0	3.4	3.65	3.7	3.55	91.9	102.3	4.8	2.25	46.9	5.1	6.0	85.0
50254	13.4		63.7	10.5	8.8	9.6	65.0	52.0	3.5	3.55	3.7	3.55	94.6	102.3	4.7	2.3	48.9	5.1	6.0	85.0
242853	13.4		68.8	9.6	8.6	9.6	65.0	53.0	3.5	3.55	3.7	4.0	88.8	88.8	5.0	2.6	52.0	5.6	6.4	87.5
50253	13.5		64.1	9.5	8.4	9.0	63.5	53.5	3.5	3.55	4.2	4.1	90.5	93.9	4.8	2.8	47.9	5.4	6.3	85.7
37-4826	13.3	89.5	64.1	10.7	9.6	9.9	64.0	47.0	3.8	3.85	3.6	3.6	91.7	93.9	5.35	2.45	46.8	5.3	6.1	86.9
242944	13.0		64.1	10.8	8.5	9.3	64.0	50.0	3.4	3.4	3.9	3.9	87.2	87.2	4.8	2.4	63.3	5.7	6.2	91.9
377764	13.0		64.1	10.8	8.5	9.3	64.0	50.0	3.4	3.4	3.9	3.9	87.2	87.2	4.8	2.6	64.2	5.0	6.4	78.1
372448	14.5		49.7	10.6	9.0	10.3	63.5	56.0	3.9	3.9	4.1	4.1	89.0	91.5	4.95	2.2	44.4	5.2	6.3	82.5
375248	14.6		47.5	10.1	8.9	10.3	66.0	60.0	3.9	3.9	4.1	4.1	89.0	91.5	5.0	2.55	51.0	5.5	6.5	84.6
375350	14.4		60.7	9.8	8.6	9.6	66.0	52.5	3.5	3.55	3.8	4.1	92.1	93.9	4.75	2.4	60.6	5.0	6.3	84.6
378653	13.5		47.4	9.8	8.2	9.0	66.0	49.0	3.7	3.7	4.0	4.0	91.3	92.5	5.05	2.6	51.5	5.0	6.3	79.4
7836	13.9	90.7	62.7	9.5	8.4	9.5	69.5	49.0	3.65	3.7	4.0	4.0	91.3	92.5	4.75	2.6	51.5	5.0	6.3	79.4
375299	12.9		62.7	9.5	8.4	9.5	69.5	49.0	3.65	3.7	4.0	4.0	91.3	92.5	4.75	2.6	51.5	5.0	6.3	79.4
375275	14.5		60.8	10.2	9.2	10.2	68.0	53.0	3.6	3.65	4.1	4.0	87.8	91.2	4.65	2.55	54.8	5.1	6.9	73.9
378482	13.4		60.8	10.2	9.2	10.2	68.0	53.0	3.6	3.65	4.1	4.0	87.8	91.2	4.65	2.55	54.8	5.1	6.9	73.9

ALEUTS: FEMALES
(Kagamil Caves)

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium (glabella ad maxium)	Diam. lateral maxium.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth wear	Menon-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
377905	(A. II.)		45		18.4	14.6	12.2	79.4	73.9		15.07	1,360.0		12.3	7.3
377873	U. S. N. M.	Kagamil	24		18.0	14.4	12.5	89.0	77.2		14.97	1,400.0			7.3
377861	do.	do.	50		17.6	14.1	12.2	80.1	77.9		14.63	1,360.0			7.3
377867	do.	do.	25		16.7	13.4	12.6	80.2	83.7		14.23	1,275.0			7.3
377923	do.	do.	20		17.2	13.9	12.6	80.8	81.0		14.57	1,275.0			7.35
377819	do.	do.	70		18.6	15.1	13.3	81.2	78.9		15.67	1,380.0		11.7	7.0
377814	do.	do.	55		17.7	14.4	13.1	81.4	81.6		15.07	1,385.0		11.8	7.2
377911	do.	do.	50		17.9	14.6	12.6	81.6	77.5		15.03	1,330.0		12.5	7.5
378119	do.	do.	25		17.1	14.0	12.0	81.9	77.2		14.37				
377871	do.	do.	25		17.1	14.0	12.0	81.9	77.2		14.37	1,370.0			7.3
377836	do.	do.	40		17.7	14.5	12.4	81.9	77.0		14.87	1,425.0			6.4
377908	do.	do.	45		17.7	14.5	12.3	81.9	76.4		14.83	1,300.0		12.2	7.2
378700	do.	do.	30		17.8	14.6	12.0	82.0	74.1		14.80	1,420.0			7.8
378703	do.	do.	35		17.2	14.2	12.4	82.6	79.0		14.60			12.0	7.6
378422	do.	do.	60		17.4	14.4	11.8	82.8	74.2		14.53				
378603	do.	do.	20		17.4	14.4	12.6	82.8	79.3		14.80	1,505.0		10.8	6.5
378808	do.	do.	55		17.6	14.6	12.2	83.0	75.8		14.80	1,385.0		12.6	7.7
377904	do.	do.	55		17.6	14.6	12.8	83.0	79.5		15.0	1,430.0		11.6	6.9
378413	do.	do.	55		17.6	14.6	12.3	83.0	82.6		15.17				
377874	do.	do.	23		17.0	14.2	12.4	83.5	79.5		14.53	1,420.0			7.0
378415	do.	do.	55		16.5	13.8	12.2	83.6	80.5		14.17				6.4
377806	do.	do.	60		16.5	14.0	12.4	83.6	81.2		14.17				
377920	do.	do.	55		17.0	14.8	13.0	83.9	81.9		15.0			12.5	7.4
377872	do.	do.	40		17.6	14.8	12.0	84.1	73.5		14.77	1,370.0		12.2	7.4
377818	do.	do.	75		17.7	14.9	11.9	84.2	80.0		14.53	1,300.0			
378416	do.	do.	50		17.1	14.4	12.6	84.2	78.1		14.70			12.7	7.6
377870	do.	do.	55		17.8	15.0	12.8	84.3	78.1		14.57	1,445.0			7.2
378411	do.	do.	50		17.3	14.6	11.8	84.4	74.0		14.57				7.2
377926	do.	do.	70		18.1	15.3	12.2	84.5	73.1		15.20				7.1
378423	do.	do.	75		17.0	14.4	12.4	84.7	79.0		14.00				

ALEUTS: FEMALES—Continued
(Kagamil Caves)—Continued

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total	Facial Index, upper	Basion-Alveolar Pl.	Basion-Subnasal Pl.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—Index
377905	14.0	87.9	52.1	10.2	8.8	4.4	62.0	51.0	3.75	3.8	4.1	4.1	91.5	92.7	4.8	2.7	56.2	5.3	6.0	88.8
377873	13.8	87.8	52.9	9.1	8.1	9.3	68.0	58.0	3.85	3.8	3.9	3.0	98.7	95.0	4.95	2.4	48.5	5.0	6.7	74.6
377881	13.0	86.1	56.1	9.6	8.0	9.6	66.5	51.5	3.5	3.55	3.9	3.9	89.7	91.0	5.15	2.6	50.5	5.3	6.4	82.8
377867	12.6	87.8	57.9	8.9	8.0	9.6	72.0	58.5	3.85	3.75	4.0	3.7	96.2	96.1	5.1	2.1	41.2	4.8	5.9	81.4
377893	12.8	87.8	57.4	8.9	8.0	9.0	79.0	59.0	3.6	3.7	3.85	3.7	92.5	100.0	5.1	2.25	44.1	5.1	5.9	86.4
377819	14.0	87.6	50.0	10.7	9.9	10.3	67.5	62.5	3.3	3.3	4.0	4.0	82.5	82.5	4.8	2.7	56.2	5.3	6.5	81.5
377814	13.2	89.7	51.5	10.3	9.0	9.9	67.0	51.0	3.6	3.7	4.2	4.0	85.7	92.5	4.95	2.55	51.5	5.5	6.5	84.6
377911	13.4	88.8	56.0	9.9	8.6	9.2	62.0	54.0	3.6	3.55	3.95	3.8	91.1	93.4	4.95	2.85	47.5	5.5	6.2	88.7
377819	13.4	88.8	56.0	9.9	8.6	9.2	62.0	54.0	3.6	3.55	3.95	3.8	91.1	93.4	4.95	2.85	47.5	5.5	6.2	88.7
377831	13.2	87.8	55.8	10.6	9.0	9.7	64.0	49.0	3.4	3.4	3.95	3.95	86.1	86.1	4.8	2.5	52.1	5.6	6.3	86.2
377830	13.9	87.7	46.0	10.9	9.5	9.7	66.0	48.0	3.7	3.75	4.15	4.0	89.2	93.7	4.65	2.5	53.8	5.3	6.3	84.1
377908	13.7	89.1	52.0	10.7	9.3	9.6	61.5	51.0	3.3	3.35	3.9	3.8	81.6	88.2	4.7	2.4	51.1	5.7	6.5	87.7
377830	13.5	87.5	57.5	10.0	9.0	9.6	60.0	46.5	3.4	3.5	4.0	3.8	85.0	92.1	5.05	2.65	52.5	6.2	6.0	93.9
378103	13.4	89.6	56.7	10.0	8.8	9.4	63.0	53.0	3.55	3.95	4.05	3.95	95.1	100.0	5.1	2.5	49.0	5.2	6.1	85.5
378422	12.3	87.8	52.9	9.3	8.4	9.2	68.5	57.0	3.6	3.55	3.7	3.7	97.3	96.0	4.6	2.0	43.5	5.9	6.1	82.0
377863	13.7	87.9	56.2	10.1	8.8	9.6	63.5	53.0	3.6	3.55	3.9	4.0	92.3	88.8	4.8	2.3	46.0	5.3	6.1	87.0
377808	13.2	87.9	52.5	9.7	8.4	9.2	64.0	43.5	3.95	3.95	4.0	4.1	93.7	96.5	4.95	2.25	46.5	5.2	5.8	89.7
378004	12.7	87.5	57.5	9.4	8.2	9.5	66.5	54.0	3.75	3.9	4.2	4.1	89.3	95.1	4.45	2.25	40.6	5.0	5.0	91.1
378113	13.5	87.5	51.9	9.4	8.2	9.2	66.5	54.0	3.55	3.65	4.0	3.95	88.3	92.4	4.6	2.2	47.8	5.0	5.0	91.1
377874	13.7	87.5	46.7	9.3	8.2	9.2	69.0	47.5	3.65	3.65	4.0	4.0	91.3	91.3	4.8	2.5	52.1	5.0	6.2	80.7
378415	13.3	87.4	51.8	10.2	9.0	9.6	63.5	54.5	3.75	3.75	4.0	3.85	97.4	97.4	4.95	2.6	52.5	5.4	6.3	85.7
377920	14.3	87.4	51.8	10.2	9.0	9.6	63.5	54.5	3.75	3.75	4.0	3.85	97.4	97.4	4.95	2.6	52.5	5.4	6.3	85.7
377920	14.2	85.9	52.1	10.4	8.9	9.3	60.0	47.5	3.6	3.65	4.15	4.0	86.8	91.3	4.95	2.85	57.6	5.7	6.0	86.4
377872	14.0	87.8	56.1	10.4	8.9	9.9	64.0	53.0	3.65	3.65	4.2	4.0	86.9	91.3	5.3	2.6	49.1	6.0	6.7	83.6
378416	14.1	90.1	55.3	10.4	8.8	9.9	64.0	47.0	3.5	3.5	3.9	3.8	89.7	92.5	5.25	2.45	46.7	5.6	6.7	83.6
377870	13.3	87.5	51.1	10.1	8.8	9.8	67.0	49.0	3.5	3.6	4.05	3.9	86.4	92.5	5.0	2.3	46.0	5.2	6.2	83.9
378411	13.3	87.5	51.1	10.1	8.8	9.8	67.0	49.0	3.5	3.6	4.05	3.9	86.4	92.5	5.0	2.3	46.0	5.2	6.2	83.9
378411	13.3	87.5	51.1	10.1	8.8	9.8	67.0	49.0	3.5	3.6	4.05	3.9	86.4	92.5	5.0	2.3	46.0	5.2	6.2	83.9
377926	14.4	87.5	40.3	9.6	8.2	8.8	61.0	49.0	3.8	3.8	3.7	3.7	96.1	97.3	4.7	2.4	51.1	5.0	6.7	83.6
377926	14.4	87.5	40.3	9.6	8.2	8.8	61.0	49.0	3.8	3.8	3.7	3.7	96.1	97.3	4.7	2.4	51.1	5.0	6.7	83.6
378423	13.3	87.5	51.1	10.4	9.0	9.5	65.0	54.0	3.4	3.55	4.2	4.2	81.0	84.5	4.8	2.5	52.1	5.6	6.7	82.6
378423	13.3	87.5	51.1	10.4	9.0	9.5	65.0	54.0	3.4	3.55	4.2	4.2	81.0	84.5	4.8	2.5	52.1	5.6	6.7	82.6
878414	14.1	87.5	51.1	10.4	9.0	9.8	65.0	43.0	3.95	3.95	4.05	4.0	97.5	98.7	5.1	2.25	46.1	5.6	6.7	82.6
377865	13.1	87.5	49.6	10.5	9.4	9.9	66.0	51.0	3.35	3.35	4.0	3.9	83.8	85.9	4.6	2.25	48.9	5.4	6.6	81.8

PRE-ALEUTS: MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium. (glabella ad)	Diam. lateral maxium.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
378438	U. S. N. M.	Umnak	28		18.5	13.3	13.4	71.9	81.3		15.07			12.5	7.4
378614	do.	do.	60		19.1	13.8	(14.7)	72.3	(82.4)		15.87			12.5	7.2
378588	do.	Aenuk	40		18.8	13.6	13.1	72.5	80.9		1,345.0			13.0	7.2
378615	do.	Umnak	55		19.0	13.8	13.1	72.6	79.9		15.30			13.0	7.7
377757	do.	Little Kiska	55		19.2	14.1		73.4						13.0	7.6
5215-7	Leningrad Mus.	Secondarily from Com-mander Islands.			19.6	14.4	13.4	73.5	78.8		15.80			13.4	7.8
378626	U. S. N. M.	Umnak	60		19.1	14.1		73.8							8.2
378633	do.	do.	60		18.4	13.6	13.4	73.9	83.7		15.13				
378602	do.	do.	45		18.9	14.0	14.1	74.1	85.7		15.67	1,490.0		12.5	7.4
7832	Moscow Mus.	do.	50		18.6	13.8	13.1	74.2	80.9		15.17				
378463	U. S. N. M.	Shiprock	60		18.3	13.6	13.1	74.3	82.1		15.0			13.4	7.8
378619	do.	Umnak	55		19.5	14.5	13.8	74.4	81.2		15.93			13.4	8.3
378731	do.	do.	40		19.2	14.3		74.5							
378731	do.	Kagamil	45		18.8	14.0	13.6	74.5	76.8		15.13			12.0	7.0
378478	do.	Shiprock	45		19.3	14.4	13.5	74.7	80.1		15.73			12.8	7.3
378618	do.	Umnak	55		18.6	13.9	12.4	74.7	76.8		14.97			12.8	7.7
7812	Moscow Mus.	do.	55		18.6	14.2	13.0	74.7	78.8		15.40				
378622	U. S. N. M.	do.	60		18.4	13.8	12.6	74.9	78.3		14.93			12.5	7.4
378641	do.	do.	55		18.6	14.0	12.3	75.3	75.5		14.97				7.5
7813	Moscow Mus.	do.	55		19.5	14.7		75.4							
378635	U. S. N. M.	do.	70		18.8	14.2	12.8	75.5	77.6		15.27				
378645	do.	do.	50		18.5	14.0		75.7						6.7	
7823	Moscow Mus.	do.	60		19.0	14.4	13.6	75.8	81.4		15.67			13.2	7.9
7806	do.	do.	55		19.0	14.4	14.0	75.8	83.8		13.80				7.7
7829	do.	do.	55		18.2	13.8	12.8	75.8	80.0		14.93				
7828	do.	do.	55		18.2	13.8	12.9	75.8	80.6		14.97				
377913	U. S. N. M.	Kagamil	45		18.2	13.8	12.8	75.8	80.6		14.97				
365739	do.	Wislow Island	70		17.6	13.4	12.8	76.1	82.6		14.00			13.0	8.2
378603	do.	Umnak	50		18.6	14.2	13.3	76.3	81.1		15.37			12.9	7.6
378607	do.	do.	55		18.7	14.3	13.8	76.5	83.6		15.60	1,385.0		13.2	7.0
378609	do.	do.	50		18.4	14.1	13.0	76.6	80.0		15.17	1,390.0		12.2	7.3
378612	do.	do.	50		18.9	14.5	13.4	76.7	80.2		15.60	1,510.0		13.4	7.8
378643	do.	do.	55		19.8	15.2	14.0	76.8	80.0		16.33	1,690.0		14.7	8.8
378627	do.	do.	35		19.0	14.6	13.4	76.8	79.8		15.67				
378543	do.	do.	35		19.0	14.6	13.0	76.8	77.4		15.53	1,500.0		13.2	8.1
378408	do.	do.	70		19.0	14.6	13.3	76.8	79.2		15.63				7.5

378631	do	do	65	18.6	14.3	13.4	76.9	81.5	15.43	13.0	7.8
378328	do	Amlia	30	18.2	14.0	12.4	76.9	77.0	14.87	12.4	8.1
378691	do	Amchitka	35	18.8	14.5	12.7	76.9	76.9	14.97	12.4	7.3
3292	Leningrad Mus.	Secondarily from Com- mander Islands.									
7790	Moscow Mus.	Umnak	30	18.8	14.5	14.0	77.1	84.1	15.77	13.1	8.2
378276	U.S.N.M.	Kashega	65	18.6	14.4	12.2	77.4	79.1	15.20	13.5	8.1
378475	do	Shiprock	50	18.8	14.6	12.2	77.7	76.3	14.73	11.4	6.7
378479	do	do	21	18.0	14.0	12.2	77.8	79.9	15.77	13.4	7.7
378250	do	Amchitka	65	19.0	14.8	13.5	77.9	75.5	15.93	13.7	8.3
378544	do	Shiprock	60	10.5	15.2	13.1	77.9	80.0	1,530.0	13.0	7.8
7811	do	Umnak	50	17.4	13.0	12.4	78.2	80.0	14.47	13.0	7.2
378729	Moscow Mus.	Kagamil	45	18.4	14.4	13.0	78.3	79.3	15.27	13.0	7.2
7766	do	Umnak	50	18.4	14.5	13.0	78.8	81.6	15.53	13.0	7.4
378341	U.S.N.M.	Atka	60	18.5	14.6	13.5	78.9	88.3	15.67	12.8	7.6
378694	do	Umnak	40	18.2	14.4	14.4	79.1	80.3	14.90	11.8	7.0
378699	do	do	50	17.8	14.1	12.8	79.2	80.3	15.33	11.7	6.8
37877	do	Shiprock	24	18.4	14.6	13.0	79.4	78.8	15.40	12.8	8.0
37877	do	do	55	18.4	14.6	13.2	79.4	80.0	15.40	12.1	7.1
378910	do	Agaitu	35	18.3	14.6	13.0	79.8	79.0	1,410.0	12.7	7.0
378661	do	Umnak	65	18.3	14.6	13.3	79.8	80.9	1,450.0	14.9	9.0
378620	do	do	55	19.5	15.6	12.8	80.0	72.9	1,660.0	14.9	9.0
37874	do	Shiprock	30	18.4	14.8	13.4	80.4	80.7	15.53	13.3	7.9
Specimens			(55)	(57)	(57)	(49)	(57)	(49)	(50)	(13)	(46)
Totals			2,773	1,065.6	812.7	644.1	76.3	79.8	768.19	19,530.0	465.3
Averages			60.4	18.69	13.26	13.14	77.9	72.9	15.36	12.93	7.64
Minima			21	17.4	13.3	12.2	71.9	72.9	14.47	11.4	6.7
Maxima			70	19.8	15.6	14.4	80.4	88.3	16.33	14.9	9.0

Footnotes on p. 81 at end of table.

PRE-ALEUTS: MALES—Continued

Catalog No.	Diam. Bizygomatic maxm. (c)	Facial Index, total $\left(\frac{a}{b} \times 100\right)$	Facial Index, upper $\left(\frac{c}{b} \times 100\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max.	Nasal Index	Upper Alveolar Arch—Length maxm.	Upper Alveolar Arch—Breadth maxm.	Upper Alveolar Arch—
378638	14.3	96.1	51.7	10.7	9.9	10.9	69.0	61.5	3.25	3.25	4.1	4.0	79.3	81.2	5.3	2.6	49.1	5.5	6.8	80.9
378639	13.0	96.1	55.4	10.9	10.2	11.4	74.5	60.5	3.8	3.8	4.2	3.85	80.5	81.8	5.0	2.5	44.6	5.3	6.8	81.7
378640	13.8	96.1	52.2	9.9	9.0	10.0	69.5	60.0	3.1	3.15	4.0	3.85	77.6	77.6	2.3	2.3	46.6	5.3	6.5	83.7
378641	14.0	92.9	55.0	10.4	9.0	10.0	65.0	48.5	3.8	3.8	3.9	3.9	97.4	97.4	5.4	2.4	44.4	5.3	6.2	83.6
377757	14.7	88.4	51.7	10.4	10.0	10.3	65.0	48.5	3.7	3.7	3.9	3.9	94.9	94.9	5.35	2.4	48.6	5.3	7.0	78.6
52157	14.4	95.1	54.2	10.3	10.0	10.3	65.0	48.5	3.8	3.8	4.3	4.3	88.4	88.4	5.5	2.85	51.8	5.9	7.2	87.9
378626	14.4	95.1	54.2	10.3	10.0	10.3	65.0	48.5	3.6	3.6	4.2	4.2	85.7	85.7	5.8	2.55	44.0	5.9	7.2	87.9
378633	14.6	85.6	50.7	10.0	9.0	10.3	71.0	55.0	3.7	3.7	4.2	4.05	88.1	91.4	5.5	2.6	47.3	5.4	6.4	84.4
378602	14.0	92.9	55.7	10.1	8.8	10.0	66.5	54.0	3.9	3.8	3.9	3.8	97.4	97.4	5.4	2.5	46.3	5.4	6.5	83.1
7892	14.9	89.9	55.7	10.0	9.2	10.6	66.5	54.0	3.6	3.7	3.75	3.8	96.0	97.4	5.2	2.7	51.9	5.2	6.2	83.9
378649	14.9	89.9	55.7	10.0	9.2	10.6	66.5	54.0	3.6	3.7	3.75	3.8	96.0	97.4	5.2	2.7	51.9	5.1	6.5	78.6
378731	14.6	85.6	50.7	10.0	9.0	10.3	71.0	55.0	3.7	3.7	4.2	4.05	88.1	91.4	5.5	2.6	47.3	5.4	6.4	84.4
378748	14.6	85.6	50.7	10.0	9.0	10.3	71.0	55.0	3.7	3.7	4.2	4.05	88.1	91.4	5.5	2.6	47.3	5.4	6.4	84.4
378618	14.5	88.5	50.3	10.8	9.8	10.6	70.0	50.5	3.5	3.5	4.4	4.25	79.6	82.4	5.7	2.65	46.5	5.8	6.8	85.4
7812	14.1	90.8	54.6	10.7	9.8	10.6	68.0	62.0	3.8	3.8	4.1	4.0	92.7	95.0	5.25	2.5	47.6	5.4	6.4	84.3
378622	14.7	88.4	51.7	10.4	9.4	10.6	68.0	62.0	3.5	3.5	4.1	3.95	85.4	88.6	5.5	2.8	50.9	5.4	6.4	84.4
378641	14.7	88.4	51.7	10.4	9.4	10.6	68.0	62.0	3.5	3.5	4.1	3.95	85.4	88.6	5.5	2.8	50.9	5.4	6.4	84.4
7813	14.6	85.6	50.7	10.0	9.0	10.3	71.0	55.0	3.7	3.7	4.2	4.05	88.1	91.4	5.5	2.6	47.3	5.4	6.4	84.4
378635	13.6	97.7	61.6	10.6	9.7	10.4	65.5	61.5	3.85	3.85	3.9	3.9	92.8	96.2	5.4	2.6	48.2	5.3	6.0	88.3
377913	13.8	97.7	61.6	10.6	9.7	10.4	65.5	61.5	3.85	3.85	3.9	3.9	92.8	96.2	5.4	2.6	48.2	5.3	6.0	88.3
365726	13.8	97.7	61.6	10.6	9.7	10.4	65.5	61.5	3.6	3.6	3.9	3.9	92.8	96.2	5.1	2.6	48.2	5.6	6.4	87.6
378603	14.6	88.4	52.1	11.4	11.4	11.4	66.5	55.5	3.7	3.7	4.2	4.2	85.1	85.1	5.1	2.5	49.0	5.7	6.8	83.8
378635	14.3	96.1	55.4	10.9	10.2	11.4	74.5	60.5	3.6	3.6	4.2	4.0	88.1	91.4	5.5	2.6	47.3	5.4	6.4	84.4
378645	14.3	96.1	55.4	10.9	10.2	11.4	74.5	60.5	3.6	3.6	4.2	4.0	88.1	91.4	5.5	2.6	47.3	5.4	6.4	84.4
7823	14.1	88.6	54.2	10.5	9.4	10.7	70.0	58.0	3.95	4.0	3.9	3.9	101.9	102.6	5.25	2.65	50.5	5.6	6.8	82.4
7806	14.9	85.0	50.3	10.8	9.8	10.6	70.0	50.5	3.5	3.5	4.4	4.25	79.6	82.4	5.7	2.65	46.5	5.6	6.9	81.2
7829	14.2	88.4	51.7	10.4	9.4	10.6	68.0	62.0	3.7	3.7	4.1	3.95	85.4	88.6	5.5	2.8	50.9	5.4	6.4	84.4
7828	14.2	88.4	51.7	10.4	9.4	10.6	68.0	62.0	3.7	3.7	4.1	3.95	85.4	88.6	5.5	2.8	50.9	5.4	6.4	84.4
377913	13.3	97.7	61.6	10.6	9.7	10.4	65.5	61.5	3.85	3.85	3.9	3.9	92.8	96.2	5.4	2.6	48.2	5.6	6.4	87.6
365726	13.8	97.7	61.6	10.6	9.7	10.4	65.5	61.5	3.6	3.6	3.9	3.9	92.8	96.2	5.1	2.6	48.2	5.6	6.4	87.6
378603	14.6	88.4	52.1	11.4	11.4	11.4	66.5	55.5	3.7	3.7	4.2	4.2	85.1	85.1	5.1	2.5	49.0	5.7	6.8	83.8

378607	14.8	51.4	10.8	9.9	10.6	68.0	62.0	3.8	3.85	4.4	4.3	86.4	89.6	5.3	2.75	51.9	5.9	6.8	86.8
378608	14.6	83.6	60.0	11.0	10.4	67.5	63.0	3.4	3.4	4.0	3.9	86.0	87.2	5.05	2.65	49.5	5.2	6.5	80.0
378612	14.2	74.4	64.9	10.4	8.9	68.0	49.0	3.8	3.6	4.0	4.0	95.0	70.0	5.4	2.5	49.1	5.9	6.9	85.5
378643	15.7	95.6	56.0	10.8	9.5	10.9	66.5	3.85	3.95	4.7	4.5	81.9	87.8	5.8	2.65	45.7	6.1	6.9	58.4
378627	14.8	89.2	64.7	10.4	9.3	10.4	67.0	3.75	3.75	4.1	4.0	91.5	93.7	5.6	2.8	50.0	5.3	6.0	83.3
378408	14.5	61.7	10.6	9.2	10.4	67.5	50.0	3.7	3.65	4.0	3.8	92.5	96.0	5.15	3.05	59.2	5.4	6.7	80.6
378631	13.7	69.1	10.3	9.3	10.6	70.0	55.0	3.8	3.85	4.0	3.9	95.0	98.7	5.4	2.3	42.6	5.2	6.0	86.7
378828	14.0	88.6	62.1	11.3	10.0	63.0	46.0	3.55	3.55	3.8	3.7	86.8	90.5	4.85	2.6	48.6	6.2	6.7	92.5
378691	14.3	82.92	68.2	10.3	9.4	10.2	66.0	3.3	3.35	3.8	3.7	86.8	90.5	5.6	2.7	48.2	6.2	7.2	86.1
7790	14.1	82.9	68.2	10.3	9.0	10.2	66.0	3.9	3.9	4.1	4.1	91.7	95.1	5.6	2.55	45.5	5.7	7.1	80.3
378276	15.0	60.0	61.0	10.2	10.0	65.0	55.0	3.85	3.9	4.2	4.1	91.7	95.1	5.6	2.45	51.0	5.6	6.6	81.8
378475	13.9	82.0	48.2	10.9	10.0	66.5	57.5	3.35	3.3	3.9	3.8	85.9	86.8	4.8	2.45	51.0	5.7	7.2	76.9
378250	15.0	89.5	51.5	11.2	10.1	65.0	58.5	3.6	3.65	4.0	3.9	90.0	93.6	5.05	2.55	50.5	6.1	6.5	52.7
378544	15.1	90.7	55.0	11.2	10.2	63.0	62.5	3.6	3.65	4.0	3.9	88.9	91.8	5.2	2.55	49.0	5.8	6.8	85.3
7811	14.1	55.8	55.8	10.1	8.8	9.9	66.0	3.6	3.65	4.05	3.9	88.9	87.2	5.2	2.55	49.0	5.7	6.9	82.6
378729	14.3	60.4	60.4	10.1	9.4	9.9	69.0	3.4	3.45	4.0	3.9	89.7	83.6	4.4	2.4	43.2	5.7	6.2	91.9
7768	14.2	60.9	60.9	10.5	9.4	10.7	70.0	3.5	3.55	3.9	3.9	89.7	83.6	4.4	2.55	49.0	5.7	6.2	91.9
378341	14.3	60.9	60.9	10.5	8.9	10.0	67.5	3.55	3.55	4.0	4.0	86.6	87.6	5.05	2.5	49.6	6.0	7.1	84.6
378624	14.4	88.9	62.8	10.3	9.2	10.2	67.5	3.55	3.5	4.1	4.0	86.6	87.6	5.05	2.5	49.6	6.0	7.1	84.6
378029	14.2	83.1	49.5	10.3	9.1	10.2	67.5	3.55	3.4	3.9	3.9	85.9	90.2	4.65	2.35	53.8	5.6	6.3	85.7
378377	15.2	77.0	44.7	10.2	9.1	10.2	67.5	3.55	3.7	4.1	4.1	91.5	96.2	5.7	2.45	49.5	5.5	6.5	81.6
378347	14.7	87.1	54.4	10.1	8.8	9.7	64.0	3.75	3.85	4.1	4.0	86.6	88.8	5.45	2.7	49.5	5.2	6.6	78.8
378610	14.5	85.6	49.0	10.0	8.9	10.1	70.0	3.55	3.55	4.1	4.1	86.6	88.8	5.45	2.7	49.5	5.2	6.6	78.8
378651	14.9	85.2	47.0	11.0	9.9	10.7	68.5	3.5	3.6	4.1	4.1	86.4	87.8	4.8	2.6	54.2	5.6	7.0	80.0
378620	15.0	99.3	60.0	11.6	9.7	10.6	68.0	3.45	3.55	4.2	4.25	82.1	85.5	5.6	2.55	45.5	6.3	7.3	86.5
378474	14.8	85.9	53.4	10.8	9.5	10.5	67.0	3.7	3.75	4.2	4.1	88.1	91.5	5.45	2.45	45.0	5.8	6.9	84.1
Specimens	(48)	(84)	(42)	(41)	(47)	(39)	(39)	(47)	(44)	(47)	(44)	(47)	(44)	(51)	(51)	(51)	(43)	(43)	(43)
Totals	691.7	429.9	438.5	526.3	2,613.0	2,145.5	170.0	159.3	190.8	174.8	174.8	89.10	269.10	130.7	240.7	287.0	240.7	287.0	287.0
Averages	14.41	89.43	62.91	10.49	9.33	10.32	67.0	3.62	3.62	4.06	3.97	91.18	91.18	5.28	2.56	48.57	5.60	6.67	83.87
Minima	13.0	77.0	44.7	9.1	7.8	9.2	60.0	3.1	3.15	3.7	3.7	77.5	81.2	4.65	2.1	39.0	5.0	6.0	77.8
Maxima	15.7	99.3	69.1	11.6	10.2	11.4	73.5	3.95	4.0	4.7	4.5	101.3	108.5	5.9	3.05	61.0	6.3	7.3	92.5

1 Allowance made for wear of teeth, where needed.

2 Small, but male characters.

3 Not negroid.

PRE-ALEUTS: FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxm. (glabelled ad maximum)	Diam. lateral maxm.	Basion-Bregm height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
378628	U.S.N.M.	Umnak	60		18.4	13.4	13.9	69.1	84.8		15.57				
378658	do	do	50		18.5	12.9	69.7								7.6
378652	do	do	65		18.4	13.0	13.5	70.5	86.0		14.97	1,305			7.1
378456	do	do	80		18.4	13.2		71.7							
378659	do	do	80		18.4	13.3		72.3							
378655	do	do	60		18.5	13.4		72.4							
378680	do	do	55		18.9	13.6	12.3	73.0	76.2		15.0				7.4
378637	do	do	70		17.9	13.1	13.5	73.2			14.83				
378634	do	do	75		18.0	13.2	12.7	73.3	81.4		14.63	1,255			7.1
378634	do	do	35		18.0	13.3	13.8	73.9	88.2		15.03				
378646	do	do	35		18.4	13.7	13.4	74.5	83.5		15.17				7.1
378632	do	do	60		18.8	14.0		74.5							
378642	do	do	55		18.8	14.0	12.8	74.5	78.1		15.20				6.9
378648	do	do	18		18.1	13.5	12.0	74.6	76.0		14.53	1,430			
378658	do	do	60		18.6	13.9		74.7							
378648	do	do	30		18.3	13.8	13.8	75.4	86.0		15.30	1,360			7.6
378630	do	do	65		18.3	13.8	12.1	75.4	75.4		14.73				7.9
378473	do	do	75		17.4	13.2	12.0	75.9	78.4		14.20				
378706	do	Shiprock	70		17.4	13.5	12.0	76.3	76.9		14.40				
7831	Moscow Mus.	Umnak	70		17.7	13.5	13.6	76.4	84.7		14.40	1,335			6.6
378621	U.S.N.M.	do	55		18.2	13.9	13.6	76.4	74.7		15.23	1,350			6.7
378647	do	do	55		18.8	14.4	12.4	76.6	74.7		15.20				
378697	do	Anchitka	50		18.0	13.2	12.4	76.7	81.6		14.27				
5215	Leningrad Mus.	Secondarily from Commander Islands			17.2	13.8	12.8	76.7	80.5		14.87				7.0
378398	U.S.N.M.	do	60		17.0	13.1		77.1							6.9
378623	do	do	70		17.9	13.8	12.4	77.1	78.2		14.70	1,255			
7807	Moscow Mus.	Umnak	70		18.4	14.2	11.8	77.2	72.4		14.80				7.3
378398	U.S.N.M.	do	20		17.6	13.6	11.8	77.3	75.6		14.33				6.6
7757	Moscow Mus.	Attu	20		17.2	13.3	13.0	77.3	85.2		14.50				7.2

378392	U.S.N.M.	Agatu.	45	18.1	77.6	73.5	14.67	1,140.0	11.8	7.2
378165	do.	Shiprock	50	13.8	77.6	79.0	14.37			7.4
378400	do.	Kagamil	65	17.4	77.8	78.8	14.87			7.1
378334	do.	Atka	18.0	14.0	77.8	78.8	14.60			7.7
378272	do.	Kashega	18.0	14.0	11.8	77.8	14.60			7.9
378298	do.	Cernovskl.	18.0	14.0	12.9	80.6	14.97	1,340.0	12.5	6.8
378542	do.	Shiprock	18.0	14.0	12.8	80.0	14.93		12.7	7.9
378704	do.	do.	30	17.9	78.2		14.83	1,230.0		8.5
378701	do.	Amchitka	18.0	14.2	78.4	88.4	14.87			7.1
378317	do.	Umnak	18.0	14.2	12.4	78.9	15.0	1,350.0	12.0	7.1
379115	do.	Kagamil	18.0	14.2	12.8	79.5	14.40		11.5	7.7
378640	Leningrad Mus.	Atka	17.2	13.6	79.2	83.9	14.67			6.7
6022	U.S.N.M.	Umnak	17.3	13.7	13.0	79.2	14.70			7.2
7830	Moscow Mus.	do.	18.1	14.1	12.2	79.4	14.57			7.2
7762	do.	do.	17.5	13.9	12.3	79.4	14.17			6.8
do.	do.	do.	70	17.1	11.8	79.5	14.03		11.6	8.0
77753	do.	Amoknak	17.1	13.6	11.4	79.5	15.17		13.2	7.5
378639	do.	Umnak	65	17.6	13.3	79.6	14.57	1,230.0		6.9
378443	do.	Atka	26	17.3	12.6	79.8	14.83			6.9
378454	do.	Umnak	65	14.0	13.0	80.0	14.83			7.2
378406	do.	Shiprock	70	17.6	14.1	80.1	14.77			7.4
378470	do.	do.	55	17.6	12.8	80.1	14.83		11.5	7.1
378604	do.	Umnak	18.4	14.8	12.8	80.1	15.33		12.4	6.5
7809	Moscow Mus.	do.	65	17.4	14.0	80.5	14.60			6.6
378330	U.S.N.M.	Ambla	30	17.4	12.4	80.5	14.93			7.1
7816	Moscow Mus.	Umnak	20	17.6	12.7	80.7	14.83			6.5
7777	do.	do.	65	14.2	12.7	80.7	14.70		11.7	7.1
378405	U.S.N.M.	Kagamil	55	17.6	12.3	80.7	14.70		12.4	6.7
378468	do.	Shiprock	28	14.2	12.4	80.7	14.53		10.9	6.4
378616	do.	Umnak	18.3	14.8	11.8	80.7	13.47	1,400.0	12.6	7.7
378601	do.	do.	30	17.8	13.3	80.9	15.0		12.3	7.5
378372	do.	do.	35	16.8	12.8	80.9	14.43		11.8	7.2
7796	Agatu	Umnak	60	17.4	13.0	81.0	14.83			7.3
7792	Moscow Mus.	do.	60	17.6	14.3	81.0	15.17			6.7
7779	do.	do.	18.0	14.7	12.8	81.7	14.23			(45)
7767	do.	do.	50	17.0	11.8	81.8	798.06	(13)	(20)	321.3
Specimens			(61)	884.7	(64)	(54)	10,980.0		240.7	7.14
Totals			3182	1,144.0	682.8	77.63	14.78	1,306.2	12.04	7.14
Averages			17.88	13.82	12.64	79.82	14.03	1,140.0	10.9	6.4
Minimum			16.8	12.9	11.4	79.1	14.03	1,140.0	10.9	6.4
Maximum			19.4	14.8	13.9	81.8	15.57	1,430.0	13.2	7.9

1 Allowance made for tooth wear, where needed.

PRE-ALEUTS: FEMALES—Continued

Catalog No.	Diam. Blizygomatie	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{c}{b \times 100}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max.	Nasal Index	Upper Alveolar Arch—Length max.	Upper Alveolar Arch—Breadth max.	Upper Alveolar Arch—	
378628						11.0			3.8		4.0		95.0								
378658	13.3			10.3	9.0	10.2	67.5	51.5	3.7	3.65	4.05	3.9	91.4	93.0	5.3	2.45	46.3				
378652	12.5								3.7	3.7	3.85	4.0	96.1	92.5	5.1	2.55	60.0				
378456																					
378659																					
378655	13.3			9.9	8.8	10.0	69.0	53.5	4.0	4.0	4.3	4.2	93.0	95.2	5.4	2.65	49.1	5.3	6.2	85.5	
378680																					
378637																					
378634	12.8			9.7	8.5	9.4	66.0	49.0	3.7	3.8	4.0	4.0	92.5	95.0	5.2	3.0	57.7	5.3	6.3	84.1	
378654																					
378646	13.6			10.2	9.2	10.0	68.0	57.0	3.45	3.5	3.9	3.7	88.5	94.6	5.0	2.5	60.0	5.5	7.0	78.6	
378632																					
378642																					
378698	11.7			9.9	8.8	9.4	65.0	53.0	3.4	3.4	3.8	3.7	89.5	91.7	4.75	2.2	46.3	5.3	6.1	86.9	
378648																					
378648	13.4			10.5	9.4	10.3	67.0	57.0	3.3	3.3	4.0	3.9	82.5	84.6	5.3	2.45	46.2	5.4	6.8	79.4	
378630	13.4			9.6	8.2	9.8	67.0	52.0	3.9	3.95	4.0	3.9	97.5	101.3	5.25	2.6	49.5	5.1	6.5	78.5	
378473	13.4								3.4	3.5	3.9	3.9	87.2	89.7	5.0	2.35	47.0				
378706	13.4								3.6	3.6	4.1	4.0	87.8	90.0	4.7	2.5	53.2	5.5	6.5	84.6	
7831	13.5			10.1	9.0	9.7	67.0	51.0	3.6	3.6	4.1	4.0	87.8	90.0	4.7	2.5	53.2	5.5	6.5	84.6	
378621	13.5								3.85	3.2	3.95	3.9	84.8	82.1	4.6	2.6	56.5				
378621	13.5																				
378647	13.9																				
378697																					
378697	13.5			10.5	9.2	9.8	64.5	50.0	3.2	3.3	3.7	3.6	86.5	91.7	4.8	2.35	49.0	5.4	6.4	84.4	
32213	12.8								3.6	3.65	3.7	3.9	97.3	91.0	4.7	2.4	51.2	5.3	5.8	91.4	
378508																					
378623																					
7807	14.0			9.7	8.5	9.5	67.0	56.5	3.8	3.85	4.1	3.9	92.7	92.0	4.95	2.4	47.5	5.1	6.0	85.0	
378595	12.9			9.1	8.3	9.1	68.5	58.5	3.7	3.45	3.75	3.75	93.3	92.0	4.9	2.3	48.9				
7787	13.3			9.8	8.8	9.6	62.0	57.0	3.7	3.7	3.95	3.9	93.7	91.9	4.7	2.3	48.9				
378592									3.4	3.4	4.2	4.2	81.0	81.0	5.0	2.5	50.0	5.2	6.0	78.8	
378165	13.5			9.7	8.8	9.6	67.5	60.0	3.4	3.4	3.8	3.7	89.5	91.0	4.9	2.3	49.9	5.3	6.3	84.1	
378400									3.4	3.5	3.7	3.7	89.5	89.5	5.1	2.5	49.0	5.2	6.4	79.1	
378344	12.7																				
378272	12.4			9.3	8.2	9.0	65.0	53.0	3.4	3.4	3.6	3.6	94.4	94.4	5.0	2.35	47.0	5.1	6.3	81.0	
378298	13.0			10.7	9.4	10.4	63.5	54.0	3.6	3.6	4.1	4.1	87.8	87.8	5.0	2.5	44.0	5.3	6.6	87.9	
378542	14.3			10.2	9.0	10.4	69.0	55.0	3.4	3.45	3.85	3.85	88.5	88.5	4.45	2.3	42.2	5.5	6.6	80.9	
378704	14.1			10.0	8.8	9.6	66.5	49.0	3.4	3.3	3.6	3.6	88.5	87.7	4.9	2.4	49.0				

KODIAK AND ALEUTIAN ISLANDS
(Abstract)

Measurement	MALES				FEMALES			
	Koniag	pre-Koniag	Aleut	pre-Aleut	Koniag	pre-Koniag	Aleut	pre-Aleut
Approximate age.....	(52) 37.7	(76) 44.3	(88) 44.9	(55) 50.4	(35) 36.6	(139) 43.7	(92) 43.5	(61) 52.2
Vault:								
Length.....	(49) 17.56	(67) 18.01	(113) 18.05	(57) 18.69	(33) 16.81	(135) 17.31	(115) 17.25	(64) 17.88
Breadth.....	(49) 15.08	(67) 13.99	(113) 15.07	(57) 14.26	(33) 14.54	(135) 13.54	(115) 14.47	(64) 13.82
Height.....	(48) 13.35	(61) 13.92	(111) 12.90	(49) 13.44	(33) 13.0	(116) 13.36	(111) 12.92	(54) 12.64
<i>Cranial index</i>	(49) 85.87	(67) 77.65	(113) 83.48	(57) 76.27	(33) 86.30	(135) 78.21	(115) 83.85	(64) 77.33
<i>Mean height index</i>	(48) 83.01	(61) 86.97	(111) 77.90	(49) 79.8	(33) 82.84	(116) 86.82	(111) 77.95	(54) 78.82
Module (mean diam.).....	(48) 15.40	(67) 15.30	(111) 15.34	(50) 15.36	(35) 14.77	(116) 14.61	(111) 14.09	(54) 14.78
Capacity.....	(2) 1,575.0	(55) 1,536.7	(85) 1,536.7	(13) 1,502.3	(2) 1,202.5	(42) 1,368.0	(42) 1,368.0	(13) 1,306.2
Face:								
Total height.....	(35) 12.47	(44) 13.06	(57) 12.50	(36) 12.93	(21) 11.90	(63) 12.06	(46) 11.70	(20) 12.04
Upper height.....	(50) 7.55	(53) 7.85	(102) 7.54	(46) 7.64	(28) 7.19	(115) 7.35	(95) 7.06	(45) 7.14
Maximum breadth.....	(50) 14.36	(63) 14.03	(106) 14.48	(48) 14.41	(28) 13.33	(107) 12.93	(104) 13.42	(47) 13.35
<i>Facial index, total</i>	(35) 85.80	(41) 93.38	(57) 87.32	(31) 80.23	(19) 89.08	(57) 98.41	(42) 87.42	(18) 89.88
<i>Facial index, upper</i>	(50) 51.74	(58) 55.93	(99) 52.31	(42) 52.91	(28) 53.91	(100) 56.92	(69) 52.62	(42) 53.62
Base, etc.:								
Basion-Alveolar Pt.....	(49) 9.83	(54) 10.28	(100) 10.52	(41) 10.49	(28) 9.74	(86) 9.94	(93) 9.90	(38) 9.96
Basion-Subnasal Pt.....	(47) 9.09	(60) 9.15	(105) 9.22	(47) 9.33	(31) 8.55	(96) 8.81	(43) 8.69	(43) 8.81
Basion-Nasion.....	(49) 10.22	(63) 10.41	(108) 10.01	(51) 10.32	(33) 9.63	(112) 9.98	(53) 9.23	(53) 9.76
Facial angle.....	(45) 68.23	(53) 68.42	(98) 64.57	(39) 67.0	(26) 67.37	(85) 68.34	(88) 65.28	(37) 66.65
Alveolar angle.....	(45) 54.54	(53) 57.03	(97) 52.07	(39) 55.00	(26) 51.87	(85) 55.37	(88) 51.86	(37) 53.73
Orbits:								
Mean height.....	(53) 3.57	(61) 3.63	(109) 3.68	(30) 3.62	(80) 3.51	(117) 3.53	(99) 3.54	(48) 3.51
Mean breadth.....	(53) 4.0	(61) 4.01	(109) 4.11	(30) 4.02	(80) 3.85	(117) 3.82	(99) 3.90	(48) 3.90
<i>Orbital index</i>	(53) 89.50	(61) 90.57	(109) 89.67	(30) 90.07	(80) 80.45	(117) 82.21	(99) 80.89	(48) 89.87
Nose:								
Height.....	(48) 5.27	(65) 5.39	(108) 5.19	(51) 5.28	(31) 4.97	(117) 5.08	(94) 4.89	(47) 4.95
Breadth.....	(48) 2.50	(65) 2.50	(108) 2.53	(51) 2.56	(31) 2.41	(117) 2.37	(94) 2.43	(47) 2.44

<i>Index</i>	(48)	(65)	(108)	(51)	(117)	(103)	(47)
Upper Alveolar Arch.....	47.10	46.40	48.72	48.87	46.72	49.69	49.50
Length.....	(50)	(50)	(99)	(43)	(96)	(90)	(98)
Breadth.....	5.57	5.54	5.64	5.60	5.31	5.29	5.32
<i>Index</i>	(50)	(50)	(99)	(43)	(96)	(90)	(98)
Lower jaw.....	6.81	6.74	6.80	6.67	6.41	6.25	6.31
Height at symphysis.....	(50)	(50)	(99)	(43)	(96)	(90)	(98)
Diam. frontal minimum.....	81.8	82.19	85.47	83.87	82.87	84.68	84.43
	(36)	(55)	(22)	(71)	(71)		
	3.50	3.73	3.33	3.45	3.45		
	(48)	(67)	(38)	(117)	(117)		
	9.73	9.47	9.25	9.19	9.19		

SIBERIA: NEOLITHIC CRANIA 1
(Abstract)

Measurement	MALES		FEMALES		Measurement	MALES		FEMALES	
	Angara River	Upper Lena River	Angara River	Upper Lena River		Angara River	Upper Lena River	Angara River	Upper Lena River
Approximate age.....	{ (39)	(7)	{ (30)	(6)	Base, etc.—Continued.				
Vault:					Basion—Subnasal Pt.....	{ (17)	(6)	{ (10)	(4)
Length.....	{ (39)	(7)	{ (20)	(6)	Basion—Nasion.....	{ 9.56	9.72	{ 8.94	8.95
Breadth.....	{ 19.47	(7)	{ 18.48	(6)	Facial angle.....	{ (27)	(6)	{ (12)	(5)
Height.....	{ (39)	(7)	{ (20)	(6)	Alveolar angle.....	{ 10.66	10.60	{ 10.0	9.70
Cranial index.....	{ 14.32	(7)	{ 13.93	(6)	Orbits (mean):	{ (17)	(5)	{ (9)	(4)
Mean height index.....	{ (27)	(6)	{ (13)	(5)	Height.....	{ 69.2	68.6	{ 68.7	67.0
Module (mean diam.).....	{ 13.43	(7)	{ 12.65	(6)	Breadth.....	{ (17)	(5)	{ (9)	(4)
Face:	{ 73.6	(7)	{ 76.1	(6)	<i>Index</i>	{ 54.8	56.1	{ 53.9	51.1
Total height.....	{ (39)	(7)	{ 76.1	(6)	Nose:	{ (20)	(7)	{ (10)	(6)
Upper height.....	{ (27)	(6)	{ (13)	(5)	Height.....	{ 3.13	3.38	{ 3.30	3.38
Breadth.....	{ 79.2	(6)	{ 78.0	(5)	Breadth.....	{ (20)	(7)	{ (10)	(6)
Facial index Total.....	{ (27)	(6)	{ (13)	(5)	<i>Index</i>	{ 3.94	3.82	{ 3.82	3.76
Facial index Upper.....	{ 15.78	(6)	{ 15.03	(5)	Upper Alveolar Arch:	{ (20)	(7)	{ (10)	(6)
Basion-Alveolar Pt.....	{ (10)	(2)	{ (3)	(2)	Length.....	{ 86.9	84.4	{ 86.1	90.0
	{ 12.60	(12.55)	{ (11.30)	(11.15)	Breadth.....	{ (10)	(7)	{ (12)	(5)
	{ (19)	(6)	{ (13)	(5)	<i>Index</i>	{ 5.41	5.22	{ 5.03	4.80
	{ 7.69	7.33	{ 7.08	6.86	Length.....	{ (21)	(7)	{ (12)	(5)
	{ (24)	(7)	{ (12)	(6)	Breadth.....	{ 2.61	2.45	{ 2.48	2.33
	{ 14.28	14.10	{ 13.20	13.0	<i>Index</i>	{ (21)	(7)	{ (12)	(5)
	{ (10)	(2)	{ (3)	(2)	Upper Alveolar Arch:	{ 48.3	46.9	{ 46.3	47.9
	{ 88.2	(89.9)	{ (85.8)	(85.5)	Length.....	{ (21)	(4)	{ (11)	(4)
	{ (18)	(6)	{ (11)	(5)	Breadth.....	{ 5.81	5.93	{ 5.56	5.60
	{ 54.1	52.1	{ 54.0	52.8	<i>Index</i>	{ (21)	(4)	{ (11)	(4)
	{ (17)	(5)	{ (10)	(4)	Breadth.....	{ 6.69	6.75	{ 6.34	6.20
	{ 10.68	10.63	{ 10.08	10.08	<i>Index</i>	{ (21)	(4)	{ (11)	(4)
						{ 86.8	87.8	{ 87.7	90.3

1 Detailed measurements published in Amer. Journ. Phys. Anthropol., vol. 29, 1942.

SIBERIA: SAMOYED

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxm. (glabela ad maxm.)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth wear	Menton-Height (a)	Alveol. Pt.-Nasion Height (b)
974	Voienno-Med. Acad.	Yenisei	.....	.....	19.1	14.8	13.4	77.49	79.06	.....	15.77	.....	.....	112.7	7.6
129 ²	Leningrad Mus.	Northwest Asia	.....	.....	18.4	14.3	12.1	77.72	74.01	.....	14.93	.....	.....	.....	7.3
4339	Moscow Mus.	Archangelski Gub.	35	.....	18.8	14.8	12.6	78.72	76.0	.....	15.40	.....	.....	.....	8.0
4348 ³	do	do	Elderly	.....	17.8	14.2	12.6	79.78	78.75	.....	14.87	.....	.....	.....	.....
50066	Leningrad Mus.	Archangelski Kraj	.....	.....	17.7	14.2	13.1	80.23	82.13	.....	15.00	.....	.....	.....	.....
4344	Moscow Mus.	Archangelski Gub.	.....	.....	17.3	14.2	13.0	82.08	82.54	.....	14.83	.....	.....	.....	7.3
4340	do	do	28	.....	17.5	14.5	12.6	82.86	78.75	.....	14.87	.....	.....	.....	7.8
50062	Leningrad Mus.	Archangelski Kraj	.....	.....	17.5	15.1	12.8	86.29	78.53	.....	15.13	.....	.....	.....	7.4
4346 ³	Moscow Mus.	Archangelski Gub.	Elderly	.....	17.4	15.4	12.9	85.51	78.66	.....	15.23	.....	.....	.....	7.5
8-1 ⁴	Leningrad Mus.	.....	.....	.....	17.1	15.2	12.5	83.89	77.40	.....	14.93	.....	.....	.....	.....
Specimens	.....	.....	.....	.....	(10)	(10)	(10)	(10)	(10)	.....	(10)	.....	.....	(3)	(8)
Totals	.....	.....	.....	.....	178.6	146.7	127.6	.....	.....	.....	150.96	.....	.....	37.10	60.20
Averages	.....	.....	.....	.....	17.86	14.67	12.76	82.14	78.45	.....	16.00	.....	.....	12.37	7.53
Minima	.....	.....	.....	.....	17.1	14.2	12.1	77.49	74.01	.....	14.83	.....	.....	11.9	7.3
Maxima	.....	.....	.....	.....	19.1	15.4	13.4	88.89	82.54	.....	15.77	.....	.....	12.7	8.0

SAMOYED-YURAK

1344 (shaman) ¹	Leningrad Mus.	Turnchanski Kraj	19.9	16.2	12.5	81.41	69.85	16.20
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SIBERIA: SAMOYED—Continued

MALES

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{c}{a} \times 100\right)$	Facial Index, upper $\left(\frac{c}{b} \times 100\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index
974	13.2	96.21	57.68	10.7	9.6	10.2	65.0	46.5	3.5	3.5	3.85	3.85	90.91	90.91	5.3	2.5	47.47	5.7	6.4	89.06
129 ²	14.0	—	52.14	10.1	8.8	9.8	66.0	49.0	3.2	3.2	3.55	3.55	90.14	90.14	5.15	2.65	51.46	7.0	7.0	78.57
4339	14.6	—	64.79	10.3	9.4	10.6	69.0	58.0	3.6	3.65	4.05	3.95	88.80	92.41	6.0	3.05	50.83	5.4	7.1	76.06
4348 ³	13.8	—	—	—	8.6	9.0	—	—	3.15	3.35	4.0	3.9	78.75	85.90	4.8	2.9	60.42	—	—	—
50966	14.2	83.80	51.41	9.2	8.4	9.7	71.0	60.0	3.4	3.4	3.8	3.7	80.47	91.89	5.2	2.3	42.69	—	—	78.13
4344	13.4	—	64.48	9.5	8.5	9.5	67.5	56.0	3.4	3.8	3.7	3.8	89.47	89.19	5.2	2.7	51.92	6.4	6.4	81.31
4340	14.1	—	65.32	9.7	8.8	9.6	65.0	59.5	3.6	3.6	3.85	3.8	93.51	94.74	5.65	2.65	46.90	5.1	6.9	73.91
50062	13.5	—	64.81	9.3	8.3	9.3	67.0	55.5	3.35	3.5	4.0	3.8	88.16	91.89	5.3	2.2	41.51	6.6	6.6	80.30
4346 ⁵	14.6	—	51.37	—	8.2	9.4	—	—	3.65	3.5	4.0	4.0	91.25	87.60	5.2	2.55	49.01	—	—	—
Prov. No. S-1 ⁶	14.3	—	—	—	8.8	9.8	—	—	3.35	3.4	3.9	3.9	85.90	87.18	4.9	2.5	51.02	—	—	—
Specimens	(10)	(3)	(8)	(7)	(10)	(10)	(7)	(7)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(7)	(7)	(7)
Totals	139.7	—	68.50	87.0	95.9	96.9	470.5	384.5	34.20	34.30	38.60	38.05	—	—	52.00	26.0	—	37.3	46.90	—
Averages	13.97	—	53.91	9.83	8.7	9.69	67.21	54.93	3.43	3.43	3.86	3.81	88.60	92.14	5.29	2.60	49.16	5.33	6.70	79.63
Minima	13.2	—	83.80	9.2	8.2	9.0	65.0	46.5	3.13	3.2	3.55	3.55	78.75	85.90	4.8	2.2	41.51	5.0	6.4	73.91
Maxima	14.6	—	57.68	10.7	9.4	10.6	71.0	60.0	3.65	3.65	4.05	4.0	93.51	94.74	6.0	3.05	60.42	7.1	7.1	82.06

SAMOYED—YURAK

1384 (shaman) ⁷	14.6	—	—	—	—	10.5	—	—	3.35	—	4.2	—	79.76	—	—	—	—	—	—	—
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¹ Allowance made for wear of teeth, where needed.

² Much like those from Yukagir Sopka.

³ Both upper median incisors lost long ago.

⁴ Near.

⁵ Both right and left upper median incisors lost long ago.

⁶ Much like an Aleut.

⁷ Pronounced type.

SIBERIA: SAMOYED

FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabela ad maximum)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Men-tion-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)	
50061	Leningrad Mus.	Archangel'ski Krai.	.....	.....	18.2	14.2	12.4	78.02	76.54	.....	14.93	.....	.....	.....	6.9
1301	do.	Northwest Asia.	.....	.....	17.4	14.0	12.2	80.46	77.71	.....	14.53	.....	.....	.....	7.1
50065	do.	Archangel'ski Krai.	.....	.....	17.2	14.1	11.8	81.78	76.40	.....	14.37	.....	.....	.....	7.0
50063	do.	do.	.....	.....	16.8	13.8	12.2	82.14	79.74	.....	14.27	.....	.....	.....	7.0
50061	do.	do.	.....	.....	17.2	14.2	13.0	82.56	82.80	.....	14.80	.....	.....	.....	7.1
4343 1	Moscow Mus.	do.	Mid-aged	.....	16.7	14.0	12.6	83.83	82.08	.....	14.43	.....	.....	.....	6.8
4342	do.	do.	25	.....	16.6	14.0	12.2	84.54	79.74	.....	14.27	.....	.....	.....	7.1
976	Leningrad Mus.	Yenisei.	.....	.....	17.2	15.0	12.8	87.21	79.50	.....	15.00	.....	.....	.....	6.8
Specimens	.....	.....	.....	.....	(8)	(8)	(8)	(8)	(8)	.....	.....	.....	.....	(3)	(8)
Totals	137.3	113.3	99.2	116.6	55.8
Averages	17.16	14.16	12.40	82.52	79.17	14.58	6.98
Minima	16.6	13.8	11.8	78.02	75.40	14.27	6.8
Maxima	18.2	15.0	13.0	87.21	82.80	15.0	7.1

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{a}{b \times 100}\right) \times c$	Facial Index, upper $\left(\frac{c}{b \times 100}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index	
50001	13.0	55.22	65.08	10.0	8.0	10.4	73.0	48.0	3.4	3.45	3.85	3.8	88.81	90.79	5.5	2.4	48.64	5.4	0.4	87.93	
1307	13.4	52.59	62.59	10.0	8.8	10.0	69.5	47.5	3.5	3.4	3.9	3.7	89.74	91.89	5.3	2.55	48.11	4.8	0.4	87.21	
50065	12.5	59.49	66.0	9.3	8.3	9.0	65.0	55.0	3.4	3.56	3.8	3.6	89.47	96.61	5.0	1.95	56.0	5.1	5.9	86.44	
50063	13.1	84.73	63.44	10.1	9.0	9.8	67.0	51.0	3.25	3.3	3.7	3.6	87.84	91.67	5.1	2.3	45.10	5.0	6.3	79.37	
50064	13.3	53.88	63.58	9.8	8.8	9.8	68.5	50.0	3.55	3.5	3.8	3.8	93.42	93.42	5.5	2.8	50.91	3	5.2	82.54	
4343	13.2	4343	61.52	8.9	8.9	9.9	68.5	51.0	3.1	3.0	3.7	3.65	83.78	82.19	5.1	2.65	51.96	5.1	6.5	76.92	
4342	13.1	64.20	64.20	9.2	8.8	9.6	70.5	57.5	3.45	3.4	3.7	3.7	90.54	93.24	5.1	2.45	48.04	5.0	6.5	86.44	
976	13.0	52.51	67.5	9.2	8.1	9.2	67.5	51.0	3.4	3.4	3.9	3.8	87.18	89.47	4.75	2.2	46.32	5.1	5.9	86.44	
Specimens	(8)	(8)	(8)	(8)	(8)	(8)	(7)	(7)	(8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)	(7)	(7)	(7)	(7)
Totals	104.6	67.70	67.70	69.20	77.7	77.7	481.0	360.0	25.95	27.10	30.35	29.65	88.80	91.40	41.35	19.30	46.67	35.60	43.0	82.79	
Averages	13.08	56.92	52.35	9.67	8.65	9.71	68.71	51.43	3.37	3.39	3.79	3.71	83.78	82.19	5.17	2.41	46.67	5.09	6.14	76.92	
Minima	12.5	84.73	61.52	9.2	8.1	9.0	65.0	47.50	3.1	3.0	3.7	3.6	83.78	82.19	4.75	1.95	48.04	4.8	5.7	76.92	
Maxima	13.4	50.40	66.0	10.1	9.0	10.4	73.0	57.5	3.55	3.55	3.9	3.8	93.42	93.61	5.5	2.8	51.96	5.4	6.5	86.44	

¹ Much like those from Yukagir Sopka.

² Both upper median incisors lost long ago.

³ Near.

SIBERIA: OSTIAK
MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabella and maximum)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
6913 ²	Moscow Mus.	Little Ob River.	Elderly		19.7	13.4	13.1	68.02	79.15	97.76	15.40			7.4	
7027	do	do	35		20.6	14.0	12.0	70.0	76.88	94.14	15.63			7.7	
7053 ³	do	do	Elderly		19.7	13.5	13.5	71.53	83.33	100.0	15.87			8.1	
7083	do	do	do		18.2	13.5	13.5	74.30	78.95	93.10	15.90			7.2	
7087	do	do	25		19.7	13.4	12.4	73.63	78.98	94.54	15.83			6.4	
134 ⁴	Leningrad Mus.	Kornysukl.	Mid-aged		18.4	13.7	12.4	74.46	76.66	90.54	15.73			8.2	
6802 ⁶	Moscow Mus.	Little Ob River	Elderly		19.5	14.6	13.1	74.87	76.83	93.73	15.73			7.0	
7088	do	do	40		19.1	14.3	12.4	74.87	80.23	95.71	15.60			7.8	
7153	do	do	40		18.3	13.8	12.4	76.41	77.56	89.86	14.83			7.1	
7004	do	do	20.0		20.0	15.1	12.9	76.60	73.50	86.43	16.00			7.8	
6980	do	do	Elderly		18.8	14.2	12.3	76.53	74.55	86.62	15.27			7.1	
7141	do	do	40		18.8	14.2	12.8	76.53	77.58	90.14	15.47			7.8	
6927	do	do	Elderly		19.4	14.7	12.3	76.77	72.14	83.67	15.47			7.1	
6992	do	do	Old		19.0	14.4	13.0	76.79	77.84	90.28	15.27			7.8	
7112	do	do	40		10.0	14.4	12.4	76.79	74.25	86.11	15.27			7.1	
7065 ⁷	do	do	Elderly		18.7	14.2	12.8	76.54	77.81	90.14	15.23			7.1	
7092	do	do	do		18.4	14.0	12.8	76.09	79.01	91.43	15.07			7.8	
6944	do	do	do		18.0	13.7	12.6	76.11	79.50	91.97	14.77			7.0	
6950 ⁸	do	do	Mid-aged		19.7	15.0	13.2	76.14	76.08	88.0	15.97			7.6	
7083	do	do	40		18.5	14.2	13.2	76.76	80.73	94.96	15.30			7.1	
7101 ⁹	do	do	24		18.2	14.0	12.5	76.92	77.64	89.29	14.90			7.6	
7129	do	do	40		18.2	14.0	13.3	76.92	82.61	95.0	15.17			7.9	
7125	do	do	Mid-aged		17.8	13.7	12.3	76.97	78.10	89.78	14.60			7.6	
7017	do	do	do		18.7	14.4	12.6	77.01	76.13	87.50	15.23			8.2	
7295	do	do	35		17.9	13.8	13.2	77.09	83.28	95.65	14.97			7.4	
51914 ¹⁰	Leningrad Mus.	do	18.4		18.4	14.2	12.6	77.17	77.50	83.73	15.07			7.0	
7078	Moscow Mus.	do	18.0		18.0	13.9	13.8	77.30	80.70	92.62	16.00			8.2	
7132	do	do	40		18.0	14.4	12.4	77.22	77.74	89.21	14.77			7.9	
6932	do	do	Old		17.8	14.4	12.6	77.49	76.56	87.50	15.20			7.5	
6910	Moscow Mus.	do	Elderly		18.6	13.8	12.8	77.65	81.01	95.75	14.80			8.0	
7062	do	do	Mid-aged		17.8	14.3	13.7	77.55	86.71	95.28	15.00			7.7	
7086	do	do	35		18.4	14.3	12.3	77.72	75.25	86.01	15.13			7.6	
7134 ¹¹	do	do	Elderly		18.4	15.0	12.9	77.72	77.68	88.81	15.73			7.9	
7174	do	do	do		18.5	14.4	12.9	77.72	75.23	86.0	15.73			7.8	
6946	do	do	do		18.5	14.4	12.2	77.81	74.16	84.73	15.03			7.3	
7118	do	do	do		17.7	13.8	12.7	77.97	80.63	95.08	14.73			7.3	

SIBERIA: OSTIAK—Continued

MALES—Continued

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabella ad maximum)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Irdhicka's method)	Teeth, wear	Menton-Height (a) 1	Alveol. Pt.-Nasion Height (b)
7154 ²⁴	Moscow Mus	Little Ob River.	40	.....	17.2	14.6	12.4	84.88	77.99	84.93	14.73	.....	.....	12.0	87.3
7037 ³⁰	do.	do.	Mid-aged	.....	17.4	14.8	12.0	85.06	74.63	81.08	14.73	.....	.....	12.0	87.3
7104 ³¹	do.	do.	do.	.....	17.6	15.0	12.4	85.23	76.07	82.67	15.00	.....	.....	12.4	7.8
6998	do.	do.	do.	.....	17.3	14.8	12.8	85.55	79.75	86.49	14.97	.....	.....	12.4	7.7
6996	do.	do.	do.	.....	18.2	15.6	12.9	85.71	76.83	82.69	15.57	.....	.....	12.4	8.4
6896	do.	do.	Mid-aged	.....	17.3	14.9	12.6	86.13	78.26	84.66	14.93	.....	.....	12.4	7.5
7183	do.	do.	do.	.....	17.8	15.4	12.6	86.62	75.90	81.82	15.27	.....	.....	12.4	7.7
7059	do.	do.	Mid-aged	.....	17.3	14.9	11.0	87.55	68.97	73.83	14.30	.....	.....	12.4	7.5
7036	do.	do.	Old	.....	17.0	15.2	12.8	87.66	78.77	84.21	15.10	.....	.....	12.4	7.1
7139	do.	do.	do.	.....	17.3	15.2	12.8	87.66	78.77	84.21	15.10	.....	.....	12.4	7.6
7061	do.	do.	Mid-aged	.....	17.2	15.4	12.8	89.65	78.55	83.72	15.13	.....	.....	12.4	7.6
Specimens.....					(90)	(99)	(99)	(90)	(99)	(99)	(90)			(20)	(90)
Totals.....					183.1	144.2	127.0	85.23	78.00	80.87	1,508.23	.....	.....	243.30	681.9
Averages.....					18.31	14.28	12.84	85.23	78.00	80.87	15.16	.....	.....	12.17	7.57
Minima.....					17.0	13.4	11.0	68.02	68.97	73.83	14.30	.....	.....	11.2	6.4
Maxima.....					20.0	15.6	14.1	89.65	86.88	100.00	16.23	.....	.....	13.2	8.4

OSTIAK-SAMOYED

1340 ³²	Leningrad Mus...	Surnshanski Krai	.....	.....	17.8	15.3	12.1	85.96	73.11	.....	15.07	.....	.....	12.7	7.7
46144 ³³	Leningrad Mus...	Northern Yenisei	.....	.....	17.9	14.8	12.7	83.68	77.68	.....	15.13	.....	.....	12.2	7.3

DOLGAN

Catalog No.	Diam. Bizygomatic	Facial Index, local $\left(\frac{a}{100}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index
6013 1	14.2	79.5	59.5	10.4	9.2	10.2	79.5	59.5	4.1	3.9	4.1	4.1	85.57	87.80	3.5	5.8	53.27	3	6.7	79.10
7027	14.2	79.5	59.5	10.4	9.2	10.2	79.5	59.5	4.1	3.9	4.1	4.1	87.80	89.02	3.5	5.8	51.79	5.6	7.4	75.63
7063 3	15.2	79.5	59.5	10.4	9.2	10.2	79.5	59.5	4.0	4.0	4.2	4.1	95.24	96.96	3.0	6.0	51.67	6.0	7.0	85.67
7083	13.8	79.5	59.5	10.0	10.0	10.0	79.5	59.5	3.8	3.9	3.8	3.8	86.84	85.53	3.2	6.2	50.0	5.8	7.1	81.69
7087	13.5	79.5	59.5	8.8	8.8	8.8	79.5	59.5	3.7	3.7	3.7	3.8	94.59	92.11	3.2	5.6	42.46	5.4	6.5	83.08
131 7	13.5	79.5	59.5	8.8	8.8	8.8	79.5	59.5	3.5	3.5	3.5	3.5	83.64	82.50	3.4	4.0	60.00	5.4	6.5	83.08
6822 6	13.9	79.5	59.5	9.4	9.4	9.4	79.5	59.5	3.3	3.2	3.5	3.5	86.11	91.43	3.6	4.4	42.86	6.0	6.8	88.24
7088	14.6	79.5	59.5	10.5	10.5	10.5	79.5	59.5	3.7	3.7	4.2	4.1	83.29	91.46	3.6	2.35	41.69	3.7	6.8	83.82
7004	13.5	79.5	59.5	9.2	9.2	9.2	79.5	59.5	3.5	3.5	4.0	3.8	83.70	90.70	3.9	2.56	45.79	5.7	6.9	82.61
7153	13.9	79.5	59.5	10.7	9.8	11.2	72.5	61.5	3.9	3.5	4.3	4.0	78.75	82.56	4.2	2.56	47.29	5.7	6.9	82.61
6980	13.9	79.5	59.5	10.7	9.8	11.2	72.5	61.5	3.4	3.5	4.0	3.9	78.75	82.56	4.2	2.56	47.29	5.7	6.9	82.61
7141	14.3	79.5	59.5	10.2	9.2	9.8	66.5	54.0	3.5	3.5	4.0	4.0	86.42	87.60	3.9	3.0	52.63	6.0	6.4	85.91
6927	15.1	79.5	59.5	10.6	10.2	10.6	63.0	46.0	3.5	3.5	4.0	4.2	95.23	94.05	3.7	2.9	50.53	5.5	7.4	81.08
6992	14.6	79.5	59.5	9.3	9.3	10.5	70.0	56.5	4.0	3.9	4.2	4.1	86.23	87.60	3.7	2.9	50.53	5.5	7.4	81.08
7112	13.6	79.5	59.5	10.0	10.0	10.0	64.0	46.5	3.4	3.4	4.1	3.9	81.70	86.08	3.2	2.8	53.33	6.0	6.7	89.56
7066 7	14.2	79.5	59.5	10.4	10.4	10.4	60.0	39.0	3.8	3.7	4.8	4.3	79.17	87.21	3.0	2.65	53.0	6.6	6.5	101.54
7092	13.3	79.5	59.5	10.4	10.4	10.4	60.0	39.0	3.5	3.5	4.1	4.1	86.57	87.21	3.3	2.85	53.77	6.6	6.5	101.54
6944	14.0	79.5	59.5	9.8	9.8	10.3	66.0	63.0	3.6	3.5	4.0	4.1	90.00	85.37	3.0	2.65	53.0	6.6	7.0	80.0
6959 8	14.3	79.5	59.5	10.2	10.0	10.3	61.5	57.0	3.4	3.4	3.9	3.9	88.46	87.18	3.5	2.6	47.87	6.2	7.0	88.57
7083	14.1	79.5	59.5	10.2	9.4	10.2	70.0	54.0	3.5	3.5	4.0	4.0	88.75	87.60	3.5	2.5	44.64	5.7	6.0	86.96
7101 9	14.0	79.5	59.5	9.5	9.5	10.3	67.0	58.0	3.2	3.3	4.1	4.1	78.05	80.49	3.5	2.5	48.33	6.0	6.4	87.50
7120	14.0	79.5	59.5	10.8	10.8	10.8	66.0	50.5	3.7	3.7	3.7	3.7	98.67	98.67	5.5	2.35	42.73	6.0	6.3	95.21
7125	13.3	79.5	59.5	8.3	8.3	9.8	69.5	52.0	3.1	3.5	4.1	4.0	75.61	87.65	5.7	2.35	40.25	5.4	6.3	86.71
7017	14.5	79.5	59.5	10.9	10.0	10.6	65.5	65.0	3.6	3.5	4.1	4.1	87.80	86.59	5.5	2.75	50.0	6.0	6.6	90.91
7295	13.6	79.5	59.5	10.6	9.4	10.1	65.5	65.0	3.6	3.6	4.0	4.0	88.89	92.31	5.0	2.35	43.56	5.5	7.1	77.46
51914 10	13.4	79.5	59.5	9.9	9.9	10.0	70.0	54.0	3.3	3.2	3.7	3.6	88.00	89.04	5.0	2.35	44.76	5.0	6.3	79.57
7078	14.6	79.5	59.5	9.6	9.6	10.7	68.5	62.5	3.4	3.4	4.0	3.5	85.0	85.0	5.5	2.3	42.73	5.5	6.5	84.62
7173	13.4	79.5	59.5	8.4	8.4	9.9	68.0	62.5	3.6	3.6	3.9	3.8	93.59	93.51	5.5	2.3	41.82	5.4	6.3	85.71
6982	14.5	79.5	59.5	10.5	9.6	10.7	68.5	62.5	3.4	3.4	3.9	3.8	80.95	80.95	5.0	2.35	42.73	5.5	6.3	85.71
7178	14.5	79.5	59.5	10.4	9.5	10.4	67.5	58.0	3.4	3.4	4.2	4.3	80.95	80.95	5.0	2.3	50.0	5.8	6.1	95.08
6910	13.3	79.5	59.5	10.6	9.4	10.6	69.0	60.0	3.7	3.7	4.2	3.9	83.33	91.87	5.4	2.8	51.98	5.8	6.1	90.16
7062	13.5	79.5	59.5	10.7	9.1	10.0	63.0	48.0	3.5	3.6	4.0	3.9	88.75	92.31	5.2	2.4	43.81	6.1	6.3	96.83
7086	14.2	79.5	59.5	10.0	8.0	10.0	67.5	56.0	3.9	3.9	4.1	3.9	90.77	98.73	5.4	2.8	44.01	6.6	6.7	83.58
7194 11	13.7	79.5	59.5	11.1	8.5	10.4	63.5	47.5	3.6	3.6	4.0	3.9	88.75	92.31	5.7	2.8	50.00	7.2	7.2	81.72
7174	14.1	79.5	59.5	10.0	10.0	11.2	70.0	54.5	3.2	3.5	3.9	4.0	83.54	80.25	5.7	2.8	50.00	6.9	7.2	81.04
6946	14.1	79.5	59.5	10.7	8.7	10.2	66.0	53.0	3.7	3.7	4.1	4.0	91.46	91.46	5.5	2.6	43.06	5.7	6.7	95.07
7055	13.3	79.5	59.5	10.5	9.2	10.1	66.5	48.5	3.6	3.6	3.9	3.9	92.31	92.31	5.2	2.45	46.67	6.0	6.1	91.80
7118	14.0	79.5	59.5	9.5	8.5	9.8	68.5	56.0	3.0	3.0	4.0	4.0	87.80	90.00	5.6	2.8	45.86	5.6	6.4	85.91
7079	13.9	79.5	59.5	10.2	9.1	10.0	65.5	54.5	3.8	3.8	4.3	4.1	86.23	96.31	5.5	2.8	50.49	5.0	6.0	81.69
7095	13.9	79.5	59.5	10.8	9.8	10.4	65.5	56.0	3.7	3.5	4.4	4.2	85.23	91.67	5.6	2.3	47.07	5.7	6.5	87.69
7096 12	13.9	79.5	59.5	9.3	9.3	10.2	65.0	46.5	3.7	3.7	4.0	4.2	92.60	92.60	5.4	2.3	42.30	5.2	6.6	78.79

See footnotes at end of table.

SIBERIA: OSTIAK—Continued
MALES—Continued

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{c}{b \times 100}\right)$	Basion-Alveolar Pl.	Basion-Subnasal Pl.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max. im.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—Xpper Index
7195	14.4	79	10.2	9.4	10.8	72.0	62.0	3.8	3.75	3.9	3.9	3.9	97.44	96.15	6.8	2.7	44.81	5.5	6.5	84.69
7196	14.5	80.93	10.6	9.4	10.6	72.0	62.0	3.4	3.4	4.2	4.0	4.0	80.95	79.76	3.2	2.7	45.77	5.5	6.5	86.15
7197	14.9	76.08	9.4	10.2	10.2	68.5	57.5	3.35	3.35	3.9	3.9	3.9	77.91	77.91	3.0	2.6	46.43	5.6	7.3	78.08
6874	14.2	84.63	10.3	9.3	10.4	68.5	57.5	3.45	3.55	4.2	4.2	4.2	84.62	86.90	3.7	2.7	47.37	5.7	6.5	81.54
6914	14.7	55.10	10.7	9.5	10.6	64.5	48.0	3.5	3.65	3.8	3.8	3.8	92.11	92.11	3.1	2.3	45.10	5.3	6.5	87.69
7186	13.6	52.94	9.3	8.0	9.0	64.5	48.0	3.2	3.35	3.5	3.5	3.5	83.12	83.12	2.5	2.2	41.07	5.7	6.5	85.71
6076	14.0	53.57	10.7	9.5	10.2	73.0	55.5	3.4	3.4	3.8	3.8	3.8	87.18	89.47	5.2	2.5	48.08	5.4	6.3	80.83
7107	13.9	49.64	9.5	8.6	10.8	74.0	64.0	3.2	3.3	3.9	3.9	3.9	82.05	86.84	6.6	2.65	47.32	5.3	6.3	85.11
6877	13.0	53.96	10.1	9.4	10.8	67.5	53.5	3.6	3.6	3.9	4.0	4.0	94.74	90.00	5.6	2.55	46.54	5.6	6.5	86.15
6897	13.0	52.67	10.1	8.9	10.2	67.5	53.5	3.45	3.45	3.9	3.9	3.9	88.46	88.46	5.0	2.7	46.00	5.6	6.5	86.15
6875	14.3	77.11	10.2	9.0	11.0	65.5	55.5	3.0	3.55	3.9	3.9	3.9	90.00	91.03	5.4	2.7	50.00	5.5	6.7	82.09
7132	14.1	76.66	10.2	9.0	10.2	65.5	55.5	3.8	3.8	4.0	4.0	4.0	95.00	97.44	6.85	2.65	46.30	5.5	6.7	82.09
7156	14.7	58.78	9.8	10.3	10.7	69.0	57.0	3.3	3.4	4.0	4.0	4.0	82.50	85.00	5.2	2.4	46.15	5.8	6.8	85.39
7194	14.7	58.78	9.8	10.3	10.7	69.0	57.0	3.5	3.4	4.2	4.1	4.1	83.33	82.83	5.45	2.45	44.95	5.7	6.5	87.69
55521	13.1	82.27	10.8	9.8	10.0	64.0	55.0	3.9	3.4	3.8	3.8	3.8	83.54	89.47	5.2	2.4	46.15	5.7	6.5	87.69
7177	14.1	51.06	10.8	9.8	10.0	64.0	55.0	3.9	3.4	4.1	4.1	4.1	65.85	65.85	5.0	2.3	46.00	5.7	6.5	87.69
7090	14.4	50.00	10.3	9.2	10.1	68.0	53.5	3.55	3.65	4.1	4.1	4.1	81.62	82.93	5.1	2.3	46.00	5.5	6.7	82.09
7161	13.8	51.45	10.1	9.4	9.8	67.0	51.0	3.65	3.75	3.8	3.8	3.8	91.81	98.68	5.7	2.75	48.85	5.4	6.7	80.60
7147	14.3	53.70	9.5	8.7	9.8	71.0	60.5	3.55	3.55	3.9	3.9	3.9	84.62	86.90	5.65	2.65	45.10	5.5	6.7	82.09
6953	13.2	84.55	10.8	9.2	9.8	61.0	55.0	3.7	3.7	4.25	4.25	4.25	87.06	90.21	5.6	2.5	44.64	6.0	6.6	76.81
7117	14.0	55.15	10.5	9.4	10.2	66.5	56.5	3.5	3.6	4.0	4.0	4.0	80.70	81.52	5.5	2.5	50.49	5.7	6.7	80.91
7182	13.6	53.02	11.4	10.1	10.8	65.0	53.0	3.45	3.55	4.2	4.2	4.2	80.23	81.52	5.5	2.5	47.27	5.6	6.8	86.76
7041	14.9	50.68	10.2	9.9	10.4	67.0	56.0	3.5	3.4	3.9	3.9	3.9	89.74	89.74	5.5	2.5	46.30	5.6	6.8	88.89
7122	14.6	52.44	10.5	9.8	10.4	64.5	56.0	3.5	3.4	3.9	3.7	3.7	80.46	89.24	6.2	2.4	46.15	5.6	6.3	88.89
9660	13.1	90.08	10.2	8.8	9.8	65.0	42.5	3.2	3.4	3.5	3.5	3.5	86.79	91.44	6.25	2.65	50.48	5.4	6.3	88.89
965	14.1	50.35	10.2	8.8	9.8	62.0	60.0	3.5	3.45	4.0	4.0	4.0	88.79	83.42	5.2	2.8	46.15	5.4	6.6	81.82
6981	14.3	52.45	10.1	9.2	10.6	72.0	60.0	3.5	3.45	4.0	3.9	3.9	79.56	80.60	5.2	2.4	50.91	5.6	6.9	91.90
7124	14.9	51.67	11.0	10.1	10.6	63.0	45.5	3.5	3.4	4.4	4.2	4.2	92.51	92.51	5.5	2.75	50.00	5.6	6.9	81.16
7039	14.4	52.08	10.7	9.6	10.5	68.0	53.0	3.5	3.55	3.85	3.85	3.85	78.26	80.60	5.5	2.5	46.00	5.6	6.2	90.92
7104	14.1	56.74	10.8	9.4	10.2	65.0	55.0	3.4	3.3	3.7	3.6	3.6	91.89	97.22	5.55	2.8	45.83	6.2	7.0	88.57
6891	14.2	53.52	10.8	9.7	10.0	63.0	55.0	3.2	3.3	3.8	3.8	3.8	81.01	86.84	3.4	2.6	52.00	6.6	6.8	82.35
7126	13.9	61.80	10.3	9.6	10.4	67.5	53.5	3.5	3.5	4.1	3.95	3.95	88.75	88.61	3.2	3.05	50.00	6.6	6.5	82.35
7156	14.8	50.55	10.2	9.9	9.9	67.0	50.0	3.55	3.5	4.0	3.95	3.95	86.75	86.61	3.0	3.05	48.00	6.7	6.8	82.35
7127	14.2	84.51	10.2	8.8	9.8	67.5	49.0	3.15	3.2	3.9	3.8	3.8	89.77	84.24	3.0	2.4	44.00	6.7	6.8	82.35
7176	13.9	85.61	10.2	8.8	10.2	70.0	53.0	3.2	3.25	3.9	3.9	3.9	80.00	83.54	3.0	2.3	43.40	6.1	6.3	83.86

7119 ²³	.....	55.40	10.8	9.6	10.7	68.5	49.5	3.65	3.75	4.1	4.0	89.02	93.75	5.85	2.65	45.30	5.5	6.5	84.62
6938	.....	53.06	10.7	9.4	10.4	66.0	49.0	3.63	3.65	4.2	4.0	86.90	91.25	5.7	2.5	43.86	5.9	7.1	83.70
7211	.....	57.75	10.8	9.4	10.0	61.5	51.5	3.3	3.3	3.9	3.8	84.62	86.84	5.6	2.5	44.64	5.9	6.4	93.75
2733	.....	.....	.....	8.8	9.9	.....	.....	.....	3.5	4.1	3.9	86.59	91.01	5.35	2.8	40.45	5.8	6.5	84.00
7066	.....	56.34	11.3	10.4	10.6	64.0	62.0	3.55	3.55	4.1	4.1	86.59	90.24	5.5	2.8	40.91	5.4	6.6	81.82
7046	.....	56.32	10.0	8.8	10.2	68.5	53.5	3.6	3.7	4.1	4.1	87.50	91.58	5.5	2.4	43.64	5.6	6.4	87.50
6898	.....	56.97	10.1	9.1	10.1	68.5	55.0	3.6	3.65	3.6	3.6	101.00	101.58	5.5	2.6	49.05	5.9	7.1	83.70
6899	.....	56.12	10.6	9.4	10.0	64.0	55.5	3.5	3.45	4.0	3.9	87.50	83.45	5.3	2.6	49.05	5.9	7.1	83.70
7154 ²⁴	.....	.....	.....	9.3	10.0	.....	.....	.....	3.4	3.4	3.85	87.50	89.67	5.2	2.5	48.08	5.6	6.8	82.35
7037 ³⁰	.....	54.07	9.5	8.6	9.6	68.0	57.0	3.5	3.4	3.5	3.5	83.93	89.15	5.3	2.5	47.17	5.1	6.2	82.26
7164 ³¹	.....	53.42	10.4	9.4	10.4	68.0	58.0	3.5	3.5	3.9	3.9	89.74	89.74	5.5	2.5	46.45	5.7	6.7	85.07
6948	.....	53.85	10.3	9.2	9.7	63.5	57.0	3.55	3.15	4.1	4.0	89.59	89.25	5.25	2.3	43.81	5.9	7.0	84.39
6896	.....	57.14	10.3	9.2	10.4	63.5	57.0	3.7	3.7	3.85	3.7	91.25	100.00	6.0	2.7	45.09	5.3	6.6	80.39
7183	.....	52.45	10.0	9.0	9.9	67.0	55.0	3.65	3.8	4.0	3.9	91.25	97.44	5.5	2.35	42.73	5.3	6.0	88.33
7059	.....	54.61	10.2	9.0	9.6	63.0	55.0	3.5	3.5	3.75	3.7	93.33	94.59	5.15	2.55	49.09	5.6	6.7	83.53
7036	.....	.....	.....	7.8	9.0	.....	.....	.....	3.4	3.5	4.0	85.00	85.90	5.5	2.7	49.09	.....	.....	80.88
7139	.....	48.97	10.3	7.4	10.1	68.0	57.0	3.45	3.45	3.9	3.9	83.45	83.45	5.28	2.5	47.62	5.5	6.8	80.88
7061	.....	53.15	9.6	8.5	9.6	67.0	54.0	3.5	3.4	3.8	3.7	92.11	91.89	5.4	2.2	40.74	5.2	6.9	75.36
Specimens.....	(98)	(20)	(90)	(87)	(99)	(87)	(87)	(95)	(93)	(95)	(98)	(96)	(95)	(98)	(98)	(58)	(58)	(58)	(88)
Totals.....	135-2301	.....	905.50	892.90	1010.3	5,310.0	4,670.5	342.10	338.05	393.10	377.80	.....	520.60	219.85	.....	197.90	153.80	.....	.....
Averages.....	.....	.....	53.87	52.89	10.41	66.78	53.68	3.49	3.52	4.01	3.94	.....	83.97	5.40	2.57	47.18	5.65	6.66	84.99
Minima.....	.....	.....	82.27	46.98	9.3	7.8	9.0	60.0	3.1	3.2	3.6	.....	75.61	4.8	2.2	40.55	5.0	6.1	75.96
Maxima.....	.....	.....	96.30	60.15	12.1	10.4	11.2	74.0	4.0	4.0	4.8	.....	100.00	101.83	6.0	3.05	60.4	.....	101.54

OSTIAK—SAMOYED

1340 ³²	86.39	52.58	9.0	7.8	8.8	63.0	46.5	3.85	3.85	4.3	4.2	89.53	91.67	5.9	2.65	44.92	5.4	6.5	83.06
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DOLGAN

4614 ³³	83.56	50.0	10.2	9.4	10.0	67.0	61.5	3.5	3.5	4.1	4.0	85.37	87.50	5.25	2.4	45.71	5.5	6.5	84.62
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1 Allowance made for wear of teeth, where needed.
 2 Maxillary lingual hyperostoses, both sides of last molars (M₃).
 3 Eskimoid; atypical—place apart.
 4 All upper incisors lost long ago.
 5 Near.

6 External maxillary hyperostoses, canines to end.
 7 Right upper lateral, and both left upper incisors lost long ago.
 8 Very massive; pronounced maxillary lingual hyperostoses in molar region, on both sides.
 9 Labial maxillary and lingual mandibular hyperostoses.
 10 Left upper median incisor lost long ago.
 11 Labial maxillary hyperostoses.
 12 Right upper median incisor lost long ago.
 13 Massive; both upper median incisors lost long ago.
 14 Metopic sutures.
 15 Both median and lateral upper incisors lost long ago.
 16 Both right upper, and left median upper incisors lost long ago.
 17 Both right and left median upper incisors, and lower left median incisor lost long ago.

18 Both lower median incisors lost long ago.
 19 Maxillary lingual hyperostoses on both sides of last two molars.
 20 Vault and face sphenoidal.
 21 Somewhat ♀-like, but ♂.
 22 Measurements (some) still somewhat less than adult.
 23 Somewhat weak, but ♂.
 24 Right upper median incisor lost long ago.
 25 Left upper lateral incisor lost long ago.
 26 Left upper median incisor lost long ago.
 27 Left upper incisors lost long ago.
 28 Maxillary lingual hyperostoses on right side, molar region; on mandible, bilateral.

All incisors, lower jaw, lost long ago.
 29 Right upper median incisor lost long ago.
 30 Left upper incisors lost long ago; also lower left lateral incisor.
 31 Somewhat ♀-like.
 32 Much like Samoeyed and Yukagirskaja Sopka crania (also close to Aleuts and Athapascan).
 33 Much like an Athapascan; like a Siber-Samoeyed (or Ostiak).

SIBERIA: OSTIAK

FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior ad maxim. (glabella ad maxim.)	Diam. lateral maxm.	Basion-Dreigma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdtchka's method)	Teeth wear	Menton-Nasion Height (a) 1	Alveol. Pt.-Nasion Height (b)
7135	Moscow Mus.	Little Ob River.	40		17.8	13.0	12.8	73.03	83.12	98.46	14.53			11.6	7.2
6967	do.	do.	Elderly		18.3	13.4	12.4	75.22	78.23	92.54	14.70				6.4
6985	do.	do.	30		18.3	13.8	12.2	73.40	74.95	88.41	14.93				7.4
135	Leningrad Mus.	do.			18.6	13.7	12.8	73.66	84.49	93.43	15.03				7.8
7044	Moscow Mus.	Koiminski Little Ob River.	Old		18.6	13.7	12.4	73.66	76.78	90.51	14.90				6.9
6991	do.	do.	40		17.8	13.2	12.5	74.16	80.65	94.70	14.50				7.0
7099	do.	do.	35		17.8	13.2	13.0	74.16	83.87	98.28	14.67				6.8
6893 3	do.	do.	Elderly		18.4	13.8	11.8	75.0	73.89	85.51	14.67				7.3
6995	do.	do.	40		16.9	12.7	12.0	75.15	81.08	94.49	13.87				6.8
7070 4	do.	do.	Old		17.8	13.4	12.6	75.28	80.77	94.93	14.60				6.8
5592-5	Leningrad Mus.	do.			18.3	13.8	13.2	75.41	89.24	95.65	15.10				6.8
7189	Moscow Mus.	do.	30		17.2	13.0	12.7	75.58	84.11	97.69	14.30			10.8	6.7
7011	do.	do.	Aged		18.7	14.2	12.0	75.94	72.95	84.51	14.97				
6900	do.	do.	Elderly		18.4	14.0	12.2	76.06	74.17	87.14	14.40				
7023	do.	do.	35		17.6	13.4	12.2	76.14	78.71	91.04	14.40				
7113	do.	do.	45		17.8	13.6	12.4	76.40	78.98	91.18	14.60				
6886	do.	do.	Old		18.0	13.8	11.6	76.67	72.95	84.05	14.47				
6969	do.	do.	50		17.9	13.8	12.4	77.09	78.23	89.86	14.70				
6900	do.	do.	35		17.5	13.5	12.8	77.14	82.58	94.81	14.60				
7131 5	do.	do.	Elderly		18.4	14.2	13.1	77.17	80.37	92.25	15.23				
7013	do.	do.	40		18.0	13.9	12.8	77.22	80.95	92.09	14.90				
6978	do.	do.	45		18.1	14.0	12.9	77.35	80.37	92.14	15.00				
6988 6	do.	do.	Elderly		17.8	13.8	12.8	77.53	81.01	92.75	14.80				
6887 7	do.	do.	do.		17.5	13.6	11.8	77.71	75.88	86.76	14.30				
6965	do.	do.	55		18.0	14.0	12.8	77.78	80.00	91.43	14.93				
7124	do.	do.	Old		18.0	14.0	12.6	77.78	78.75	90.60	14.87				
6991	do.	do.	Elderly		17.7	13.8	12.6	77.97	80.00	91.90	14.70				
7043	do.	do.	35		17.8	13.9	13.1	78.09	82.65	91.24	14.93				
6876	do.	do.	40		17.4	13.6	13.0	78.16	76.77	87.54	14.30				
7074 8	do.	do.	Elderly		17.4	13.6	13.2	78.16	78.71	89.71	14.40				
7076	do.	do.	Old		17.4	13.6	11.7	78.16	78.16	86.03	14.23				
1005 9	Leningrad Mus.	do.			17.6	13.8	12.4	78.41	79.68	89.86	14.60				
5532-4	do.	do.			17.6	13.8	12.9	78.41	81.07	93.48	14.77				
7196	Moscow Mus.	do.	45		17.7	13.9	12.4	78.45	79.68	98.48	14.60				
7170	do.	do.	Old		17.7	13.9	13.0	78.55	82.28	93.58	14.87				
6948 10	do.	do.	40		17.4	13.7	12.2	78.74	78.46	89.05	14.53				
6870	do.	do.	50		17.3	13.8	12.4	78.86	79.23	89.86	14.57				

SIBERIA: OSTIAK—Continued
FEMALES—Continued

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabella ad max. max.)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Irdhøka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
7072	Moscow Mus.	Little Ob River	24		16.4	13.6	12.0	82.93	80.0	88.23	14.0				6.4
7143	do	do	24		16.4	13.6	11.8	82.93	78.67	80.76	13.93				6.4
6955 a	do	do	Old		17.0	14.1	12.0	82.91	77.17	85.11	14.37				6.6
6873	do	do	30		17.6	14.6	12.2	82.92	76.78	83.56	14.80				7.3
7179	do	do	30		17.6	14.6	12.2	83.92	76.40	84.25	14.83				7.0
5191-5	do	do	35		16.0	13.3	11.2	83.92	76.40	81.21	13.50				7.1
7088	do	do	Mid-aged		16.6	13.8	12.8	83.15	81.21	92.71	14.40				7.3
7187	do	do	Mid-aged		17.8	14.8	13.1	83.16	80.27	88.51	15.23				7.1
6956	do	do	Elderly		17.3	14.4	12.8	83.24	80.76	88.80	14.83				6.8
6941 22	do	do	40		17.4	14.5	11.1	83.33	82.59	79.56	14.33				6.8
6952 24	do	do	30		17.0	14.2	12.3	83.53	80.77	86.02	14.50				7.0
7056 24	do	do	Mid aged		16.9	14.2	12.6	83.53	78.85	86.02	14.40				7.8
6966 23	do	do	30		17.0	14.3	12.7	84.02	79.10	85.02	14.47				7.1
7052	do	do	22		17.0	14.3	12.7	84.12	81.16	88.81	14.67				7.1
7048	do	do	Mid-aged		17.8	15.0	12.6	84.27	76.85	84.0	13.13				7.6
7210	do	do	25		16.6	14.4	12.6	84.71	80.25	87.5	14.47				6.9
7040	do	do	55		16.6	14.1	13.0	84.94	84.69	92.2	14.37				7.8
7201	do	do	35		16.2	13.8	12.8	85.19	85.53	92.76	14.27				7.1
7081	do	do	40		16.7	14.3	12.6	85.23	77.90	84.0	13.07				6.9
7092	do	do	30		16.7	14.3	12.5	85.63	80.65	87.41	14.50				6.9
7092	do	do	35		16.9	14.5	12.8	85.80	81.53	88.28	14.73				7.5
7202	do	do	30		17.0	14.6	12.2	85.88	77.22	83.56	14.60				6.7
7053 26	do	do	23		17.2	14.8	12.2	85.05	76.25	82.43	14.73				7.7
5191-1	do	do	Mid-aged		16.4	14.2	11.8	86.59	77.12	83.1	14.13				6.7
237-1	do	do	40		17.0	14.9	12.7	87.65	79.62	85.23	14.87				6.1
7175	do	do	Mid-aged		16.2	14.2	12.2	87.65	80.25	85.92	14.20				6.7
7060	do	do	do		16.4	14.4	12.3	87.80	79.87	85.42	14.37				6.6
Specimens			(66)		(115)	(115)	(115)	(115)	(115)	(115)	(115)				(110)
Totals			2290		1,493.1	1,419.7	123.5	80.18	78.72	88.45	1,675.54			201.7	768.8
Averages			35.2		17.41	13.96	12.35	80.18	78.72	88.45	14.57			11.21	6.99
Minimum			20		16.0	12.7	11.1	78.03	69.57	76.65	13.50			10.6	6.0
Maxima			55		18.8	15.0	13.3	87.80	84.71	98.86	15.33			11.9	7.8

OSTIAK-SAMOYED

1341	Leningrad Mus	Surchanski Krai			16.9	14.3	12.0	84.62	76.52		14.40					6.6
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Diagn. Bitygomatic	F_{total} Index, total ($\times 100$) ^c	F_{facial} Index, upper ($\times 100$) ^c	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Naso—Height	Nose—Breadth maxim.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—Index
7185	88.55	96.75	9.6	9.8	9.6	89.0	55.0	3.2	3.5	3.0	3.8	50.83	68.93	5.2	2.5	48.57	5.1	7.7	76.12
6967	91.20	97.5	9.5	8.5	9.6	89.0	45.0	3.25	3.85	3.0	3.8	84.00	87.01	5.05	1.95	48.12	5.4	6.7	80.60
6985	96.22	10.9	10.0	9.0	10.0	87.5	51.0	3.0	3.5	3.8	3.8	84.74	92.01	5.8	1.45	45.37	5.6	6.4	85.60
135	96.93	10.9	10.6	9.0	10.6	87.5	48.5	3.5	3.85	3.85	3.8	90.91	92.51	5.75	1.15	46.08	6.0	6.8	88.24
7044	94.33	9.6	8.7	9.6	9.6	88.5	57.5	3.25	3.8	3.7	3.75	83.33	83.33	4.9	2.45	50.00	5.3	6.3	82.18
6961	97.51	9.3	8.4	9.4	9.4	88.5	58.0	3.2	3.7	3.7	3.7	87.74	89.49	4.9	2.4	48.98	5.6	6.7	89.15
7099	92.31	10.6	10.5	9.8	10.5	70.0	58.0	3.2	3.0	3.8	3.9	84.81	81.08	5.4	2.6	48.15	5.6	6.7	89.85
6883	95.50	10.1	9.8	9.8	9.8	68.0	45.5	3.65	3.7	4.0	3.9	91.35	94.87	4.9	2.35	52.01	5.4	6.0	90.00
6995	93.97	9.9	8.6	9.2	9.2	83.0	45.0	3.6	3.6	3.8	3.8	89.47	94.74	5.1	2.6	50.98	5.4	6.7	80.60
7070	90.75	9.6	8.4	9.6	9.6	80.0	46.0	3.15	3.7	3.7	3.7	85.14	85.14	5.2	2.65	51.54	5.4	6.7	80.60
5592-5	93.15	10.2	10.1	9.2	10.1	72.0	50.0	3.85	3.85	3.7	3.7	81.82	85.14	4.8	2.35	48.56	5.2	5.7	81.23
7189	94.22	10.2	10.1	9.6	10.1	68.5	54.0	3.65	3.65	4.05	4.05	90.12	90.12	5.8	2.7	46.55	5.7	6.0	95.00
7011	85.44	9.0	8.6	9.4	9.4	95.0	46.0	3.2	3.2	3.7	3.7	86.49	87.47	5.05	2.2	43.96	5.7	6.0	95.00
6900	93.53	8.9	8.0	9.2	9.2	68.5	50.0	3.55	3.75	3.75	3.7	91.67	101.35	4.9	2.25	46.52	4.9	5.7	85.99
7023	93.85	9.5	8.5	9.4	9.4	67.5	52.5	3.5	3.55	4.1	3.95	85.37	89.87	5.2	2.45	47.12	5.3	6.6	80.30
6886	92.61	10.2	9.0	9.6	10.2	64.0	47.0	3.85	3.85	1.25	3.9	90.59	91.59	5.3	3.0	56.60	5.6	6.8	82.35
6990	95.69	10.6	9.2	10.0	9.5	46.5	46.5	3.4	3.55	3.9	3.9	87.18	91.08	5.1	2.4	47.06	5.6	6.8	82.35
6890	94.89	10.3	8.6	9.9	9.6	60.0	58.5	3.35	3.55	4.1	3.9	81.71	91.05	5.3	2.75	51.89	5.4	6.7	80.60
7131	92.21	9.8	8.6	10.1	10.1	71.0	49.5	3.4	3.55	4.1	4.0	80.49	83.75	5.1	2.65	51.96	5.1	6.2	82.80
7013	91.83	10.5	9.4	10.4	10.4	67.0	57.0	3.3	3.35	3.7	3.7	80.19	91.59	5.8	2.45	46.23	5.4	6.6	81.23
6978	94.41	10.5	9.2	10.2	10.2	66.5	49.0	3.3	3.3	3.7	3.7	80.19	91.59	5.8	2.45	46.23	5.4	6.6	81.23
6988	91.71	10.5	9.2	10.2	10.2	66.5	49.0	3.3	3.3	3.7	3.7	80.19	91.59	5.8	2.45	46.23	5.4	6.6	81.23
6887	91.07	10.8	9.6	10.1	10.1	66.5	49.0	3.3	3.3	3.7	3.7	80.19	91.59	5.8	2.45	46.23	5.4	6.6	81.23
6965	98.01	9.8	8.8	9.8	9.8	62.0	51.0	3.2	3.45	3.0	3.8	82.65	85.71	5.15	2.35	45.63	6.2	6.2	100.00
7124	97.72	11.0	8.7	10.4	10.4	65.5	58.0	3.0	3.0	4.0	4.0	95.12	97.50	5.3	2.5	47.14	5.4	6.2	82.87
6991	94.01	10.2	8.9	9.8	9.8	63.5	50.0	3.1	3.25	4.05	4.0	95.00	95.00	5.3	2.65	50.00	5.4	6.0	90.00
7043	95.50	10.4	9.4	10.1	10.1	65.5	56.0	3.3	3.45	4.0	3.95	76.54	83.83	5.15	2.6	50.49	5.7	6.0	86.86
6876	91.94	9.6	8.6	9.6	9.6	63.5	51.5	3.3	3.3	3.0	3.0	92.93	97.81	5.2	2.65	50.96	5.5	6.2	88.71
7074	93.68	9.6	8.6	9.6	9.6	64.0	50.0	3.15	3.2	3.7	3.6	92.14	93.89	5.0	2.8	48.98	4.9	5.5	89.09
7076	93.68	10.2	9.0	9.6	9.6	64.0	50.0	3.9	3.9	4.1	4.1	95.12	93.86	5.3	2.6	49.06	5.4	6.2	100.00
1065	94.69	9.9	8.8	9.6	9.6	66.5	53.0	3.9	3.9	4.1	4.1	95.12	93.86	5.3	2.6	49.06	5.4	6.2	100.00
5552-4	95.50	9.2	8.0	9.4	9.4	68.0	48.0	3.5	3.45	3.8	3.8	92.14	90.79	5.3	2.3	46.90	5.1	6.0	85.0
7165	96.82	9.6	8.4	9.4	9.4	65.5	55.5	3.4	3.4	3.9	3.9	87.18	87.18	4.85	2.3	47.12	5.3	6.1	86.80
7170	91.80	10.5	9.4	10.2	10.2	67.5	53.5	3.3	3.25	3.9	3.8	84.62	85.63	5.1	2.45	46.04	5.5	6.5	84.62
6948	93.79	9.6	8.8	9.7	9.7	69.0	61.0	3.6	3.6	3.9	3.7	92.31	97.30	4.8	2.0	43.90	4.7	6.2	70.81
(12.1)	95.77	9.3	8.4	9.2	9.2	68.0	56.5	3.3	3.35	3.3	3.6	100.0	100.00	4.8	2.15	44.79	4.7	6.2	80.65
6949	91.67	9.6	8.6	9.6	9.6	70.5	53.5	3.45	3.5	4.05	3.95	86.70	88.61	5.1	2.7	44.79	5.0	6.4	80.65
7103	91.85	10.4	9.5	10.2	10.2	68.0	53.0	3.8	3.65	3.85	3.9	98.79	98.69	5.1	2.75	53.82	5.7	6.4	94.06
6908	95.20	10.1	9.1	10.0	10.0	69.0	54.0	3.4	3.35	3.8	3.8	89.47	88.16	5.0	2.4	48.0	5.5	6.8	94.83
6872	95.06	10.5	9.3	9.9	9.9	64.5	51.0	3.2	3.25	3.8	3.9	84.21	83.39	5.0	2.6	52.0	6.1	6.1	98.89
7155	93.17	9.3	8.4	9.9	9.9	66.0	57.0	3.5	3.45	3.9	3.8	89.74	90.79	4.75	2.35	49.47	5.0	6.3	79.37

SIBERIA: OSTIAK—Continued
FEMALES—Continued

Catalog No.	Diam. Biyzomatic	Faetal Index, total	Faetal Index, upper	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Ocular Index, right	Ocular Index, left	Nose—Height	Nose—Breadth max.	Nasal Index	Upper Alveolar Arch—Length max.	Upper Alveolar Arch—Breadth max.	Upper Alveolar Arch—Index
6888	13.5	82.77	79	10.2	0	1.7	64.0	59.0	3.7	3.3	3.8	3.3	96.10	100.0	5.7	2.5	43.88	5.7	6.6	86.98
7160 13	13.5	85.27	82	10.0	9.2	10.6	73.0	61.0	3.6	3.5	4.05	3.9	96.42	97.74	5.7	2.25	44.55	5.0	6.3	79.97
6905	12.9	86.30	81	9.9	9.2	10.4	65.0	53.0	3.15	3.1	3.9	3.8	94.74	92.11	4.9	2.3	46.94	5.0	6.3	76.94
7047	13.2	87.15	80	11.1	10.0	10.3	64.0	48.5	3.8	4.0	4.0	3.8	95.0	91.98	4.3	2.7	50.94	5.6	6.3	88.89
6878	13.3	87.15	80	10.3	9.1	9.3	71.5	57.0	3.5	3.45	3.95	3.8	95.0	92.26	4.9	2.65	43.08	5.3	6.3	84.15
6884	13.3	87.15	80	8.8	8.0	9.3	68.0	53.0	3.6	3.6	3.9	3.9	98.61	98.46	5.2	2.5	43.08	5.3	6.3	84.15
6954	13.8	86.26	79	10.4	9.4	10.0	68.0	47.0	3.0	3.1	4.0	4.0	97.0	92.31	3.85	2.8	52.54	5.7	6.5	87.69
7128	13.1	87.15	80	10.9	9.4	10.0	64.0	47.0	3.0	3.0	3.7	3.75	95.19	91.50	4.0	2.35	48.96	5.7	6.5	87.69
6871 14	12.4	87.15	80	9.4	8.4	9.2	61.0	42.5	3.5	3.5	3.8	3.8	92.11	92.11	4.9	2.75	56.12	5.9	6.6	89.39
7029	12.7	87.15	80	10.3	8.8	9.4	64.0	48.0	3.35	3.35	3.6	3.55	93.06	92.96	4.9	2.45	55.06	5.3	6.2	86.48
6922	13.0	87.15	80	10.0	8.9	9.4	64.0	48.0	3.45	3.45	3.85	3.8	93.06	93.42	4.9	2.45	49.49	5.3	6.2	86.48
7100	12.7	87.15	80	9.7	8.4	9.4	74.5	54.5	3.5	3.5	3.8	3.7	92.11	94.59	4.9	2.2	44.90	4.4	5.6	78.57
7010	12.9	87.15	80	8.6	7.7	8.4	66.0	51.0	3.5	3.55	3.9	3.8	93.06	93.42	4.9	2.2	44.90	4.4	5.6	78.57
7035	13.7	87.15	80	10.2	9.1	9.3	66.0	51.0	3.5	3.55	3.9	3.8	93.06	93.42	4.9	2.2	44.90	4.4	5.6	78.57
7035	13.7	87.15	80	10.2	9.1	9.3	66.0	51.0	3.5	3.55	3.9	3.8	93.06	93.42	4.9	2.2	44.90	4.4	5.6	78.57
7142	13.9	87.15	80	9.9	8.7	9.3	68.5	41.0	3.65	3.65	3.9	3.8	93.06	93.42	4.9	2.2	44.90	4.4	5.6	78.57
7071 13	13.9	87.15	80	9.4	8.0	8.8	64.0	41.0	3.65	3.5	3.9	3.8	93.06	93.42	4.9	2.2	44.90	4.4	5.6	78.57
6942	12.9	87.15	80	10.2	8.7	9.5	67.0	45.0	3.45	3.5	4.0	4.0	86.25	87.50	5.4	2.5	62.19	5.4	5.8	95.10
6940 15	13.2	87.15	80	9.6	8.7	9.5	67.0	45.0	3.45	3.5	4.0	4.0	86.25	87.50	5.4	2.5	62.19	5.4	5.8	95.10
7140	13.9	87.15	80	9.4	8.2	9.2	66.5	51.0	3.55	3.55	3.9	3.75	93.49	95.95	4.95	2.6	51.49	5.6	6.8	82.55
6983 17	13.6	87.15	80	10.2	9.2	9.8	66.5	53.5	3.3	3.4	3.9	3.75	84.62	90.67	5.1	2.55	48.4	5.4	6.4	84.58
7098	13.1	87.15	80	9.1	8.0	8.8	69.5	50.0	3.4	3.4	3.7	3.6	91.89	94.44	5.0	2.5	50.0	4.9	6.2	79.03
7105	13.1	87.15	80	9.1	8.0	8.8	70.0	54.5	3.2	3.4	3.9	3.8	82.05	89.47	5.0	2.5	50.0	4.9	6.2	79.03
7167	13.8	87.15	80	9.9	8.9	9.6	65.0	49.5	3.5	3.6	3.7	3.6	94.69	100.0	5.2	2.4	46.15	4.9	5.9	83.05
6911 18	12.6	87.15	80	9.1	8.2	9.0	65.0	49.5	3.5	3.5	3.7	3.6	94.69	100.0	5.2	2.4	46.15	4.9	5.9	83.05
7090	13.3	87.15	80	9.7	8.8	9.8	70.0	59.5	3.1	3.1	3.75	3.75	82.67	82.67	4.8	2.45	61.04	5.0	6.2	80.65
6879	13.5	87.15	80	9.8	9.0	10.2	73.0	57.0	3.35	3.25	3.8	3.7	88.16	87.81	4.95	2.45	48.48	5.0	6.0	83.83
7007	13.5	87.15	80	9.8	9.0	10.2	72.5	53.5	3.6	3.7	4.1	4.05	87.80	91.98	5.65	2.7	47.79	5.2	5.9	88.14
7009	12.7	87.15	80	9.6	8.6	9.0	63.5	50.5	3.45	3.4	4.0	3.9	86.25	87.15	5.1	2.4	47.09	5.2	6.3	82.54
7145	13.1	87.15	80	7.9	7.0	8.6	63.0	48.0	3.6	3.6	4.1	3.9	84.15	92.91	4.75	2.35	49.47	5.1	6.1	88.61
7202	13.4	83.58	77	10.6	9.4	10.1	68.0	48.0	3.5	3.55	3.9	3.8	89.74	98.49	4.3	2.4	45.28	5.6	6.5	86.15
6916	12.6	87.15	80	9.4	8.4	9.0	62.0	49.5	3.2	3.4	3.75	3.7	85.93	91.80	4.3	2.4	45.28	5.6	6.5	86.15
6953 2	13.5	87.15	80	10.0	9.0	9.4	68.2	48.0	3.4	3.7	3.7	3.7	91.80	91.80	4.3	2.35	48.45	5.2	6.0	86.67
6953	13.1	87.15	80	9.4	8.3	9.2	70.5	62.0	3.3	3.35	3.65	3.6	90.41	93.06	4.85	2.35	48.45	5.2	6.0	86.67
7108	13.4	87.15	80	10.7	9.6	10.2	67.0	51.0	3.25	3.2	3.8	3.7	85.53	86.49	5.1	2.43	48.04	4.8	6.3	76.19
7115	12.5	87.15	80	8.9	8.1	9.2	71.0	47.0	3.5	3.5	3.8	3.75	92.83	97.87	5.0	2.1	43.0	4.8	5.9	81.90
7115	12.5	87.15	80	8.9	8.1	9.2	71.0	47.0	3.5	3.5	3.8	3.75	92.83	97.87	5.0	2.1	43.0	4.8	5.9	81.90
6904	12.8	89.84	82	9.2	8.6	9.4	64.5	54.5	3.4	3.4	4.0	4.0	85.63	85.93	4.75	2.45	46.67	5.2	5.8	89.66
7051 19	14.2	77.46	70	10.7	9.6	9.9	66.0	42.0	3.3	3.3	4.0	4.1	82.90	87.70	4.75	2.5	50.53	5.6	6.5	86.15
7054	13.3	87.15	80	9.6	9.4	10.0	66.0	42.0	3.3	3.3	4.0	4.1	82.90	87.70	4.75	2.5	50.53	5.6	6.5	86.15
7212	12.9	87.15	80	9.0	8.0	8.6	70.0	62.0	3.5	3.6	3.7	3.7	89.74	97.50	4.9	2.31	46.08	4.9	6.0	83.00
7212	12.9	87.15	80	9.0	8.0	8.6	66.0	53.0	3.5	3.65	3.95	3.7	89.74	98.66	4.9	2.31	46.08	4.9	6.0	83.00

OSTIAK-SAMOYED

7213	11.9	61.34	9.6	8.4	9.0	62.5	53.0	3.75	3.83	3.7	3.7	101.35	104.05	4.9	2.2	44.90	5.5	96.49	
7100 20	14.4	48.61	10.2	9.4	10.0	68.0	60.0	3.3	3.0	3.9	3.9	89.74	94.74	5.0	2.45	43.0	5.6	93.83	
7218	13.1	51.91	9.8	8.4	9.0	70.5	35.0	3.3	3.35	3.9	3.9	87.4	84.81	5.5	2.6	47.27	5.4	87.10	
6830	12.8	54.40	10.3	9.2	9.8	65.0	54.0	3.25	3.2	3.7	3.7	87.84	89.47	4.05	2.55	54.84	5.4	91.63	
7077	12.5	48.44	9.3	8.6	9.6	73.5	55.5	3.2	3.4	3.9	3.8	82.05	86.17	4.9	2.6	63.06	5.0	81.97	
7055	12.6	86.61	10.1	8.8	9.4	68.0	48.5	3.2	3.3	3.6	3.5	88.89	91.89	4.8	2.45	51.04	5.5	88.71	
7072	12.8	60.0	9.3	8.8	9.5	72.0	63.5	3.15	3.15	3.55	3.5	83.73	90.0	5.05	2.45	48.51	4.6	76.67	
7143	11.9	63.78	9.9	8.9	9.6	68.0	50.5	3.3	3.3	3.7	3.7	89.19	89.19	4.55	2.35	51.65	5.1	79.68	
6955 31	13.4	49.25	10.1	8.9	9.6	61.5	43.5	3.4	3.4	3.85	3.9	88.81	87.18	5.0	2.7	54.0	6.4	84.15	
6873	13.3	54.89	10.1	9.0	9.8	65.0	53.5	3.1	3.3	3.85	3.75	80.62	83.0	5.2	2.3	48.08	5.3	80.15	
7170	13.7	51.09	10.1	9.0	9.6	65.0	44.5	3.5	3.55	3.8	3.8	89.74	89.42	5.3	2.3	43.40	5.4	88.14	
5101 5	12.5	48.0	10.1	9.0	9.4	65.5	37.5	3.0	3.0	3.7	3.65	81.08	82.19	4.75	2.6	51.74	5.0	89.37	
7082	12.8	57.03	9.2	8.1	9.1	65.5	54.5	3.55	3.55	3.7	3.6	95.95	100.0	5.1	2.65	51.96	5.2	79.37	
7187	13.6	53.91	9.9	8.8	9.6	66.5	53.5	3.45	3.45	3.7	3.7	93.24	86.95	4.7	2.5	51.02	5.3	86.89	
6936	13.5	50.37	10.2	9.4	10.0	68.5	62.0	3.5	3.55	3.8	3.75	93.19	102.70	4.7	2.7	57.45	5.6	84.85	
6934 2	13.4	50.0	10.6	9.2	9.1	59.0	42.0	3.55	3.45	4.1	4.0	85.37	86.25	4.7	2.6	55.22	5.3	84.19	
6962 30	13.2	88.64	10.4	9.2	9.1	68.5	53.0	3.8	3.8	3.9	3.7	93.11	102.70	5.0	2.15	43.0	6.3	79.87	
7050 24	13.0	56.04	10.0	8.6	9.7	64.5	51.5	3.45	3.6	3.7	3.6	93.74	106.0	5.1	2.35	45.16	5.4	84.58	
6960 26	13.3	61.88	9.8	8.6	9.4	67.0	52.0	3.55	3.6	3.8	3.6	93.74	106.0	5.1	2.35	45.16	5.4	84.58	
7018	12.1	84.21	9.7	8.6	9.6	67.0	52.0	3.25	3.3	3.9	3.9	92.11	97.90	5.1	2.7	51.13	6.4	80.30	
7210	13.3	64.56	9.4	8.3	9.3	68.5	52.0	3.3	3.3	3.9	3.9	83.33	84.02	5.25	2.7	51.13	5.3	80.30	
7090	13.1	59.54	10.2	9.1	10.1	66.0	38.0	3.7	3.75	3.55	3.5	92.00	92.93	4.7	2.5	46.31	5.0	73.36	
7201	12.7	56.12	9.8	8.6	9.6	67.0	47.0	3.35	3.35	3.9	3.9	94.37	97.37	5.2	2.45	41.55	5.6	82.14	
7181	14.3	48.25	10.5	9.5	10.3	69.0	53.0	3.38	3.38	3.75	3.75	88.16	89.35	5.1	2.7	52.94	6.3	83.15	
7054	13.0	53.08	9.8	9.1	9.6	69.0	61.0	3.65	3.7	3.9	3.8	95.0	96.70	5.1	2.3	46.10	5.8	87.30	
7162	12.5	60.0	9.6	8.4	9.2	64.0	55.5	3.4	3.55	3.8	3.7	89.47	95.95	4.95	2.25	46.45	4.8	82.76	
7216	13.0	56.92	9.4	8.3	9.2	65.5	53.5	3.4	3.4	3.65	3.5	93.15	97.14	5.3	2.45	46.23	5.3	83.33	
7053 26	13.5	49.63	9.4	8.4	9.4	69.0	51.5	3.5	3.55	3.8	3.75	92.11	94.67	4.8	2.35	46.96	4.8	72.73	
5191-1	12.3	89.43	9.5	8.0	9.0	63.5	44.5	3.2	3.35	3.9	3.7	82.05	90.54	4.95	2.6	48.66	5.0	81.97	
237-1	14.0	47.86	8.9	8.1	9.5	73.0	55.0	3.1	3.1	3.7	3.7	83.78	83.78	5.15	2.7	52.43	5.1	85.48	
7175	12.9	51.94	8.8	8.2	9.2	71.0	61.0	3.2	3.1	4.05	3.8	79.01	81.58	5.2	2.6	50.0	4.8	77.27	
7060	13.5	48.89	10.4	8.9	9.4	62.0	41.5	3.3	3.2	3.9	3.7	84.62	86.49	4.6	2.45	53.26	5.3	83.33	
Specimens.	(114)	(109)	(114)	(114)	(109)	(109)	(109)	(113)	(112)	(113)	(112)	(113)	(112)	(114)	(114)	(114)	(101)	(101)	(101)
Totals.	1,494.6	1,073.5	1,001.2	1,099.7	7,334.0	5,697.5	385.65	386.25	435.65	424.45	424.45	435.65	424.45	577.35	284.4	533.6	631.1	533.6	631.1
Averages.	13.1	86.81	9.85	8.78	9.65	67.28	52.27	3.41	3.45	3.86	3.79	88.52	91.0	5.00	2.49	49.26	5.28	84.65	
Minima.	10.4	77.46	8.6	7.7	8.6	59.0	35.0	3.0	3.0	3.3	3.5	75.0	77.60	4.3	2.1	41.35	4.4	5.5	
Maxima.	14.4	95.30	11.1	10.0	10.6	75.0	63.5	3.9	4.0	4.25	4.15	101.35	105.29	5.8	3.1	59.05	6.2	100.00	

1 Allowance made for wear of teeth, where needed.
 2 Near.
 3 Right upper incisors lost long ago.
 4 Left upper median incisor lost long ago.
 5 Vault over right frontal, occipital and in left parietal caten through—cancer?
 6 All upper incisors and right canine lost long ago.
 7 Palate U-shaped; right upper median incisor lost long ago.
 8 All upper incisors lost long ago.
 9 Left upper median incisor lost long ago.
 10 Right upper median incisor lost long ago.
 11 U-palate; left median incisor evidently torn out, forward.
 12 All upper incisors lost long ago.
 13 Left upper median incisors lost long ago.
 14 Left upper lateral incisor lost long ago.
 15 M₂ and M₃, both sides, in maxilla, never erupted.
 16 External maxillary hyperostosis.
 17 Somewhat ♂-like, but probably ♀; right upper median incisor lost long ago.
 18 Vault badly syphilitic, palate also.
 19 Base much impressed.
 20 Vault badly syphilitic, also lower jaw.
 21 Right upper median incisor lost long ago.
 22 Vault badly syphilitic, also palate and right maxilla.
 23 Somewhat ♂-like, but probably ♀.

1341.-----48.89-----9.6-----8.6-----9.3-----67.0-----49.0-----3.7-----4.05-----91.39-----5.0-----2.3-----46.0-----

SIBERIA: VOGUL

MALES¹

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabella ad maxim.)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Birlik's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
4382	Moscow Mus.	Ob River (southwest of Ostiaks).	Elderly		19.6	13.5	12.8	68.88	77.34		15.30				7.4
4358	do	do	45		19.8	13.8	12.8	69.70	76.19		15.47				7.4
4360	do	do	Mid-aged		18.9	13.1	12.6	70.90	78.02		14.97				7.5
4353	do	do	Elderly		18.6	13.4	12.2	72.04	76.25		14.73				7.4
4373	do	do	do		19.2	14.0	12.6	72.92	75.50		15.27				7.4
4385	do	do	Mid-aged		19.6	14.4	12.6	73.47	74.12		15.53				7.0
4110	do	do	35		19.0	14.0	13.7	73.68	82.03		15.57				7.1
4381	do	do	Old		18.7	14.0	12.6	74.87	77.06		15.10				8.0
4361	do	do	Elderly		19.2	14.6	12.3	76.01	72.78		15.37				7.4
4402	do	do	40		17.8	13.6	13.1	76.40	85.55		14.93				7.3
4376	do	do	40		18.8	14.4	13.0	76.60	78.91		15.40				7.0
4381	do	do	25		18.5	14.4	12.2	77.84	74.16		15.03				6.7
4375	do	do	Mid-aged		18.4	14.4	12.8	78.26	78.05		15.20				6.9
4362	do	do	45		18.2	14.3	12.4	78.57	76.91		14.97			11.6	6.9
4427	do	do	Mid-aged		18.0	14.2	12.6	78.80	78.23		14.93				7.0
Specimens			(15)		(15)	(15)	(15)	(15)	(15)		(15)			(1)	(14)
Totals			282.3		210.4	190.6	190.6	71.5	77.4		227.77			(11.6)	101.5
Averages			18.82		13.08	12.71	12.71	68.9	72.8		15.18				7.25
Minima			17.8		13.4	12.2	68.0	68.0	68.0		11.73				6.7
Maxima			19.8		14.6	13.7	73.9	73.9	85.4		15.57				8.0

ABERRANT

4659	Moscow	Ob River (Southwest of Ostiaks).	Mid-aged		18.8	15.3	13.0	81.88	76.25		15.70			12.3	7.4
4380	do	do	40		17.9	14.8	12.5	82.08	76.45		15.07			13.0	7.8
4366	do	do	Elderly		18.0	15.0	13.8	83.33	82.64		15.60				

MALES

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, $\left(\frac{c}{a \times 100}\right)$ oval	Facial Index, $\left(\frac{c}{b \times 100}\right)$ upper	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max-im.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—
4382	13.4	---	55.22	10.0	9.0	10.1	69.0	57.5	3.5	3.5	3.7	3.7	94.59	94.59	5.25	2.85	43.57	5.4	26.5	83.03
4388	14.0	---	52.86	10.1	9.3	10.2	69.0	61.5	3.5	3.5	4.0	3.9	83.75	94.12	5.3	2.85	53.77	5.4	6.0	78.96
4390	13.1	---	67.29	10.2	9.3	10.2	68.5	57.5	3.6	3.6	3.65	3.1	98.63	96.65	5.5	2.7	61.82	5.6	6.4	97.50
4383	13.6	---	44.41	10.0	9.3	10.4	71.5	66.0	3.2	3.1	3.75	3.75	86.67	82.97	5.05	2.0	61.40	5.4	6.7	80.60
4373	13.8	---	63.62	10.7	9.8	10.3	65.5	53.0	3.3	3.3	3.65	3.65	84.42	86.71	5.7	2.05	46.49	5.3	6.5	81.54
4395	14.2	---	49.30	10.5	9.4	10.2	68.0	48.5	3.3	3.2	3.7	3.7	89.19	86.49	5.3	2.7	60.94	5.3	6.5	81.54
4410	13.7	---	61.82	10.2	9.6	10.8	75.0	66.0	3.2	3.2	3.9	3.9	82.05	82.05	5.1	2.5	49.02	5.2	6.1	85.25
4394	13.8	---	---	---	9.3	10.2	66.0	55.0	3.3	3.5	4.0	3.9	82.50	89.74	5.3	2.85	63.77	5.3	6.5	81.54
4365	13.5	---	59.26	9.7	8.7	9.8	72.0	58.0	3.5	3.2	3.8	3.8	84.21	---	5.2	2.4	46.15	5.3	6.4	82.81
4402	13.8	---	---	9.9	9.0	10.4	72.0	71.5	3.2	3.5	3.8	3.8	93.42	---	5.4	2.25	41.67	5.1	5.8	87.92
4376	13.2	---	52.90	9.4	9.0	10.2	74.0	42.5	3.75	3.75	3.85	3.8	97.40	98.68	5.5	2.6	47.27	5.1	6.2	82.26
4381	14.2	---	53.03	9.6	8.4	9.8	70.5	42.5	3.5	3.4	3.7	3.7	87.84	91.89	4.9	2.65	64.08	5.4	7.0	77.14
4375	14.2	---	47.18	9.7	8.9	10.0	72.5	58.5	3.4	3.4	3.7	3.7	87.84	90.79	5.15	2.65	61.46	5.3	6.5	81.54
4362	13.9	---	49.64	10.6	9.4	10.2	67.0	46.5	3.5	3.5	3.7	3.8	84.59	90.79	5.15	2.65	61.46	5.3	6.5	81.54
4427	13.8	---	50.72	10.0	8.9	9.9	68.5	51.5	3.4	3.5	4.0	3.8	85.0	93.42	5.1	2.5	49.02	5.4	6.4	84.38
Specimens	(14)	(1)	(13)	(14)	(15)	(15)	(14)	(14)	(15)	(12)	(15)	(12)	(15)	(12)	(15)	(15)	(15)	(15)	(14)	(14)
Totals	192.0	---	140.8	140.8	137.2	152.7	978.0	795.5	51.1	41.15	57.05	45.4	53.42	50.6	79.75	38.85	75.0	90.4	75.0	---
Averages	13.71	(83.45)	52.8	10.06	9.15	10.18	69.9	56.8	3.41	3.43	3.80	3.78	89.6	89.6	5.32	2.59	43.7	5.36	6.46	82.0
Minima	13.1	---	44.4	9.4	8.4	9.8	66.0	42.5	3.2	3.1	3.65	3.7	82.1	82.1	4.9	2.25	41.7	5.1	5.8	77.1
Maxima	14.2	---	59.3	10.7	9.8	10.8	75.0	71.5	3.75	3.75	4.0	3.9	93.7	93.7	6.0	2.85	64.1	5.8	7.0	89.2

ABERRANT

4659	14.4	86.42	51.39	10.3	9.1	10.0	66.5	51.5	3.4	3.4	3.9	3.9	87.18	87.18	5.25	2.5	47.62	5.6	6.9	81.16
4380	13.7	94.89	66.93	10.5	8.8	9.8	62.5	43.5	3.6	3.6	3.6	3.6	100.0	100.0	5.1	2.3	42.59	6.0	6.7	89.55
4366	13.8	---	---	---	---	10.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---

1 See Sillinec, I., Vogul, Antrop. Žurnal, vol. 5, pp. 94-115, 1904.

2 Near.

3 Vault sphyllitic.

4 Some labial maxillary hyperostosis.

5 Vault Eskimoid; face Indian-like.

6 Face and nose rather pronounced.

SIBERIA: VOGUL
FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium. (glabella ad maxium)	Diam. lateral maxium.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c.c. (Hrdlicka's method)	Teeth, wear	Men's Height (a)	Alveol. Pt.-Nasion Height (b)
4369	Moscow Mus.	Ob River (southwest of Ostiaks).	Elderly		19.0	13.6	12.2	71.58	74.85		14.93				7.1
4415	do	do	45		18.5	13.4	11.8	72.43	73.98		14.57				7.1
4417	do	do	Old		17.6	12.8	11.8	72.73	77.63		14.07				
4393	do	do	Elderly		18.4	13.4	12.2	72.83	76.73		14.67				6.8
4398	do	do	25		18.2	13.3	12.4	73.08	78.73		14.63				7.3
4423 ?	do	do	Old		19.0	14.0	12.6	73.68	76.36		15.20				6.2
4385	do	do	25		17.2	12.7		73.84							3 6.5
4386	do	do	Elderly		18.1	13.4	11.6	74.03	73.65		14.37				7.2
4389 ?	do	do	55		18.6	13.8	12.4	74.19	76.54		14.93				
4389 ?	do	do	30		17.9	13.3	11.7	74.30	75.0		14.30				6.2
4361	do	do	Old		17.6	13.1	12.6	74.43	82.08		14.43				6.6
4400	do	do	35		17.7	13.2	12.5	74.58	80.91		14.47				6.8
4413	do	do	35		18.4	13.8	12.2	75.0	75.78		14.80				6.8
4379	do	do	Mid-aged		17.3	13.0	12.3	75.14	81.19		14.70				6.2
4386	do	do	Old		18.3	13.8	12.0	75.41	74.77		14.10				7.0
4424	do	do	Old		17.6	13.3	11.4	75.57	73.79		14.20				6.9
4377	do	do	Elderly		17.3	13.1	11.4	75.72	81.53		14.27				7.1
4367 ?	do	do	Mid-aged		17.0	13.5	12.4	76.70	79.74		14.50				6.8
4384	do	do	Old		17.0	13.0	12.0	77.27	76.92		14.40				
4419	do	do	Elderly		16.7	13.0	12.0	77.81	80.81		13.90				
4420	do	do	Old		17.4	13.6	12.0	78.16	77.42		14.33				
4405	do	do	Elderly		17.6	13.8	13.1	78.41	83.41		14.83				
4374	do	do	30		17.5	13.8	13.1	78.56	74.42		14.30				6.0
4374	do	do	Old		17.5	13.8	13.1	78.89	80.12		15.03				6.8
4397	do	do	Mid-aged		18.0	13.2	12.9	78.89	76.87		14.17				6.5
4370	do	do	25		17.0	13.7	11.8	80.59	76.87		14.0				6.6
4425 ?	do	do	25		16.6	13.4	12.0	80.72	80.0		14.0				6.9
4378	do	do	35		17.4	14.2	11.7	81.61	74.65		14.43				
Speelmen's Totals	(27)	(27)	(11)		380.10	363.8	(26)	(27)	(26)		(26)	(27)		(1)	(22)
Averages			355		345.6	315.6		75.78	77.54		376.53			147.9	6.72
Minima			32.3		17.78	13.47	12.14	71.58	73.66		13.45			13.90	6.0
Maxima			25.0		16.6	12.7	11.4	71.58	73.66		15.20			15.20	7.3
			55.0		19.0	14.2	13.1	81.61	83.44		15.20			15.20	7.3

Catalog No.	Diam. Bizygomatic		Facial Index, total		Facial Index, upper		Basion-Alveolar Pt.		Basion-Subnasal Pt.		Basion-Nasion		Facial Angle		Alveolar Angle		Orbits—Height, right		Orbits—Height, left		Orbits—Breadth, right		Orbits—Breadth, left		Orbital Index, right		Orbital Index, left		Nose—Height		Nose—Breadth max- im.		Nasal Index		Upper Alveolar Arch— Length maxim.		Upper Alveolar Arch— Breath maxim.		Upper Alveolar Arch— Index	
	(25)	(1)	(21)	(21)	(21)	(21)	(25)	(25)	(25)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(23)	(24)	(23)	(24)	(23)	(24)	(23)	(24)	(23)	(24)	(23)	(24)	(25)	(25)	(18)	(18)	(15)	(15)	(18)	(18)				
4369	13.5	63.79	10.2	8.0	9.3	66.5	49.5	3.6	3.6	3.3	3.7	3.7	3.7	92.31	97.30	5.2	2.55	49.01	5.4	6.5	88.08	6.5	88.52	5.4	6.5	88.08	6.5	88.52	5.4	6.5	88.08	6.5	88.52	5.4	6.5	88.08	6.5	88.52		
4415	12.5	66.80	10.1	8.5	9.4	65.5	48.5	3.3	3.3	3.3	3.7	3.7	3.7	89.19	87.84	3.0	2.45	49.0	3.4	6.1	86.52	3.0	86.52	3.4	6.1	86.52	3.0	86.52	3.4	6.1	86.52	3.0	86.52	3.4	6.1	86.52	3.0	86.52		
4368	12.7	53.54	9.8	8.0	9.9	70.0	52.0	3.4	3.4	3.5	4.0	3.8	3.8	83.75	89.47	5.25	2.7	51.43	5.2	6.0	86.67	5.2	86.67	5.2	6.0	86.67	5.2	6.0	86.67	5.2	6.0	86.67	5.2	6.0	86.67	5.2	6.0	86.67		
4390	12.8	60.78	8.9	8.2	9.4	73.0	62.5	3.5	3.5	3.5	3.8	3.8	3.8	92.11	93.70	4.9	2.45	50.0	4.5	5.6	80.56	4.5	80.56	4.5	5.6	80.56	4.5	5.6	80.56	4.5	5.6	80.56	4.5	5.6	80.56	4.5	5.6	80.56		
4425	12.9	66.69	9.0	8.3	9.8	73.0	62.5	3.2	3.2	3.2	3.5	3.5	3.5	84.21	87.21	4.5	2.3	45.79	5.1	6.0	85.0	5.1	85.0	5.1	6.0	85.0	5.1	6.0	85.0	5.1	6.0	85.0	5.1	6.0	85.0	5.1	6.0	85.0		
4385	12.0	60.69		8.0	9.6																																			
4389	13.3	89.47	64.14	9.9	8.8	69.0	51.5	3.7	3.7	3.7	4.2	4.1	4.1	90.14	90.14	4.85	2.4	49.48	5.3	6.0	88.33	5.3	88.33	5.3	6.0	88.33	5.3	6.0	88.33	5.3	6.0	88.33	5.3	6.0	88.33	5.3	6.0	88.33		
4361	12.7			8.8	10.0																																			
4400	13.1			8.8	9.8																																			
4413	13.0	47.55	10.0	9.2	10.0	72.0	55.5	3.4	3.4	3.4	3.9	3.7	3.7	82.05	86.81	4.7	2.55	54.36	5.1	6.2	82.96	5.1	82.96	5.1	6.2	82.96	5.1	6.2	82.96	5.1	6.2	82.96	5.1	6.2	82.96	5.1	6.2	82.96		
4379	13.4	60.77	9.2	8.4	9.8	75.5	63.5	3.3	3.3	3.3	3.7	3.7	3.7	89.33	89.19	5.25	2.65	50.18	4.9	6.0	81.67	4.9	81.67	4.9	6.0	81.67	4.9	6.0	81.67	4.9	6.0	81.67	4.9	6.0	81.67	4.9	6.0	81.67		
4386	12.6	50.75	9.1	8.4	9.6	72.0	63.0	3.5	3.5	3.5	3.8	3.8	3.8	88.16	93.42	4.9	2.5	51.02	5.3	6.1	80.53	5.3	80.53	5.3	6.1	80.53	5.3	6.1	80.53	5.3	6.1	80.53	5.3	6.1	80.53	5.3	6.1	80.53		
4424	13.0	52.37	9.8	8.4	9.8	67.5	47.0	3.4	3.4	3.4	3.9	3.7	3.7	87.18	91.89	5.3	2.4	45.38	5.3	6.0	86.33	5.3	86.33	5.3	6.0	86.33	5.3	6.0	86.33	5.3	6.0	86.33	5.3	6.0	86.33	5.3	6.0	86.33		
4377	13.0	47.69	9.0	8.4	9.8																																			
4391	12.7	65.12	10.4	9.0	9.6	63.5	46.0	3.3	3.3	3.3	3.7	3.6	3.6	88.46	94.69	4.8	2.8	58.38	5.6	6.3	88.69	5.6	88.69	5.6	6.3	88.69	5.6	6.3	88.69	5.6	6.3	88.69	5.6	6.3	88.69	5.6	6.3	88.69		
4367	13.0	53.03	9.7	8.7	9.8																																			
4384	13.4	58.09	9.1	8.0	9.6	71.5	53.5	3.2	3.2	3.2	3.9	3.7	3.7	82.05	86.81	4.9	2.5	51.02	5.6	6.3	81.03	5.6	81.03	5.6	6.3	81.03	5.6	6.3	81.03	5.6	6.3	81.03	5.6	6.3	81.03	5.6	6.3	81.03		
4419	12.4			8.6	9.6																																			
4405	12.8	53.13	9.2	8.4	9.4	70.0	51.0	3.6	3.6	3.5	4.1	3.9	3.9	87.80	89.74	5.0	2.3	46.0	4.7	5.8	81.03	4.7	81.03	4.7	5.8	81.03	4.7	5.8	81.03	4.7	5.8	81.03	4.7	5.8	81.03	4.7	5.8	81.03		
4374	13.4	44.78	9.0	8.3	9.2	73.0	58.0	3.4	3.4	3.5	3.7	3.6	3.6	91.89	97.29	4.5	2.4	53.06	5.0	6.2	80.61	5.0	80.61	5.0	6.2	80.61	5.0	6.2	80.61	5.0	6.2	80.61	5.0	6.2	80.61	5.0	6.2	80.61		
4397	14.2	47.89	9.2	8.8	10.2	77.0	67.0	3.5	3.5	3.6	4.1	3.9	3.9	86.50	92.31	5.4	2.85	62.78	4.7	6.2	75.81	4.7	75.81	4.7	6.2	75.81	4.7	6.2	75.81	4.7	6.2	75.81	4.7	6.2	75.81	4.7	6.2	75.81		
4370	13.0	50.0	9.1	8.0	9.0	70.0	45.0	3.2	3.2	3.15	3.7	3.7	3.7	86.49	85.14	4.95	2.4	44.48	5.1	6.4	79.69	5.1	79.69	5.1	6.4	79.69	5.1	6.4	79.69	5.1	6.4	79.69	5.1	6.4	79.69	5.1	6.4	79.69		
4198	12.5	52.90	9.2	8.6	9.0	64.0	54.0	3.1	3.1	3.15	3.6	3.45	3.45	86.11	81.30	4.45	2.5	60.18	5.3	6.0	83.33	5.3	83.33	5.3	6.0	83.33	5.3	6.0	83.33	5.3	6.0	83.33	5.3	6.0	83.33	5.3	6.0	83.33		
4368	12.5	58.20	9.2	8.4	9.5	70.5	57.0	3.2	3.2	3.2	3.8	3.7	3.7	80.26	86.49	5.2	2.7	51.32	4.6	6.5	70.77	4.6	70.77	4.6	6.5	70.77	4.6	6.5	70.77	4.6	6.5	70.77	4.6	6.5	70.77	4.6	6.5	70.77		

1 Upper median incisors lost long ago.
 2 Right upper median incisor lost long ago.
 3 Near.
 4 Allowance made for wear of teeth.
 5 Vault sphenoidal.
 6 Vault sphenoidal.

(25) Totals
 (18) Averages
 (15) Minima
 (18) Maxima

SIBERIA: TUNGUS (MOSCOW SERIES)

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxm. (glabella ad maxmum)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
8071	Moscow Mus.	Near Tampa River	35		19.8	14.4	13.0	72.7	76.0		15.73				
8069	do.	"Dagar"	40		19.0	13.9	12.6	75.2	76.6		15.17				
8078	do.	do.	50		19.2	14.1	13.4	78.4	89.5		15.57				
8080	do.	do.	40		19.4	14.5	12.9	74.7	76.1		15.60			13.4	8.0
8078a	do.	do.	30		19.2	14.4	13.4	75.0	79.8		15.67			11.8	7.2
8089	do.	Northeast of Lake Balkal.	30		19.4	14.8	13.9	76.3	81.3		16.03				6.5
8087	do.	"Dagar"	20		19.1	14.6	12.6	76.4	74.8		15.43				7.2
8085	do.	Northeast of Lake Balkal.	35		19.2	14.7	13.4	76.5	79.1		15.77				7.6
4635	do.	Prinorskaia Obl.	50		18.0	13.8	12.8	76.7	89.5		14.87				7.4
8076	do.	"Dagar"	50		19.4	15.3	13.2	78.9	76.1		15.97				8.0
4634	do.	Prinorskaia Obl.	45		18.3	14.5	13.7	79.2	83.5		15.50				7.8
Specimens			(11)		(11)	(11)	(11)	(11)	(11)		(11)				(11)
Totals			425		210.0	159.0	144.9				171.31			(3)	37.0
Averages			38.6		19.09	14.45	13.17	75.71	78.54		15.57			12.33	7.58
Minima			20		18.0	13.8	12.6	72.7	74.8		14.87			11.8	6.5
Maxima			50		19.8	15.3	13.9	79.2	83.5		16.03			13.4	8.5

FEMALES

8077	Moscow Mus	Northeast of Lake Balkal.	40	18.3	13.8	11.8	75.41	73.52	14.03	7.4
8082	do	do	30	17.2	13.2	11.3	76.74	74.84	13.00	6.8
8083	do	do	30	18.2	14.0	11.7	76.02	72.67	14.03	7.2
8079	do	do	40	17.4	13.4	11.6	77.01	73.32	14.13	7.2
8081 (slightly c ¹ -like)	do	do	35	18.9	14.6	12.2	77.25	72.84	13.23	7.3
8074	do	do	35	17.2	13.5	12.0	78.49	78.18	14.23	7.3
8073	do	do	25	17.4	13.7	12.0	78.74	77.17	14.37	7.1
8070	do	do	35	17.3	13.8	11.9	79.77	76.53	14.33	7.5
8086	do	do	35	18.3	14.6	12.6	79.78	76.60	15.17	7.8
8084	do	do	25	17.4	14.0	12.2	80.46	77.71	14.53	7.8
Specimens			(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
Totals			330	177.6	138.6	119.3	78.04	75.46	14.515	34.10
Averages			33	17.76	13.86	11.93	78.04	75.46	14.52	11.37
Minima			25	17.2	13.2	11.3	75.41	72.67	13.90	10.4
Maxima			40	18.9	14.6	12.6	80.46	78.18	15.23	12.0

¹ Near.

SIBERIA: TUNGUS (MOSCOW SERIES)—Continued

MALES

Catalog No.	Diam. Bizygomatic maxm. (c)	Facial Index, total	$\left(\frac{a \times 100}{c}\right)$	Facial Index, upper	$\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxm.	Upper Alveolar Arch— Breadth maxm.	Upper Alveolar Arch— Index
8071	14.0	---	---	55.0	---	10.4	9.4	10.2	68.5	59.0	3.5	3.4	3.8	3.75	92.1	90.7	5.35	2.7	60.5	5.4	7.0	77.1
8079	13.5	---	---	56.2	---	10.1	9.0	10.0	67.5	52.0	3.5	3.4	3.8	3.7	92.1	91.0	5.85	2.7	59.3	5.1	6.9	73.9
8078	14.5	---	---	58.6	---	11.2	9.8	10.8	64.5	53.0	3.8	3.8	4.0	3.9	95.0	97.4	5.8	2.7	46.6	6.0	7.2	73.9
8080	14.7	91.2	---	54.4	---	10.5	9.3	10.4	67.0	50.0	3.8	3.7	4.2	4.0	90.5	92.6	6.0	2.7	46.0	6.2	6.8	77.0
8078a	14.3	82.5	---	50.4	---	10.7	9.8	10.6	69.5	57.0	3.4	3.45	3.8	3.75	89.5	92.0	5.35	2.8	42.5	5.5	6.8	83.3
8089	13.0	---	---	50.0	---	9.5	8.6	10.3	77.5	51.5	3.25	3.6	3.6	3.6	90.3	89.7	5.1	2.6	51.0	5.1	6.8	81.0
8087	13.5	---	---	53.3	---	10.8	9.6	10.4	67.0	49.0	3.45	3.5	4.05	3.9	86.2	89.7	5.3	2.65	60.0	5.5	6.8	80.9
8085	14.2	---	---	53.6	---	11.3	9.8	10.6	64.5	44.0	3.3	3.4	3.9	3.9	84.6	87.2	5.4	2.55	47.3	5.9	6.7	83.1
4035	14.0	---	---	52.9	---	10.0	9.0	10.4	71.5	56.0	3.3	3.25	3.7	3.7	89.3	87.8	5.3	2.5	47.3	5.2	7.1	73.2
8076	15.3	---	---	52.3	---	10.4	9.1	10.2	66.0	50.0	3.65	3.7	4.0	3.9	91.3	94.9	5.85	2.8	47.9	5.7	7.1	80.3
4034	13.8	---	---	56.5	---	10.3	9.2	10.1	66.0	57.0	3.45	3.55	3.9	3.9	88.5	91.0	5.1	3.0	53.8	5.5	7.0	78.6
Specimens	(11)	(3)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(10)	(11)	(10)	(11)	(10)	(11)	(11)	(11)	(11)	(11)	(11)
Totals	154.9	---	115.2	747.5	---	578.5	102.6	114.0	747.5	38.4	35.15	42.75	38.40	38.40	89.82	91.54	60.1	29.9	49.75	60.2	75.5	79.74
Averages	14.08	---	10.47	52.59	---	52.59	9.33	10.36	76.95	3.52	3.49	3.89	3.84	3.84	87.2	87.2	5.46	2.72	46.0	5.47	6.86	77.74
Minimum	13.0	---	9.5	50.0	---	9.5	8.6	10.0	64.5	44.0	3.25	3.25	3.6	3.7	84.6	87.2	5.1	2.5	45.0	5.1	6.3	73.2
Maximum	15.3	---	11.3	58.6	---	11.3	9.8	10.8	77.5	59.0	3.8	3.8	4.2	4.0	95.0	97.4	6.0	3.0	53.8	6.0	7.2	88.1

SIBERIA: TUNGUS (LENINGRAD SERIES)

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxm. (glabela ad maxmum)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. (Mrdlička's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
730-2	Leningrad Mus.	Mouth of Angara River.			18.2	14.2	12.2	78.02	75.31		14.87			12.5	8.0
5537-2	do.	Urut River, Chabarovsk region.			18.3	15.0	13.0	81.97	78.08		15.43			12.4	7.5
5192-1	do.	Lake Essoi.			18.0	15.0	12.3	83.83	74.55		15.10			12.2	7.4
5146-4	do.	Lower Tunguska.			17.8	15.1	13.5	84.83	82.07		15.47			13.0	7.5
5192-2	do.	Lake Essoi.			17.6	15.4	12.5	87.50	75.76		15.17			12.4	8.3
1200-6	do.	Turchanski Kraj.			17.0	14.9	12.6	87.65	79.0		14.83			12.4	7.6
Specimens					(6)	(6)	(6)	(6)	(5)		(6)			(5)	(6)
Totals					106.9	89.6	76.10	83.89	77.46		90.87			62.50	43.3
Averages					17.82	14.93	12.68	78.02	74.55		15.15			12.50	7.72
Minima					17.0	14.2	12.2	87.65	79.0		14.83			12.2	7.4
Maxima					18.3	15.4	13.5	87.65	82.07		15.47			13.0	8.3

FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxm. (glabela ad maxmum)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. (Mrdlička's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
730-1	Leningrad Mus.	Mouth of Angara River.			18.0	14.2	13.1	78.89	81.97		15.10			11.7	7.4
5537-1	do.	Chabarovsk region.			17.0	13.6	12.0	80.0	78.43		14.20			11.2	6.9
5537-3	do.	do.			17.4	14.0	11.8	80.46	75.16		14.40			10.8	6.9
5275-1	do.	Yenisei River.			17.7	14.3	12.5	80.79	78.13		14.83			10.3	6.6
5537-7	do.	Chabarovsk region.			16.7	13.8	12.4	82.63	81.81		14.30			11.2	6.6
5146-5	do.	Lower Tunguska.			18.0	14.9	12.8	82.78	77.81		15.23			7.0	7.0
5242-1	do.	(?)			17.0	14.2	11.8	83.53	75.64		14.33			7.2	7.2
5275-2	do.	Yenisei River.			17.6	15.2	13.0	86.96	79.27		15.27			11.1	6.8
5240-1	do.	do.			17.0	15.1	11.8	88.82	73.52		14.63			11.2	6.0
Specimens					(9)	(9)	(9)	(9)	(9)		(9)			(7)	(9)
Totals					156.40	129.30	111.2	82.67	77.81		132.29			77.50	62.30
Averages					17.38	14.37	12.36	82.67	77.81		14.70			11.07	6.92
Minima					16.7	13.6	11.8	78.89	73.52		14.20			10.3	6.6
Maxima					18.0	15.2	13.1	88.82	81.97		15.27			11.7	7.4

MALES

Specimens	Diam. Bizygomatic max. (c)	Facial Index, total $\left(\frac{c}{a} \times 100\right)$	Facial Index, upper $\left(\frac{c}{b} \times 100\right)$	Basion-Alveolar Pt.	Basion Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max. im.	Nasal Index	Upper Alveolar Arch—Length max. im.	Upper Alveolar Arch—Breadth max. im.	Upper Alveolar Arch—	Upper Alveolar Arch—
730-2	13.8	50.58	57.07	10.4	9.2	10.4	67.0	51.0	3.25	3.4	3.9	3.7	85.32	91.89	5.95	2.85	47.90	5.3	6.3	84.13	84.13
5537-9	14.6	84.95	41.57	10.3	9.3	10.5	70.0	55.0	3.25	3.25	4.0	3.7	81.25	87.84	5.55	2.65	47.75	3.4	6.5	83.08	83.08
5192-1	14.8	82.43	50.0	10.2	8.6	10.2	67.0	49.0	3.55	3.55	3.7	3.9	88.75	91.62	5.15	2.6	66.49	3.3	7.1	79.10	79.10
5146-4	14.1	90.28	53.19	9.9	8.6	10.2	70.5	49.0	3.2	3.2	3.7	3.7	87.74	86.49	5.5	2.65	48.18	3.3	7.1	80.28	80.28
5192-2	14.4	90.28	47.64	10.5	9.2	9.9	62.0	53.0	3.65	3.65	4.0	4.1	87.60	89.02	5.75	2.65	46.09	3.5	6.1	90.16	90.16
1200-6	14.1	87.91	53.90	10.0	8.8	9.8	69.0	48.5	3.6	3.7	4.2	4.0	85.71	92.50	5.7	2.5	43.86	3.4	6.4	84.98	84.98
Specimens	(6)	(5)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)
Totals	85.8	61.3	54.30	60.80	402.5	314.0	20.75	23.80	23.10	23.10	23.10	23.10	85.29	89.83	5.6	2.65	47.32	22.60	39.10	83.98	83.98
Averages	14.30	87.17	53.96	10.22	9.05	10.13	67.68	52.33	3.38	3.46	3.97	3.85	81.26	87.49	5.15	2.5	43.86	5.3	6.9	79.10	79.10
Minima	13.8	82.43	41.57	9.9	8.6	9.8	62.0	48.5	3.2	3.2	3.7	3.7	81.25	86.49	5.15	2.5	43.86	5.3	6.1	79.10	79.10
Maxima	14.8	90.58	57.97	10.5	9.3	10.5	70.5	57.5	3.6	3.7	4.2	4.1	88.75	92.50	5.95	2.85	60.49	5.7	7.1	90.16	90.16

FEMALES

Specimens	Diam. Bizygomatic max. (c)	Facial Index, total $\left(\frac{c}{a} \times 100\right)$	Facial Index, upper $\left(\frac{c}{b} \times 100\right)$	Basion-Alveolar Pt.	Basion Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max. im.	Nasal Index	Upper Alveolar Arch—Length max. im.	Upper Alveolar Arch—Breadth max. im.	Upper Alveolar Arch—	Upper Alveolar Arch—
730-1	12.6	92.86	58.73	9.4	8.4	9.6	68.0	53.0	3.5	3.55	3.5	3.4	100.0	104.41	5.5	2.6	47.27	4.8	6.4	75.0	75.0
5537-1	13.2	81.85	52.27	10.0	9.0	9.9	69.0	55.5	3.15	3.1	3.7	3.6	85.14	86.11	4.85	2.5	61.55	5.0	6.7	74.63	74.63
5537-3	12.8	81.98	53.91	9.4	8.5	9.4	68.0	57.0	3.2	3.15	3.5	3.4	91.65	92.65	5.0	2.3	46.0	6.5	6.5	76.92	76.92
5275-1	13.6	76.74	48.63	9.7	8.7	9.6	69.0	51.0	3.4	3.35	3.7	3.65	91.89	91.78	4.4	2.5	51.02	4.9	6.4	76.66	76.66
5537-7	13.3	81.21	49.62	9.6	8.7	9.5	69.0	48.0	3.1	3.15	3.8	3.7	81.58	85.14	4.9	2.4	51.55	6.2	6.2	80.65	80.65
5146-5	13.4	92.21	52.21	9.6	8.5	9.5	68.0	44.5	3.55	3.65	4.0	3.8	88.75	92.65	5.1	2.6	60.98	5.3	6.6	86.48	86.48
5242-1	12.7	91.46	56.69	10.6	9.4	9.6	61.5	42.0	3.15	3.15	3.5	3.5	90.0	92.65	5.0	2.55	51.0	5.5	6.6	83.93	83.93
5275-2	13.8	80.73	49.28	9.8	8.7	9.7	68.5	52.0	3.05	3.05	3.5	3.5	87.14	87.14	4.9	2.5	51.02	5.1	6.5	78.46	78.46
5240-1	13.2	81.85	52.27	10.0	8.5	9.2	62.5	42.0	3.2	3.2	3.7	3.7	86.49	86.49	4.9	2.6	53.06	5.4	6.1	83.52	83.52
Specimens	(9)	(7)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
Totals	118.6	83.76	52.53	88.40	603.5	454.5	29.35	32.00	29.15	29.15	32.00	32.15	89.06	91.29	4.45	2.55	50.62	46.0	57.6	79.86	79.86
Averages	13.18	82.74	48.63	9.82	8.71	9.59	67.66	50.50	3.30	3.35	3.86	3.67	81.58	85.14	4.93	2.3	47.0	5.11	6.40	74.63	74.63
Minima	12.6	76.74	43.53	9.4	8.4	9.2	61.5	42.0	3.05	3.05	3.5	3.4	81.58	85.14	4.4	2.3	46.0	6.1	6.1	74.63	74.63
Maxima	13.8	92.86	58.73	10.6	9.4	9.9	69.0	57.0	3.55	3.65	4.0	3.8	100.0	104.41	5.5	2.6	60.98	6.7	6.7	88.52	88.52

SIBERIA: BURIAT (U. S. N. M. SERIES)

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabella ad maxim.)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. (Hrdliczk's method)	Tooth wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
283607	A. H. U. S. N. M.	Near Troickosvsk (Klakhta).	60		18.7	14.5	13.0	77.5	73.5		15.40	1,590.0			
282614	do	do	25		18.4	14.3	13.8	77.7	84.4		15.50	1,605.0			7.4
283306	do	do	30		18.0	14.0	13.2	77.8	82.5		15.07	1,520.0			8.1
283703	do	do	28		17.8	14.0	13.4	78.7	84.3		15.07	1,400.0			7.0
283629	do	do	40		19.2	15.2	13.2	79.2	76.7		15.87	1,650.0			7.4
283707	do	do	40		18.0	14.4	13.3	80.0	82.1		15.23	1,490.0			
283608	do	do	25		18.0	14.6	13.0	81.1	79.8		15.20	1,545.0			7.3
283604	do	do	35		18.2	15.1	12.9	83.0	77.5		15.40	1,490.0			8.2
283615	do	do	50		17.4	14.6	13.0	83.9	81.3		15.00	1,570.0			8.2
283616	do	do	45		18.2	15.3	12.8	84.1	76.4		15.43	1,550.0			7.7
283701	do	do	45		17.7	14.9	13.6	84.2	83.4		15.30	1,510.0			7.4
283613	do	do	35		18.2	15.4	13.8	84.6	82.1		15.80	1,640.0			7.6
283621	do	do	60		17.6	14.9		84.7							7.6
283621	do	do	60		17.7	15.0	12.4	84.8	75.8		15.03	1,470.0			7.6
283706	do	do	60		18.1	15.5	12.9	85.6	76.8		15.50	1,500.0			7.6
283705	do	do	75		17.3	15.1	12.7	87.3	73.8		15.03	1,500.0			7.6
283612	do	do	35		17.6	15.4	12.9	87.5	78.2		15.30	1,450.0			7.9
283711	do	do	30		18.5	16.2	13.9	87.6	80.1		16.20	1,915.0			7.1
283710	do	do	24		18.5	16.2	13.9	87.6	80.1		16.20	1,915.0			7.1
283699	do	do	55		17.6	15.5	12.9	88.1	77.9		15.33	1,530.0			8.1
Specimens			(19)		18.7	14.5	13.0	77.5	73.5		15.40	1,590.0			
Totals			822		342.2	283.9	236.7	(19)	(18)		(18)	(18)		(8)	(15)
Averages			43.3		18.01	14.91	13.15	82.96	79.75		15.38	1,552.5		12.73	7.64
Minima			24		17.3	14.0	12.4	77.5	75.8		15.00	1,400.0		11.4	7.0
Maxima			75		19.2	16.2	13.9	88.1	84.4		16.20	1,915.0		13.7	8.2

Catalog No.	Diam. Bizygomatic maxim. (c)		Basion-Subnasal Pt.	Basion-Alveolar Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index	Lower Jaw—Height at Symphysis
	Facial Index, total $\left(\frac{c}{a \times 100}\right)$	Facial Index, upper $\left(\frac{c}{b \times 100}\right)$																		
283607	14.3		10.2	9.6	10.2	72.0	55.5	3.4	3.45	4.1	4.05	82.9	81.2	5.35	2.6	51.2	6.7	76.7		
283614	13.7	59.7	10.2	10.4	10.2	68.5	56.0	3.5	3.35	3.65	3.65	91.9	91.1	5.35	2.6	48.6	6.7	81.9	4.1	
283606	13.9	60.4	9.6	8.9	9.6	73.0	91.0	3.45	3.4	3.75	3.75	92.0	90.7	5.15	2.35	46.1	6.4	76.6	3.1	
283620	13.8	53.6	10.5	10.5	10.5	69.0	53.0	3.15	3.5	3.8	3.8	82.9	83.2	5.0	2.7	52.1	5.4	83.1		
283607	13.6	84.0	8.5	9.6	9.5	67.5	46.0	3.35	3.35	3.8	3.8	82.9	83.2	5.0	2.65	53.0	5.2	80.0	3.3	
283608	13.4	54.5	8.4	9.6	8.4	67.5	53.0	3.35	3.35	3.5	3.5	87.2	93.7	3.5	2.55	46.4	5.4	83.7		
283604	14.3	57.9	10.2	10.2	10.4	67.5	53.0	3.4	3.4	3.9	4.0	87.2	86.0	3.0	3.0	46.0	5.4	85.0		
283615	13.5	101.48	9.1	9.5	9.4	63.5	51.0	3.65	3.5	3.85	3.85	94.3	90.9	3.6	2.7	48.2	5.0	91.5	3.95	
283616	14.3	65.8	10.0	10.0	10.0	67.0	50.5	3.55	3.45	3.7	3.7	93.9	93.2	3.65	2.5	44.2	5.3	82.1		
283701	13.5	54.8	9.7	9.7	10.1	70.5	59.0	3.2	3.15	3.8	3.7	81.2	85.1	3.25	2.75	52.4	5.4	81.7	3.4	
283613	14.4	62.8	8.2	9.0	10.4	76.5	59.0	3.55	3.65	4.0	4.0	88.8	91.3	3.7	2.6	45.6	4.9	72.4	3.4	
283621			8.4	9.7	9.4	61.5	49.5	3.8	3.85	3.75	3.9	101.3	98.7	3.4	2.7	60.0	5.6	90.3	3.9	
283706	13.7	94.9	9.4	10.7	10.7	61.5	49.5	3.3	3.2	3.75	3.75	88.0	85.3	3.4	2.7	50.0	5.6	80.3		
283705	13.5	55.5	9.4	9.6	9.4	65.0	43.5	3.45	3.4	3.5	3.65	101.5	93.2	3.5	2.5	45.5	5.3	80.3		
283612	14.1	53.9	8.4	9.9	9.6	64.0	50.0	3.65	3.65	3.9	3.85	93.6	91.8	3.75	2.75	47.8	5.9	85.5	3.35	
283711	14.8	53.4	9.5	10.5	10.0	64.0	47.0	3.65	3.65	3.5	3.5	84.7	87.1	3.5	2.9	66.9	5.8	81.7		
283710	13.5	52.6	9.0	10.3	9.4	62.0	40.0	3.05	3.05	3.6	3.5	92.2	90.9	3.5	2.55	45.5	5.5	77.5	3.75	
283639	14.6	63.2	8.2	9.6	9.5	64.0	50.5	3.55	3.5	3.85	3.85	92.2	90.9	3.5	2.55	45.5	5.5	77.5		
Specimens	(17)	(8)	(15)	(15)	(15)	(15)	(15)	(16)	(18)	(16)	(16)	(16)	(18)	(18)	(18)	(18)	(15)	(15)	(15)	(8)
Totals	266.9		179.0	147.4	157.9	1,099.5	797.5	55.0	61.80	60.4	67.65	81.9	81.0	97.85	48.0	81.0	98.9	81.0	32.25	
Averages	13.94	60.73	9.94	9.83	9.94	67.30	53.17	3.44	3.43	3.78	3.76	91.06	91.55	3.44	2.67	49.05	5.40	81.90	4.0	
Minima	13.4	52.0	8.1	8.9	9.4	62.0	43.5	3.05	3.05	3.5	3.5	82.9	85.0	3.0	2.35	44.2	4.9	75.4	3.1	
Maxima	14.8	101.48	10.7	10.5	10.7	76.5	61.0	3.8	3.85	4.1	4.05	101.5	98.7	3.8	3.0	66.9	5.9	91.5	4.1	

1 Extraordinarily difficult in these people to estimate age.

2 Near.

3 Allowance made for wear of teeth.

SIBERIA: BURIAT (IRKUTSK SERIES)

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabelle ad max.)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdlička's method)	Teeth wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
7539-10	Irkutsk Mus.	Ostraiā Sopka, near Kiakhta.	30		18.4	14.8	14.0	89.43	84.54	94.59	15.73				
7539-5	do	do	25		18.5	15.0	13.1	81.08	78.21	87.53	15.53				8.0
7539-17	do	do	24		18.2	14.8	12.6	81.32	76.96	85.14	15.20				7.5
7539-9	do	do	30		18.4	15.0	13.3	81.52	79.64	88.67	15.57				7.7
7003-1	do	do	Mid-aged		18.3	15.0	13.0	81.37	78.08	86.67	15.43				8.1
7539-18	do	Balaganski	do		18.8	16.1	12.9	85.64	73.93	80.12	15.93				8.3
7539-16	do	Ostraiā Sopka, near Kiakhta.	28		17.9	15.4	13.0	86.03	78.08	84.42	15.43				7.7
7539-6	do	do	40		17.6	15.3	13.4	86.53	81.46	87.58	15.43				7.7
7874-3	do	Ostraiā Sopka, near Kiakhta.	30		17.4	15.2	13.6	87.56	83.44	89.47	15.40				17.5
7539-1	do	do	25		17.9	16.0	12.3	89.39	72.57	76.88	15.10				7.7
Specimens			(8)		(10)	(10)	(10)	(10)	(10)	(10)	(10)				(9)
Totals			232		181.4	152.6	131.2				155.05				70.20
Averages			29		18.14	15.26	13.12	84.12	78.56	86.98	15.51				7.8
Minima			24		17.4	14.8	12.3	80.43	72.67	76.88	15.20				7.5
Maxima			40		18.8	16.1	14.0	89.59	84.54	94.59	15.93				8.3

Catalog No.	Diam. Bizygomatic maxim. (c)		Facial Index, total $\left(\frac{c}{a} \times 100\right)$		Facial Index, upper $\left(\frac{c}{b} \times 100\right)$		Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max. im.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—
	(10)	(9)	(6)	(6)	(6)	(6)	(10)	(10)	(10)	(6)	(6)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(9)	(9)	(9)
7539-10	14.2	14.2	77.74	67.23	10.3	8.9	8.0	10.0	65.0	48.0	3.8	3.8	3.8	3.8	3.8	97.44	97.11	5.3	7.6	44.64	5.6	6.5	86.15
7539-5	14.0	14.0	64.56	67.23	9.9	8.9	8.0	10.0	68.5	54.0	3.4	3.3	3.7	3.0	3.2	97.44	100.0	5.0	5.0	44.64	5.3	6.1	89.89
7539-17	13.8	13.8	68.53	67.23	9.7	8.8	8.0	10.0	69.0	60.0	3.6	3.6	3.5	3.6	3.6	94.74	97.22	5.0	4.1	43.62	5.3	6.0	93.89
7539-9	13.2	13.2	66.48	67.23	10.6	9.2	8.0	10.2	64.5	51.5	3.3	3.35	3.5	3.9	3.9	80.49	85.99	5.4	3.5	43.62	5.3	6.0	84.65
7003-1	14.6	14.6	66.33	67.23	9.6	8.5	8.0	10.2	66.0	57.5	3.8	3.8	4.1	3.9	3.9	83.72	97.44	5.75	4.7	46.96	5.4	7.1	76.06
7539-18	15.0	15.0	64.61	67.23	9.6	8.6	8.0	10.2	71.0	56.5	3.4	3.4	4.0	3.8	3.8	83.72	89.44	5.75	2.6	46.02	5.1	6.6	77.27
7539-16	14.1	14.1	65.80	67.23	9.9	8.7	8.0	9.9	67.0	50.5	3.55	3.65	3.7	3.6	3.6	92.56	101.59	5.0	2.8	60.00	5.5	6.8	80.83
7539-6	13.8	13.8	65.96	67.23	10.3	9.2	8.0	10.7	72.0	54.0	3.45	3.5	4.05	4.0	3.6	85.19	87.50	5.4	2.45	45.57	5.4	6.3	85.71
7874-3	13.9	13.9	65.96	67.23	10.3	9.2	8.0	10.7	72.0	54.0	3.45	3.5	4.05	4.0	3.6	85.19	87.50	5.4	2.45	45.57	5.4	6.3	85.71
7539-1	14.2	14.2	67.23	67.23	10.2	9.9	8.0	9.6	62.5	48.5	3.7	3.75	3.65	3.6	3.6	101.37	104.17	5.55	2.35	45.95	5.6	7.1	73.87
Specimens	(10)	(10)	(6)	(6)	(6)	(10)	(10)	(10)	(6)	(6)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(9)	(9)	(9)
Totals	140.8	140.8	65.47	67.23	90.10	88.60	8.86	100.70	605.50	479.5	35.50	35.85	38.80	37.60	37.60	91.49	95.56	55.40	25.85	46.65	49.00	59.70	82.08
Averages	14.1	14.1	65.47	67.23	10.0	8.86	8.86	10.1	67.3	53.3	3.55	3.59	3.83	3.76	3.76	91.49	95.56	5.54	2.59	46.65	5.45	6.63	82.08
Minima	13.2	13.2	63.56	65.96	9.6	8.5	8.0	9.6	62.5	48.0	3.3	3.35	3.65	3.6	3.6	80.49	85.99	5.3	2.45	43.52	5.1	6.1	76.06
Maxima	15.0	15.0	68.53	68.53	10.6	9.2	8.0	10.7	72.0	60.0	3.8	3.8	4.1	4.0	4.0	101.37	104.17	5.75	2.8	60.94	5.6	7.1	86.89

1 Near.

SIBERIA: BURIAT (U.S.N.M. SERIES)

FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxm. (glabella ad maxmum)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Irdhicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)		
282625	U.S.N.M. (A. H.)	Near Troickosvsk	70		17.7	13.8	12.7	78.0	80.6		14.73	1,450		11.3	7.4		
282704			26		18.2	14.3	13.2	78.6	81.2		15.23	1,335					
275709			70		17.9	14.5	12.2	81.0	75.5		14.87	1,340					
283022			30		17.3	14.2	12.6	82.1	80.0		14.70	1,350					
283611			40		18.0	14.9	12.6	82.8	76.6		15.17	1,370					
283610			50		17.3	14.4	12.5	82.2	78.9		14.73	1,370					
283619			35		16.8	14.0	12.1	83.3	78.6		14.30	1,300					
283617			32		16.5	13.8	12.9	83.6	83.1		14.40	1,210					
273703			55	Asymmetrical	17.4	14.7	12.3	84.5	76.7		14.80	1,470				12.6	7.7
283601			do	do	35		17.6	15.0	13.4	85.2	76.1		15.00	1,410			6.9
283702 (large O)			do	do	35		17.8	15.4	12.4	85.5	77.7		15.20	1,415			7.9
278712			do	do	55		17.0	14.9	12.4	87.7	77.7		14.77	1,350			17.4
283603			do	do	30		17.1	15.2	12.5	83.9	77.4		14.93	1,440			7.4
283626			do	do	60		17.3	15.4	12.7	89.0	77.7		15.13				
Specimens	(14)				(14)	(14)	(14)	(14)	(14)		(14)	(12)		(4)	(10)		
Totals	631		243.9		204.5	176.5	176.5	83.85	78.28		207.96	16,440		48.89	72.90		
Averages	45.1		17.42		14.61	12.54	14.86	81.30	78.28		14.85	1,370		12.20	7.20		
Minima	26		16.5		13.8	12.1	78.0	74.7			11.30	1,210		11.3	6.6		
Maxima	70		18.2		15.4	13.2	89.0	85.1			15.23	1,470		12.7	7.9		

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{c}{a} \times 100\right)$	Facial Index, upper $\left(\frac{b}{c} \times 100\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max-Im.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—Index	Lower Jaw—Height at Symphysis	
283625	13.1	86.3	56.5	8.9	8.2	9.7	70.5	63.0	3.3	3.35	3.5	3.5	91.9	95.7	5.3	2.6	49.1	5.1	6.3	81.0	3.05	
283704	13.3			8.0	8.0	8.7			3.6	3.6	3.6	3.5	100.0	102.9	5.35	2.7	50.5		6.3		3.2	
283602	13.8		56.5	9.1	8.2	9.9	71.0	59.5	3.65	3.7	3.9	3.8	93.6	97.4	5.6	2.75	49.1	4.9	6.5	75.4		
283611						9.8																
283610	13.1		59.4	9.4	8.4	9.6	71.0	58.0	3.3	3.3	3.7	3.6	89.9	91.7	4.7	2.35	50.0	4.7	6.1	77.1		
283619	13.4		56.0	9.0	8.2	9.1	68.5	56.0	3.3	3.35	3.7	3.7	90.2	90.5	5.15	2.4	46.6	4.8	6.1	78.7		
283617	12.8		57.0	9.5	8.6	9.9	72.5	57.0	3.25	3.2	3.6	3.55	90.5	90.7	5.1	2.6	51.0	4.8	6.1	78.7		
283703	13.4	94.0	57.5	9.5	8.1	9.5	66.0	47.5	3.5	3.5	3.9	3.9	89.7	89.7	5.5	2.6	47.3	5.3	5.9	88.8	3.05	
283501	13.3		51.9	9.5	8.4	9.4	67.5	52.0	3.45	3.35	3.8	3.75	90.8	89.8	4.9	2.5	51.0	4.9	6.4	76.6		
283702 Q	13.9		56.8	10.2	8.7	10.1	66.5	43.5	3.5	3.5	3.8	3.75	92.1	93.3	5.85	2.8	47.9				3.2	
283712	14.3		51.7	10.3	9.2	10.0	66.5	53.0	3.55	3.6	4.15	4.2	85.5	85.7	5.4	2.85	52.3	5.2	6.5	80.0	3.2	
283603	14.0		52.9	9.7	8.4	9.5	66.0	48.0	3.6	3.6	3.65	3.65	98.6	98.6	5.3	2.45	46.2	5.5	6.7	82.1		
283626	13.8				8.0	9.6			3.4	3.4	3.9	3.8	87.2	89.5	5.4	2.9	53.7					
Specimens	(12)	(4)	(10)	(10)	(12)	(14)	(10)	(10)	(12)	(11)	(12)	(11)	(12)	(11)	(12)	(12)	(12)	(9)	(9)	(9)	(9)	(9)
Totals	162.2		95.10	100.4	135.3	135.3	686.0	533.5	41.4	37.85	45.2	41.05	91.59	92.60	63.55	31.5	49.57	45.20	56.60	79.86	13.70	
Averages	13.52		63.96	9.51	8.37	9.66	68.60	53.35	3.45	3.44	3.77	3.73	85.5	85.7	5.30	2.63	49.57	5.02	6.29	79.86	3.14	
Minima	12.8		50.4	8.9	8.0	9.1	66.0	43.5	3.2	3.2	3.5	3.5	85.5	85.7	4.7	2.35	46.2	4.7	5.9	75.4	3.05	
Maxima	14.3		57.5	10.3	9.2	10.1	72.5	63.0	3.65	3.7	4.15	4.2	100.0	102.9	5.85	2.9	53.7	5.5	6.7	89.8	3.2	

1 Near.

SIBERIA: BURIAT (IRKUTSK SERIES)

FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium. (glabella ad maxium)	Diam. lateral maxium.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlička's method)	Teeth wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
7699-1	Irkutsk Mus.	(?)	Old		17.8	14.2	12.8	79.78	80.00	90.14	14.93				
6020-15	do	Ostraja Sopka, near Kiakhua.	35		17.6	14.4	13.0	81.82	81.95	90.83	15.00				7.4
7609-12	do	do	20		17.5	14.9	13.0	83.24	80.95	87.95	15.13				7.1
7609-2	do	do	35		16.8	14.0	12.0	83.33	77.92	85.71	14.27				6.9
5531-14	do	do	Old		17.4	14.6	12.4	83.91	77.50	81.93	14.80				
6020-5	do	Sulka	25		16.6	14.7	13.2	88.55	81.57	89.50	14.83				7.4
5531-11	do	Ostraja Sopka, near Kiakhua.	Elderly		17.0	15.2	12.4	82.41	77.02	81.68	14.87				
5531-8	do	do	25		16.8	15.2	11.7	90.48	73.48	76.97	14.57				6.9
5531-13	do	do	35		16.8	15.2	12.9	60.48	80.63	81.87	14.97				7.3
5531-7	do	do	Elderly		16.6	15.2	12.6	91.67	79.55	82.89	14.80				7.4
Specimens.			(6)		(10)	(10)	(10)	(10)	(10)	(10)	(10)				(7)
Totals			175		170.9	147.6	126.0				148.17				50.4
Averages			20		17.09	14.76	12.00	85.56	79.10	85.97	14.81				7.2
Minima			20		16.6	14.0	11.7	79.78	73.13	76.97	14.27				6.9
Maxima			35		17.8	15.2	13.2	91.67	84.55	90.88	15.13				7.4

Catalog No.	Diam. Bizygomatic maxm. (c)	Facial Index, total $\left(\frac{c}{a} \times 100\right)$	Facial Index, upper $\left(\frac{c}{b} \times 100\right)$	Basion-Alveolar Pl.	Basion-Subnasal Pl.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxm.	Upper Alveolar Arch— Breadth maxm.	Upper Alveolar Arch— Index
7600-1	14.2	---	54.81	9.5	9.3	10.4	70.0	55.0	3.8	3.7	4.0	4.0	95.0	84.87	5.6	2.9	51.79	5.5	6.6	83.33
6020-15	13.5	---	---	9.5	8.4	9.8	---	---	3.55	3.55	4.1	4.0	87.80	83.75	5.3	2.75	51.80	5.5	6.0	83.08
7600-12	13.9	---	51.08	10.6	9.4	10.4	69.0	51.0	3.4	3.4	3.9	3.8	89.74	89.47	5.15	2.65	51.46	5.4	6.5	88.53
7600-2	13.1	---	52.07	9.8	8.5	9.1	63.5	43.5	3.4	3.5	3.7	3.6	91.80	97.92	4.05	2.7	54.55	5.3	6.0	88.53
5531-14	13.3	---	---	8.0	8.0	10.0	---	---	3.6	3.6	3.8	3.8	91.74	94.74	3.6	2.85	50.89	---	---	---
6020-5	13.6	---	54.41	9.7	8.5	9.8	68.5	48.5	3.5	3.55	3.9	3.7	89.74	93.95	3.55	2.55	49.95	5.5	6.5	84.02
5531-11	13.6	---	---	---	8.5	9.4	---	---	3.35	3.4	3.9	3.8	85.90	89.47	3.05	2.8	55.45	---	---	---
5531-8	14.2	---	49.59	9.3	8.1	9.0	65.5	47.0	3.4	3.6	3.9	3.9	87.73	92.31	5.1	3.1	62.78	4.9	6.7	73.15
5531-13	14.3	---	51.09	---	7.5	9.4	---	---	3.25	3.3	3.6	3.55	90.28	92.96	5.1	3.1	62.78	4.6	6.3	73.02
5531-7	13.5	---	51.87	---	8.5	9.5	---	---	3.5	3.7	4.1	3.9	92.68	94.87	5.2	2.7	51.92	5.0	6.3	79.37
Specimens	(10)	---	(7)	(5)	(10)	(10)	(5)	(5)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(9)	(9)	(7)	(7)	(7)
Totals	137.2	---	---	48.9	83.7	96.5	336.5	248.0	35.29	35.30	38.90	37.95	90.49	93.02	47.50	25.00	52.00	36.25	44.90	80.02
Averages	13.72	---	50.70	9.78	8.57	9.69	67.9	48.6	3.52	3.53	3.89	3.88	85.60	88.75	5.28	2.78	52.63	5.17	6.41	79.02
Minima	13.1	---	48.59	9.3	7.6	9.0	63.5	45.5	3.25	3.3	3.6	3.55	85.60	88.75	4.95	2.55	45.95	4.6	6.0	73.02
Maxima	14.3	---	54.81	10.6	9.4	10.4	70.0	55.0	3.8	3.7	4.1	4.0	95.0	97.92	5.6	3.1	60.78	5.5	6.7	83.33

SIBERIA: BURIAT

(Summary)

MALES

	Approximate age of subject	Diam. anterior-posterior maxill. (glabella ad maximum)	Diam. lateral maxill.	Basion-Bregma height	Cranial Index	Mean Height Index	Cranial Module	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)	Diam. Bizygo-nasale maxill. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion
	(27)	(29)	(29)	(28)	(29)	(28)	(28)	(8)	(24)	(27)	(8)	(24)	(24)	(28)	(28)
Specimens	1, 054	523.6	436.5	307.9	431.61	79.32	431.61	101.8	184.8	377.7	90.73	55.05	237.5	246.5	279.7
Totals	39	15.05	13.14	12.3	15.42	72.57	15.42	12.73	7.70	14.0	83.0	60.4	9.90	8.80	9.90
Averages	21	17.3	14.0	14.0	77.5	84.4	15.00	11.4	7.9	13.2	82.0	60.7	8.9	8.1	9.4
Minima	75	19.2	16.2	14.0	89.39		16.29	13.7	8.3	15.0	101.48		10.6	9.6	10.7

FEMALES

	Approximate age of subject	Diam. anterior-posterior maxill. (glabella ad maximum)	Diam. lateral maxill.	Basion-Bregma height	Cranial Index	Mean Height Index	Cranial Module	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)	Diam. Bizygo-nasale maxill. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion
	(20)	(21)	(24)	(24)	(24)	(24)	(21)	(4)	(17)	(22)	(4)	(17)	(15)	(22)	(24)
Specimens	806	414.8	352.1	301.5	356.13	78.03	356.13	48.80	123.3	299.4	89.21	65.53	144.0	186.1	232.2
Totals	40.3	17.28	14.67	12.56	14.84	73.13	14.84	12.90	7.25	13.61	85.3	65.53	9.60	8.46	9.1
Averages	20	16.5	13.8	11.7	11.27	85.1	11.27	12.8	6.6	12.8	85.3	48.59	8.9	7.6	9.1
Minima	70	18.2	15.4	13.2	15.23		15.23	12.7	7.9	14.3	94.0	57.5	10.6	9.4	10.4

MALES

	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxim.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—Index	Lower Jaw—Height at Symphysis
	(24)	(24)	(26)	(28)	(26)	(28)	(26)	(28)	(28)	(28)	(28)	(24)	(24)	(24)	(8)
Specimens.....	1, 615.0	1, 277.0	90.50	97.65	99.2	105.25	91.23	92.78	153.25	73.85	48.19	130.0	158.6	81.97	32.25
Totals.....	67.29	53.21	3.48	3.40	3.82	3.76	80.49	85.0	5.47	2.64	45.62	5.42	6.61	75.4	4.03
Averages.....	62.0	43.5	3.95	3.05	3.5	3.5	101.5	104.17	5.0	3.0	55.9	4.9	5.9	75.4	3.1
Minima.....	76.5	61.0	3.8	3.85	4.1	4.05			6.0	3.0	66.9	5.9	7.1	91.5	4.1

FEMALES

	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxim.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—Index	Lower Jaw—Height at Symphysis
	(15)	(15)	(22)	(21)	(22)	(21)	(22)	(21)	(21)	(21)	(21)	(16)	(16)	(16)	(5)
Specimens.....	1, 622.5	781.5	76.5	73.15	84.1	79.0	91.08	92.59	111.05	56.5	60.88	81.4	101.5	80.90	15.70
Totals.....	68.17	52.10	3.48	3.48	3.92	3.76	86.5	85.7	5.29	2.69	45.55	5.00	6.34	73.02	3.14
Averages.....	63.5	43.5	3.25	3.2	3.5	3.5	100.0	102.9	4.7	3.85	45.55	4.6	5.9	89.8	3.05
Minima.....	72.5	63.0	3.8	3.7	4.15	4.2			5.85	3.1	60.78	5.5	6.7		3.2

SIBERIA: ULCHI—D

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium. (glabella and maxium)	Diam. lateral maxium.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdlička's method)	Teeth wear	Menon-Nasion Height (a) ¹	Alveol. Pt.-Nasion Height (b)
8270	Moscow Mus.	Mouth of Amur River.	Mid-aged		19.8	14.3	13.6	71.72	80.0		15.87			12.8	27.6
8275	do.	do.	Elderly		18.0	13.3	13.0	75.89	89.46		15.10			7.8	7.8
8284	do.	do.	do.		18.8	14.0	13.0	74.67	79.87		15.27			11.9	7.9
8281	do.	do.	do.		18.0	13.8	13.1	76.67	83.59		14.97				7.5
Specimens.					(4)	(4)	(4)	(4)	(4)		(4)			(2)	(1)
Totals					74.60	55.3	53.7	74.75	83.68		61.21			21.70	30.80
Averages					18.63	13.83	13.45	74.75	83.68		15.30			12.85	7.70
Minima					18.0	13.3	13.0	71.7	79.8		14.97				7.5
Maxima					19.8	14.2	14.0	76.7	89.5		15.87				7.9

FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium. (glabella and maxium)	Diam. lateral maxium.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdlička's method)	Teeth wear	Menon-Nasion Height (a) ¹	Alveol. Pt.-Nasion Height (b)
8285	Moscow Mus.	Mouth of Amur River	Old		17.9	13.4	12.6	74.86	80.51		14.63				
8291	do.	do.	do.		17.6	13.2	12.3	75.0	79.87		14.37				7.1
8288	do.	do.	Mid aged		18.0	13.8	12.8	76.87	80.50		14.87				7.2
8277	do.	do.	do.		17.8	13.8	12.2	77.53	77.22		14.60				7.2
8282 ³	do.	do.	25		18.2	14.3	12.8	78.57	78.77		15.10				27.3
8255 ⁴	do.	do.	40		18.2	14.4	12.6	79.19	77.30		15.07			12.1	7.8
8251	do.	do.	25		17.6	14.0	12.4	79.55	78.48		14.67				7.3
8259 ⁵	do.	do.	35		17.2	13.8	12.6	80.83	81.39		14.53				7.0
8260 (small)	do.	do.	35		17.2	13.8	12.5	80.35	83.58		14.60				7.1
Perhaps ♀															
8269 ⁶	do.	do.	Mid-aged		17.4	14.0	12.4	80.46	78.98		14.60				7.2
8274	do.	do.	Old		17.6	14.2	13.5	80.68	81.91		15.10				7.2
8256 ⁷	do.	do.	Elderly		17.4	14.2	12.6	81.61	79.75		14.73			12.7	8.0
8271	do.	do.	35		17.1	14.0	12.3	81.87	79.10		14.47				7.3
Specimens			(13)		(13)	(13)	(13)	(13)	(13)		(13)			(3)	(10)
Totals			595		224.2	180.9	163.9	78.03	79.76		191.34			36.0	73.2
Averages			45.8		13.02	12.61	12.61	78.03	79.76		14.72			12.0	7.33
Minima			24		13.2	12.2	12.2	74.86	77.22		14.37			11.2	7.0
Maxima			70		18.2	14.4	13.5	81.87	84.91		15.10			12.7	8.0

MALES

Specimens	Diam. Bizygomatic max. (c)	Facial Index, total (a×100)	Facial Index, upper (b×100)	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max. Im.	Nasal Index	Upper Alveolar Arch—Length max.	Upper Alveolar Arch—Breadth max.	Upper Alveolar Arch—Index	
8270	13.6	94.12	56.88	10.5	10.2	69.0	53.5	3.95	3.95	3.9	3.9	3.9	83.33	83.33	5.8	2.9	50.0	5.7	6.7	85.07	
8275	14.0	55.71	210.6	8.9	9.4	70.0	49.0	3.5	3.5	4.1	4.05	4.05	59.30	63.33	3.95	2.7	47.38	6.7	6.7	85.07	
8294	13.7	57.66	10.2	8.9	10.4	68.5	49.0	3.45	3.45	4.0	3.9	3.9	86.75	86.75	3.85	2.8	47.86	5.4	6.7	77.6	
8281	13.8	86.23	54.35	9.9	8.8	72.5	51.0	3.6	3.6	3.8	3.9	3.9	94.74	89.46	5.65	2.65	46.90	6.7	6.7	77.6	
Totals	(4)	(2)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(3)	(3)	(3)	(3)
Averages	13.78	60.16	55.90	10.30	9.15	69.25	50.75	3.54	3.54	3.94	3.94	3.94	89.56	83.89	5.81	2.76	47.53	5.43	6.7	81.09	
Minima	13.6	54.4	10.2	8.9	8.8	66.0	49.0	3.25	3.25	3.8	3.9	3.9	83.3	83.3	5.65	2.65	45.4	5.2	6.7	77.6	
Maxima	14.0	57.7	10.6	10.6	10.5	72.5	53.5	3.85	3.85	4.1	4.05	4.05	94.7	92.8	5.95	2.9	50.0	5.7	6.7	85.1	

FEMALES

8265	13.0																				
8261	12.3																				
8268	12.8																				
8277	13.2																				
8282	13.8																				
8285	13.9																				
8291	13.6																				
8289	12.7																				
8260	13.4																				
8269	13.4																				
8274	13.8																				
8256	12.9																				
8271	12.6																				
Specimens	(13)	(3)	(10)	(13)	(13)	(10)	(10)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(10)	(10)	(10)	(10)
Totals	171.3		99.3	114.3	128.5	673.0	513.5	45.45	42.1	50.90	46.45	46.45	68.55	68.55	34.35	2.6	52.0	5.0	6.1	81.97	
Averages	13.18		89.65	55.45	9.93	8.79	67.30	51.35	3.51	3.92	3.87	3.87	60.64	60.64	2.64	2.7	47.86	5.4	6.3	77.6	
Minima	12.3		52.00	9.1	8.3	61.0	45.50	3.25	3.3	3.7	3.6	3.6	52.0	52.0	2.55	2.35	46.60	4.8	6.1	71.64	
Maxima	13.9		62.02	10.7	9.8	74.0	60.5	3.8	3.8	4.1	4.0	4.0	94.69	95.95	3.13	2.5	48.98	5.8	6.7	86.57	

1 Allowance made for wear of teeth, where needed.
 2 Near.
 3 Right upper median incisor lost long ago.
 4 Moderate maxillary hyperostosis.
 5 Maxillary hyperostosis, pm2 to M3.
 6 Left upper median incisor lost long ago.
 7 Very pronounced maxillary, and slight mandibular, hyperostoses.

SIBERIA: ULCHI—B

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabelle ad maximum)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Weight, wear	Men-ton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
8263	Moscow Mus.	Mouth of Amur River	Elderly		17.8	14.6	14.0	82.02	86.42		15.47				8.5
8266	do.	do.	do.		17.1	14.2	13.5	83.04	86.26		14.33				7.9
8267	do.	do.	Mid-aged		17.8	14.8	13.8	83.15	84.66		15.47				8.5
8275	do.	do.	40		17.4	15.0	13.8	86.21	85.19		15.40				8.6
8275	do.	do.	30		18.2	15.6	12.8	85.71	75.74		15.53				7.6
Specimens.					(5)	(5)	(5)	(5)	(5)		(5)			(2)	(5)
Totals.					88.3	74.2	67.9	84.63	82.67		76.8			27.7	41.10
Averages					17.66	14.84	13.58	84.03	82.67		15.36			13.85	8.22
Minima					17.1	14.2	12.8	82.02	75.74		14.93			13.7	7.6
Maxima					18.2	15.6	14.0	86.21	86.42		15.53			14.0	8.6

FEMALES

8279	Moscow Mus.	Mouth of Amur River	24		16.7	14.2	12.5	85.03	80.91		14.47				7.2
8282	do.	do.	50		16.4	14.2	12.4	86.59	81.05		14.33				6.9

MALES

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—Upper Index
S263	14.2	---	49.88	11.0	9.3	10.4	62.5	51.0	3.5	3.55	4.1	4.2	82.97	84.62	5.35	2.65	49.53	6.0	7.2	83.53
S266	14.3	---	55.21	10.7	9.2	10.0	63.0	49.5	3.6	3.65	3.9	3.9	92.41	92.91	5.3	2.75	61.89	7.2	7.1	78.87
S267	14.3	67.90	59.14	11.0	9.7	11.0	67.0	55.0	3.5	3.45	3.9	3.8	89.74	90.79	5.85	3.0	61.28	7.0	7.0	81.53
S272	15.3	89.54	56.21	10.9	9.5	10.4	63.0	54.5	3.4	3.5	4.15	4.15	81.93	84.34	5.65	2.45	43.93	5.7	6.8	73.53
S273	15.0	---	60.67	9.9	8.8	10.3	70.5	51.5	3.6	3.6	4.0	4.0	---	90.0	5.7	2.5	43.86	5.0	6.8	73.53
Specimens	(6)	(2)	(6)	(5)	(5)	(5)	(5)	(5)	(4)	(5)	(4)	(5)	(4)	(5)	(5)	(5)	(5)	(4)	(4)	(4)
Totals	73.10	---	---	53.5	46.5	52.1	326.0	261.5	14.05	17.70	16.10	20.05	87.27	88.28	5.57	13.35	47.94	22.3	28.10	79.36
Averages	14.62	---	---	10.7	9.3	10.42	65.20	52.30	3.51	3.64	4.03	4.01	87.97	88.98	5.37	2.67	47.94	5.88	7.03	76.63
Minima	14.2	---	---	9.9	8.8	10.0	62.5	49.5	3.4	3.45	3.9	3.8	81.93	84.34	5.3	2.45	43.56	3.0	6.8	76.63
Maxima	15.3	---	---	11.0	9.7	11.0	70.5	55.0	3.65	3.6	4.15	4.2	92.41	92.51	5.85	3.0	61.89	6.0	7.2	83.53

FEMALES

S279	13.6	---	62.94	10.4	9.2	9.8	65.0	53.0	3.4	3.5	4.0	3.9	85.0	89.74	4.9	2.65	64.08	5.5	6.5	84.02
S282	13.7	---	60.56	9.8	8.6	9.4	65.5	49.0	3.35	3.3	4.05	3.95	82.72	83.54	4.95	2.5	60.51	5.5	6.5	84.02

SIBERIA: GILIAK—LB (SAKHALIN)

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxill. (glabella ad maxillam)	Diam. lateral maxill.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Irdlicka's method)	Teeth wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
5106-2	Leninrad Mus.	Sakhalin Island			18.2	14.4	13.8	79.12	84.66		15.47				7.4
840	do.	do.			18.4	14.6	14.0	79.95	84.85		15.67				7.6
5106-4	do.	do.			18.4	15.0	14.2	81.52	85.03		15.87			13.4	8.2
843	do.	do.			18.2	15.0	13.6	82.49	81.89		15.60				8.2
842	do.	do.			18.1	15.0	13.0	82.87	78.55		15.37				8.2
850	do.	do.			17.9	15.3	14.0	85.47	84.94		15.73				8.2
5106-5	do.	do.			18.0	15.6	13.4	86.67	79.76		15.67			13.2	8.3
852	do.	do.			17.5	15.2	13.0	86.85	79.51		15.23				8.3
3926-14	do.	do.			17.1	15.2	12.4	88.89	76.78		14.90				7.4
Specimens					(9)	(9)	(9)	(9)	(9)		(9)			(2)	(7)
Totals					161.8	135.3	121.4				139.51			26.6	55.3
Averages					17.88	15.03	13.49	83.62	81.72		15.50			13.3	7.90
Minimum					17.1	14.4	12.4	79.12	76.78		14.90			13.2	7.4
Maximum					18.4	15.6	14.2	88.89	85.03		15.87			13.4	8.3

SIBERIA: GILIAK—LB (SAKHALIN)—Continued
MALES

Catalog No.	Diam. Bizygomatic maxm. (c)	Facial Index, total $\left(\frac{c}{a} \times 100\right)$	Facial Index, upper $\left(\frac{c}{b} \times 100\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxm.	Upper Alveolar Arch— Breadth maxm.	Upper Alveolar Arch— Index	
5106-2	13.8	---	53.62	10.4	9.4	10.3	68.0	54.5	3.55	3.45	4.0	4.0	88.75	86.25	5.5	2.55	46.96	5.6	6.9	81.16	
840	14.2	---	53.52	10.8	9.8	11.0	71.0	61.0	3.15	3.25	3.9	3.9	80.77	83.53	5.05	2.25	44.55	5.8	7.2	80.56	
5106-4	15.1	---	54.30	10.5	9.3	10.6	67.5	56.0	3.8	3.8	4.1	4.1	92.68	92.68	5.7	2.8	49.12	6.0	7.6	78.95	
843 2	14.4	---	56.94	10.9	9.6	10.8	67.0	54.0	3.45	3.5	4.0	4.0	84.15	87.50	5.6	2.7	48.21	5.4	6.7	80.60	
842	14.2	---	47.75	10.9	9.6	10.5	64.5	56.0	3.4	3.45	4.0	4.0	85.0	86.25	5.3	2.6	49.06	5.8	6.9	84.06	
850	10.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5106-5	14.6	90.41	56.85	10.9	9.5	10.5	64.5	51.0	3.55	3.6	3.8	3.8	93.42	94.74	5.8	2.75	47.41	5.8	6.9	84.06	
852	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3920-1	14.0	---	52.86	11.0	9.6	9.8	60.5	45.0	3.35	3.2	3.9	3.9	85.90	82.05	5.35	2.7	50.47	5.8	6.8	85.29	
Specimens	(8)	(2)	(7)	(7)	(7)	(8)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)
Totals	111.0	---	75.40	66.80	83.50	433.0	377.5	24.25	24.25	27.70	27.70	27.70	87.29	87.55	38.3	18.35	40.20	49.0	49.0	---	---
Averages	13.88	---	55.13	10.77	9.54	10.44	66.14	53.93	3.46	3.45	3.97	3.96	87.29	87.55	5.47	2.62	47.91	5.74	7.0	82.07	
Minima	10.7	---	47.75	10.4	9.3	9.8	60.5	45.0	3.2	3.2	3.8	3.8	80.77	82.05	5.05	2.25	44.55	5.4	6.7	78.95	
Maxima	15.1	90.41	56.94	11.0	9.8	11.0	71.0	61.0	3.8	3.8	4.1	4.1	93.42	94.74	5.8	2.8	50.47	6.0	7.6	85.29	

FEMALES

5105-8	13.3	9.9	8.6	9.6	65.0	51.0	3.3	3.7	88.19	5.25	2.6	49.52	5.0	6.8	75.53
845	---	66.39	9.7	8.8	9.9	69.0	3.5	3.55	88.91	5.2	2.4	46.15	15.1	6.1	83.61
844	13.0	9.8	8.8	9.4	65.5	54.0	3.55	3.6	91.03	5.0	2.4	48.0	5.2	6.3	82.54
5105-9	13.6	9.6	8.8	10.1	76.0	51.5	3.35	3.8	85.53	4.85	2.5	51.55	4.6	6.5	70.77
5105-7	13.4	10.9	9.6	10.2	63.5	52.5	3.45	3.7	83.24	5.55	2.8	60.45	6.0	7.2	83.33
849	---	58.21	9.8	9.8	63.0	51.0	3.3	3.8	86.84	4.95	2.65	53.54	---	---	---
841	13.8	10.6	9.3	9.8	63.0	51.0	3.3	3.35	88.16	5.5	2.4	43.64	---	---	---
5105-6	13.0	11.1	9.2	10.4	66.5	58.0	3.0	3.0	97.50	4.4	2.2	60.0	5.4	6.5	83.08
838	---	49.26	10.1	10.4	63.5	48.5	3.35	3.4	78.95	5.05	2.25	44.55	---	---	---
836	13.8	10.3	8.8	9.7	63.5	48.5	3.25	3.9	86.90	5.0	2.5	50.0	---	---	---
839	12.7	10.4	9.0	9.0	63.0	48.0	3.25	3.2	86.67	5.0	2.5	50.0	---	---	---
851	---	57.48	10.8	10.1	64.0	41.0	3.5	3.75	88.89	5.2	2.5	48.08	---	---	---
5105-3	13.8	10.8	9.1	10.1	64.0	41.0	3.5	3.9	89.74	5.2	2.5	48.08	---	---	---
848	---	53.62	10.8	10.1	64.0	41.0	3.5	3.9	89.74	5.2	2.5	48.08	---	---	---
Totals	(10)	(2)	(9)	(10)	(12)	(9)	(11)	(10)	(11)	(11)	(11)	(11)	(9)	(9)	(9)
Averages	13.40	103.1	9.10	118.4	596.0	467.5	37.45	34.2	37.75	55.95	27.2	47.70	58.4	58.4	81.68
Minimum	12.7	66.39	9.6	9.8	63.0	41.0	3.0	3.0	83.24	4.4	2.2	43.64	4.6	6.1	70.77
Maximum	13.8	91.79	11.1	10.4	76.0	60.0	3.9	3.9	97.50	5.55	2.8	60.45	6.4	7.2	88.89

1 Like an Athapascan; somewhat unusual for a Gilliak, but +.

2 Upper median incisors lost long ago.

3 Near.

4 Resembles those of Yukagirskaja, Sopka, Samoyeds, etc.; base depressed (common, more or less).

5 Upper incisors lost long ago.

6 Aleutlike.

7 Possibly not quite normal; base impressed.

8 Allowance made for wear of teeth.

SIBERIA: GILIAK-D (AMUR)

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabella ad maximum)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
46153	Leningrad Mus.	Northern Okhotsk Sea.	Adult	.....do.....	18.8	13.2	13.7	70.21	85.63	.....	15.23	.....	.....	.....	7.6
50331	.....do.....	Lower Amur	.....do.....	.....do.....	18.8	14.0	13.6	74.47	82.93	.....	15.47	.....	.....	.....	7.6

FEMALES

50101	Leningrad Mus.	Lower Amur	Adultdo.....	18.4	13.5	13.4	78.57	84.01	15.10	6.9
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MALES

Catalog No.	Diam. Bizygomatic maxm. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxm.	Nasal Index	Upper Alveolar Arch—Length maxm.	Upper Alveolar Arch—Breadth maxm.	Upper Alveolar Arch—Index
46153	14.0	.....	54.29	11.3	9.9	11.2	71.0	57.5	3.4	3.55	4.2	4.2	80.85	84.52	5.3	2.5	47.17	6.0	6.7	89.55
50331	13.5	.....	56.50	10.4	9.1	10.6	70.0	48.0	3.35	3.4	3.9	3.9	85.60	87.18	5.6	2.75	49.11	5.7	6.9	82.61

FEMALES

50101	13.1	52.67	10.5	9.2	10.0	61.0	49.5	3.25	3.35	4.0	3.8	81.25	83.16	4.75	2.9	61.0	5.6	6.3	83.89
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¹ Near.

SIBERIA: YAKUT

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabela ad maximum)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Morditchka's method)	Teeth wear	Men-tion-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
59894	Leningrad Mus.	Yakutia	Adult		19.6	14.7	14.2	75.0	82.8		16.17				8.4
59897	do.	do.	do.		18.8	14.5	13.8	77.1	82.9		13.70				8.1
59895	do.	do.	do.		17.6	14.6	13.4	81.6	82.9		13.30			13.1	8.0
36702	Moscow Mus.	do.	do.		18.3	13.0	14.0	82.0	84.1		13.77				
36708	do.	do.	do.		19.0	13.6	13.4	82.1	77.5		16.0				8.1
10773	Leningrad Mus.	do.	do.		18.2	13.1	12.4	83.0	74.5		15.23			12.5	7.9
36701	Moscow Mus.	do.	do.		18.6	13.5	13.4	83.3	78.5		15.83			13.0	8.0
Specimens					(7)	(7)	(7)	(7)	(7)		(7)			(3)	(6)
Totals					130.4	105.0	91.6	89.5	89.4		110.0			38.6	48.5
Averages					18.63	15.0	13.51	87.5	87.4		15.71			12.57	8.08
Minima					17.9	14.5	12.4	75.0	74.5		15.23			12.5	7.9
Maxima					19.6	15.6	14.2	83.3	84.1		16.17			13.1	8.4

Catalog No.	Diam. Bizygomatic maxm. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxm.	Nasal Index	Upper Alveolar Arch—Length maxm.	Upper Alveolar Arch—Breadth maxm.	Upper Alveolar Arch—	
52824	14.8	---	56.8	10.5	9.2	10.8	68.5	53.0	3.45	3.5	4.1	4.0	84.2	87.5	5.9	2.75	46.6	9.9	7.0	84.3	
52827	13.9	---	58.3	10.2	9.2	10.6	69.5	60.0	3.2	3.35	3.9	3.85	82.1	87.0	5.55	2.9	52.6	5.4	6.5	83.1	
52825	14.3	---	55.9	11.0	9.6	10.2	62.5	54.5	3.3	3.25	3.75	3.75	88.0	86.7	5.25	2.7	51.4	6.2	6.9	89.9	
36702	13.8	---	---	---	8.4	10.0	---	---	3.2	3.15	3.85	3.85	83.1	81.8	5.8	2.3	39.7	---	---	---	
36705	15.6	---	51.9	10.3	9.1	10.8	71.0	52.0	3.7	3.7	4.1	4.1	90.2	90.2	6.0	3.15	52.5	5.9	7.4	79.7	
10773	14.2	---	55.6	9.4	8.2	9.2	63.5	52.0	3.5	3.4	3.8	3.9	92.1	87.2	5.6	2.5	44.6	5.3	6.8	77.9	
36701	15.1	---	53.0	10.6	9.3	11.0	70.5	51.0	3.6	3.7	4.3	4.3	83.7	86.1	5.8	2.95	50.9	5.7	6.8	83.8	
Specimens	(7)	(3)	(6)	(6)	(7)	(7)	(6)	(6)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(6)	(6)	(6)	(6)
Totals	101.7	---	62.0	72.6	63.0	72.6	405.5	322.5	33.05	24.05	27.8	27.75	80.7	80.7	39.9	10.25	31.4	31.4	41.4	31.4	---
Averages	14.53	---	55.2	10.33	9.0	10.37	67.6	53.8	3.42	3.44	3.97	3.96	86.2	86.2	5.70	2.75	48.2	3.73	6.90	83.1	
Minima	13.8	---	51.9	9.4	8.2	9.2	62.5	51.0	3.2	3.15	3.75	3.75	82.1	81.8	5.25	2.3	39.7	3.3	6.5	77.9	
Maxima	15.6	---	58.3	11.0	9.6	11.0	71.0	60.0	3.7	3.7	4.3	4.3	92.1	90.2	6.0	3.15	52.5	6.2	7.4	89.9	

SIBERIA: YUKAGIR

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium. (glabella ad maxium)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Irdhick's method)	Wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
42556	Leningrad Mus.	Yukagirskaja Sopka	.....	.....	19.2	14.8	13.2	77.08	77.65	.....	15.73	.....	.....	13.3	8.0
8407	Moscow Mus.	Korkodon River	.....	.....	18.2	14.2	13.0	78.02	80.25	.....	15.13	.....	.....	12.5	7.9
42555	Leningrad Mus.	Yukagirskaja Sopka	.....	.....	18.0	14.2	12.4	78.81	79.63	.....	15.70	.....	.....	12.9	7.9
42558	do.	do.	.....	.....	18.4	14.6	13.6	78.89	77.02	.....	14.87	.....	.....	.....	.....
42574	do.	do.	.....	.....	18.4	14.6	13.4	79.95	82.42	.....	15.53	.....	.....	.....	.....
42593	do.	do.	.....	.....	18.6	14.8	13.4	79.67	80.21	.....	15.60	.....	.....	.....	7.8
42592	do.	do.	.....	.....	18.2	13.0	12.0	82.42	75.90	.....	15.27	.....	.....	.....	7.6
Specimens					(7)	(7)	(7)	(7)	(7)		(7)			(3)	(5)
Totals					129.5	102.4	91.6	79.1	79.0		107.83			38.7	39.20
Averages					18.50	14.63	13.09	77.08	75.90		15.40			12.90	7.84
Minima					18.0	14.2	12.4	77.08	75.90		14.87			12.5	7.6
Maxima					19.2	15.0	13.6	82.42	82.42		15.73			13.3	8.0

FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium. (glabella ad maxium)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Irdhick's method)	Wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
42598	Leningrad Mus.	Yukagirskaja Sopka	.....	.....	18.6	13.8	12.3	74.19	75.93	.....	14.90	.....	.....	.....	7.4
42597	do.	do.	.....	.....	18.0	13.6	12.8	75.66	81.01	.....	14.80	.....	.....	.....	6.8
42590	do.	do.	.....	.....	18.8	14.3	12.4	76.06	71.92	.....	15.17	.....	.....	.....	7.3
42569	do.	do.	.....	.....	18.2	14.2	12.8	78.02	79.01	.....	15.07	.....	.....	.....	7.9
42572	do.	do.	.....	.....	18.2	14.2	(Low)	78.02	.....	.....	.....	.....	.....	.....	7.4
42557	do.	do.	.....	.....	18.5	14.2	(Med.)	79.78	.....	.....	.....	.....	.....	12.0	7.5
42573	do.	do.	.....	.....	17.8	14.4	(Med.)	79.78	.....	.....	.....	.....	.....	.....	7.5
42564	do.	do.	.....	.....	18.0	14.4	13.1	80.23	80.86	.....	15.17	.....	.....	.....	7.3
42569	do.	do.	.....	.....	17.2	13.8	11.8	80.23	76.13	.....	14.97	.....	.....	.....	6.7
42551	do.	do.	.....	.....	17.9	14.4	12.2	80.45	73.54	.....	14.83	.....	.....	.....	7.5
42566?	do.	do.	.....	.....	17.6	14.4	13.0	81.82	81.25	.....	15.90	.....	.....	.....	6.3
42571	do.	do.	.....	.....	16.8	13.8	12.2	82.14	74.74	.....	14.27	.....	.....	.....	7.3
42565	do.	do.	.....	.....	17.4	14.3	12.0	82.18	75.71	.....	14.57	.....	.....	.....	7.3
Specimens					(13)	(13)	(10)	(13)	(10)		(10)			(2)	(12)
Totals					232.8	183.8	124.60	78.95	73.0		148.05			23.80	87.10
Averages					17.91	14.14	12.46	78.95	73.0		14.81			11.90	7.26
Minima					16.8	13.6	11.80	74.19	74.92		14.27			11.8	6.3
Maxima					18.8	14.4	13.10	82.18	81.25		15.17			12.0	7.9

MALES

Catalog No.	Diam. Bizygomatic max. (c)	Facial Index, total (a×100)	Facial Index, upper (b×100)	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max. im.	Nasal Index	Upper Alveolar Arch—Length max.	Upper Alveolar Arch—Breadth max.	Upper Alveolar Arch—Upper Index	
42556	15.0	88.67	53.53	10.0	9.0	10.6	71.0	55.5	3.7	3.6	4.1	4.1	90.24	87.80	5.95	3.0	70.42	5.4	7.0	77.14	
8107	13.6	84.46	53.98	8.4	8.4	9.9	69.0	62.0	3.4	3.45	3.9	3.9	87.18	88.46	5.2	2.65	60.94	5.2	6.7	77.61	
42555	14.8	90.85	55.63	10.0	9.0	10.2	68.5	55.5	3.4	3.45	3.9	3.9	87.18	88.46	5.8	2.5	43.10	5.6	6.8	82.35	
42558	14.2	90.85	55.63	10.0	9.0	10.3	68.5	55.5	3.4	3.45	3.9	3.9	87.18	88.46	5.8	2.5	43.10	5.6	6.8	82.35	
42574	14.4	87.46	52.78	9.8	8.9	10.3	71.0	60.5	3.3	3.3	3.9	3.9	84.62	84.62	5.35	2.4	62.34	5.5	7.0	78.67	
42563	14.2	87.46	52.78	10.0	8.8	10.0	67.0	51.5	3.3	3.35	3.8	3.75	86.84	86.84	5.6	2.8	42.86	5.1	6.6	77.57	
42562	14.2	87.46	52.78	10.0	8.8	10.0	67.0	51.5	3.3	3.35	3.8	3.75	86.84	86.84	5.6	2.8	42.86	5.1	6.6	77.57	
Specimens	(6)	(3)	(5)	(6)	(6)	(7)	(6)	(5)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(5)	(5)	(5)	(5)
Totals	86.20	86.20	49.6	53.0	53.0	71.4	346.5	285.0	20.45	20.55	23.60	23.45	33.1	33.1	15.9	26.8	48.0	26.8	34.1	78.6	
Averages	14.37	88.0	51.0	9.92	8.83	10.20	69.3	57.0	3.41	3.44	3.93	3.91	86.7	88.0	5.52	2.65	53.36	5.36	6.82	78.6	
Minima	13.6	84.46	52.78	8.8	8.4	9.0	67.0	51.5	3.3	3.3	3.8	3.75	83.75	84.62	5.2	2.4	42.86	5.1	6.6	77.14	
Maxima	15.0	90.85	55.63	10.0	9.0	10.6	71.0	62.0	3.7	3.6	4.1	4.1	90.24	89.33	5.95	3.0	52.34	5.0	7.0	82.35	

FEMALES

42568	12.9	57.96	37.96	9.9	8.8	10.0	68.5	53.5	3.1	3.0	3.7	3.7	83.78	81.08	5.35	2.65	49.53	5.2	6.5	80.0	
42567	13.2	51.62	37.96	9.2	8.3	10.1	70.5	57.0	3.45	3.45	3.7	3.8	83.24	83.24	4.95	2.5	50.51	5.3	6.1	78.69	
42560	14.0	62.14	40.0	9.3	8.4	10.4	71.5	55.0	3.55	3.55	3.9	4.0	91.02	88.75	5.75	2.55	47.96	5.2	6.3	77.91	
42559	13.9	66.83	38	9.8	8.8	10.0	70.5	57.0	3.55	3.55	3.9	3.9	91.02	88.75	5.75	2.55	47.96	5.2	6.2	87.30	
42572	13.2	66.06	37.96	9.7	8.6	10.0	66.5	54.5	3.6	3.6	3.9	3.7	94.74	97.30	5.45	2.5	46.45	5.4	6.5	83.87	
42557	13.8	86.96	54.56	10.4	9.0	10.4	66.0	53.5	3.25	3.1	3.7	3.25	87.84	95.38	5.2	2.5	48.08	5.4	6.4	84.33	
42573	13.6	53.68	37.96	9.9	8.8	9.6	66.0	53.5	3.25	3.1	3.7	3.25	87.84	95.38	5.2	2.5	48.08	5.4	6.4	84.33	
42564	12.6	63.17	37.96	9.0	8.2	9.3	70.5	57.0	3.15	3.15	3.65	3.6	86.30	87.50	4.95	2.55	61.52	3.0	6.7	74.63	
42569	13.7	66.20	37.96	9.3	8.4	9.8	69.5	56.0	3.3	3.35	3.8	3.7	86.84	90.54	5.8	2.9	60.0	3.2	7.3	71.33	
42551	13.4	66.87	37.96	8.5	7.5	8.9	67.0	55.0	3.4	3.5	3.5	3.5	97.14	97.14	4.7	2.5	46.30	4.8	6.4	73.0	
42566	13.4	66.87	37.96	8.5	7.5	8.9	67.0	55.0	3.4	3.5	3.5	3.5	97.14	97.14	4.7	2.5	46.30	4.8	6.4	73.0	
42571	13.2	89.39	35.30	9.7	8.6	10.0	66.5	54.5	3.6	3.6	4.0	3.9	50.0	52.31	5.15	2.45	62.13	4.7	6.3	74.60	
42565	13.2	89.39	35.30	9.7	8.6	10.0	66.5	54.5	3.6	3.6	4.0	3.9	50.0	52.31	5.15	2.45	62.13	4.7	6.3	74.60	
Specimens	(12)	(2)	(12)	(10)	(8)	(11)	(10)	(10)	(11)	(10)	(11)	(10)	(11)	(10)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
Totals	159.9	83.6	49.6	93.6	83.8	107.1	697.5	555.0	37.15	37.03	41.15	36.80	31.10	63.3	31.10	61.6	78.10	61.6	78.10	80.0	
Averages	13.33	68.16	41.25	9.36	8.68	9.74	69.75	55.5	3.38	3.36	3.74	3.68	90.28	91.90	5.28	2.59	49.13	5.13	6.51	78.87	
Minima	12.4	86.96	37.96	8.5	7.5	8.9	66.0	53.5	3.1	3.0	3.5	3.25	83.78	81.08	4.7	2.45	44.52	4.7	6.1	71.33	
Maxima	14.0	89.39	37.96	9.9	8.8	10.4	76.5	57.5	3.6	3.6	4.0	4.0	97.14	97.30	5.8	2.9	64.37	5.5	7.3	87.30	

3 Vault sphenoidal.

1 Near.

SIBERIA: OROCHI
MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabella ad maxim.)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth wear	Men-tion-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
8617	Moscow Mus.		Mid-aged		17.8	15.0	13.1	84.27	79.88		15.30				7.4

FEMALES

8616	Moscow Mus.	(?)	Young adult		17.6	14.3	12.4	81.26	77.74		14.77				6.6
7439 ²	do.		40		17.6	14.6	12.3	82.96	76.40		14.83				6.8
889	Volenko-Med. Acad. Leningrad	Imperatorski Bay			16.6	13.2	13.0	79.62	87.26		14.27			11.6	6.9

MALES

Catalog No.	Diam. Bitygomatic maxm. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxm.	Nasal Index	Upper Alveolar Arch—Length maxm.	Upper Alveolar Arch—Breadth maxm.	Upper Alveolar Arch—
8617 ¹	14.8	.....	50.0	10.1	9.0	9.8	69.0	55.0	3.4	3.4	4.05	3.9	83.95	87.18	5.2	2.45	47.1	.....	.....	Upper Alveolar Arch—

FEMALES

8016	13.1	.....	.....	10.1	9.6	10.1	69.0	49.0	.....	.....	.....	.....	.....	.....	4.9	2.5	51.09	5.2	6.4	81.26
7459 ²	.....	.....	.....	10.2	9.3	10.2	64.5	56.0	3.2	3.3	3.8	3.7	84.21	89.19	4.8	2.85	48.96	5.5	6.6	83.53
889	12.9	.....	53.40	10.0	9.0	9.4	64.5	56.0	3.2	3.3	3.8	3.7	84.21	89.19	4.8	2.85	48.96	5.5	6.6	83.53

¹ Samoed type.

² Marked intranasal shelves.

SIBERIA: KORIAK, LAMUT, AND KAMCHADAL

KORIAK

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (gabella ad maximum)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
4653 ♂	Moscow Mus.	Kuel River			18.1	14.2	13.8	78.46	85.46		15.37				6.8
4654 ♀	do	do	35		17.2	13.5	12.5	78.49	81.43		14.40				6.8

LAMUT

4650 (♀) ³	Moscow Mus.	Yakutskaja Obl.	50		17.8	13.7	12.4	76.97	78.73		14.63					7.2
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KAMCHADAL

893 (♀)	Leningrad Mus.	Kamehatka			17.4	13.3	13.6	76.44	88.60		14.77					7.0
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KORJAK

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{c}{a \times 100}\right)$	Facial Index, upper $\left(\frac{c}{b \times 100}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max. im.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—
4653 1	12.8	—	52.15	9.6	8.6	9.6	69.0	53.5	3.4	3.4	3.8	3.8	89.47	89.47	5.0	2.35	47.0	—	—	—
4654 (♀)	12.8	—	53.15	9.6	8.3	9.2	67.5	49.5	3.5	3.5	3.7	3.7	84.69	84.69	4.8	2.6	64.17	—	—	—

LAMUT

4650 (♂) ²	13.1	—	64.96	9.7	8.5	9.6	67.5	50.5	3.3	3.4	3.9	3.6	84.62	86.84	5.1	2.35	46.08	—	—	—
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KAMCHADAL

893 (♀)	13.5	—	61.85	9.6	8.7	9.8	70.5	59.0	3.25	—	3.8	—	85.65	—	4.9	2.4	48.98	—	—	—
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¹ Face ♀-like, but probably a boy.

² Near.

³ External maxillary hyperostoses.

SIBERIA: CHUKCHI
(Chukchi Peninsula)

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maximi. (glabella, ad maximi.)	Diam. lateral maximi.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
6539	Moscow Mus.	Chukchi Peninsula	35		18.6	13.6	14.1	73.12	87.68	103.68	15.43				7.6
6597	do	do	50		19.0	14.0	13.6	73.68	82.42	97.14	15.33				8.0
6521	do	do	28		18.9	14.0	14.0	74.07	85.11	100.00	15.63				8.5
6516	do	do	25		19.0	14.1	13.9	74.91	83.99	98.58	15.67				7.6
6527	do	do	45		19.6	13.6	13.8	74.49	80.70	98.65	16.00				8.3
6511	do	do	55		18.4	13.8	13.6	72.0	84.47	98.55	15.97				8.4
6518	do	do	60		19.2	14.4	13.8	72.0	82.44	93.83	15.80				7.5
6533	do	do	40		18.4	13.8	13.9	72.0	86.34	100.72	13.72				8.5
6546	do	do	60		18.0	13.5	14.2	72.0	80.19	105.19	13.33				8.2
6552	do	do	30		18.2	13.8	13.4	72.33	83.70	97.10	15.13				7.7
6514	do	do	35		18.4	14.0	13.5	76.09	83.35	96.45	15.30				7.6
6506	do	do	60		18.1	13.8	13.0	76.24	81.60	94.30	14.97				7.7
6553	do	do	40		18.7	14.3	13.6	76.47	82.43	95.10	15.53				8.6
6517	do	do	35		18.0	13.8	13.9	76.67	87.42	100.72	15.23				7.7
6524	do	do	65		18.6	14.3	14.4	76.88	87.54	100.70	15.77				7.3
6517	do	do	65		19.1	15.1	12.8	77.44	73.99	84.77	13.80				8.0
6524	do	do	55		19.5	15.2	14.1	78.35	81.50	92.76	16.23				8.6
3245-1	Leninograd Mus.	do	35		19.1	14.8	13.0	79.57	77.84	87.84	15.47				7.7
8115	Moscow Mus.	do	30		18.2	14.5	13.0	79.67	79.27	87.84	15.27				7.7
6549	do	do	35		18.0	14.8	13.0	82.29	87.87	97.80	15.17				7.7
6523	do	do	23		17.3	14.3	13.9	82.69	87.87	97.80	15.73				7.7
6509	do	do	22		18.4	15.4	13.4	83.70	79.89	87.01	15.73				8.3
6506	do	do	50		18.4	15.4	13.4	83.70	79.89	87.01	15.73				8.3
Speelmen			927		(22)	(22)	(21)	(22)	(21)	(21)	(21)			(1)	(21)
Totals			927		408.50	313.19	286.90				325.53				107.1
Averages			42.1		18.57	14.27	13.66	76.7	83.2	95.62	15.50			13.5	7.96
Minima			22		17.3	13.5	12.8	73.12	73.99	84.77	14.97				7.3
Maxima			65		19.6	15.4	14.4	83.70	90.16	105.19	16.23				8.5

Catalog No.	Diam. Bizygomatic		Facial Index, total	Facial Index, upper $\left(\frac{c}{b \times 100}\right)$	Basion-Alveolar Pl.	Basion Subnasal Pl.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index
	(1)	(2)																			
6589	14.3	(22)	---	58.15	10.6	9.6	10.8	70.5	57.0	3.7	3.8	4.1	4.1	90.24	92.68	5.45	2.2	40.37	5.8	6.7	86.37
6597	13.9	(22)	---	57.66	10.4	9.1	10.2	66.0	53.0	3.75	3.75	4.0	4.0	93.75	93.75	5.5	2.5	45.45	5.5	7.0	78.57
6521	14.4	(22)	---	59.03	10.2	9.4	11.1	72.5	66.0	4.1	4.0	4.15	4.15	98.80	96.89	5.7	2.4	42.11	5.4	6.4	84.83
6516	14.9	(22)	---	57.80	11.0	9.8	10.6	66.5	54.5	3.6	3.6	3.9	3.8	92.31	94.74	5.25	2.15	40.95	5.7	6.7	85.07
6527	14.9	(22)	---	57.70	10.4	9.4	10.4	66.5	60.5	3.7	3.75	4.2	4.05	89.16	92.59	5.7	2.6	45.61	---	---	---
6511	14.0	(22)	---	60.00	11.2	9.8	10.6	63.5	53.5	3.8	3.75	4.2	4.1	90.48	91.46	5.6	2.75	49.11	6.1	7.0	87.14
6518	14.8	(22)	---	60.68	10.9	10.0	11.2	72.5	57.5	3.8	3.7	4.5	4.3	84.44	86.05	5.7	2.85	50.00	---	---	---
6535	13.8	(22)	---	61.69	10.8	9.9	10.6	65.5	64.0	3.65	3.55	4.1	4.1	93.02	96.59	5.75	2.7	46.96	5.7	6.0	95.00
6546	14.2	(22)	---	58.57	11.0	10.0	10.5	66.5	61.5	3.75	3.85	4.0	4.0	93.75	96.85	5.5	2.45	44.56	5.7	6.8	86.76
6552	14.2	(22)	---	54.93	10.7	9.6	10.5	67.0	57.0	3.6	3.7	4.1	3.9	87.80	91.87	5.4	2.3	43.59	5.6	6.8	82.55
6514	14.6	(22)	---	52.74	10.8	9.8	10.4	67.5	54.5	3.85	3.8	4.2	4.4	91.67	95.86	5.1	2.0	39.22	6.3	8.8	89.89
6500	14.2	(22)	---	53.62	10.0	8.8	10.0	68.0	53.5	3.85	3.85	4.15	4.15	92.77	92.77	5.3	2.55	48.11	5.6	6.3	87.52
6551	14.3	(22)	---	59.44	10.6	9.4	10.4	65.0	56.0	3.8	4.0	4.45	4.4	85.39	90.91	5.9	2.5	42.57	6.1	7.2	84.78
6517	13.8	(22)	---	52.80	10.2	9.2	10.1	68.5	56.5	3.7	3.65	3.9	3.9	94.87	93.59	5.1	2.4	47.06	5.4	6.6	81.82
6524	14.5	(22)	---	---	11.0	9.8	11.0	---	---	3.8	3.85	4.1	4.1	92.68	93.90	5.55	2.2	39.61	---	---	---
6549	14.9	(22)	---	53.69	10.3	9.0	10.3	66.5	54.5	3.65	3.75	4.25	4.35	85.88	86.91	5.35	2.7	50.67	6.1	7.0	87.14
5245-1	15.1	(22)	---	56.59	11.5	10.4	11.2	66.0	58.0	3.75	3.7	4.1	4.05	91.67	91.86	6.35	2.1	35.00	5.9	6.7	88.06
8115	14.3	(22)	---	52.85	10.1	9.4	10.4	70.0	63.5	3.3	3.2	3.8	3.7	86.84	86.49	5.35	2.8	50.45	5.6	7.1	77.46
6540	14.0	(22)	---	55.00	10.6	10.6	10.4	64.5	56.5	3.6	3.6	3.9	3.9	92.31	92.31	5.3	2.4	43.64	5.6	7.1	78.87
6523	14.3	(22)	---	53.85	10.1	9.0	10.2	68.5	57.0	3.6	3.6	4.1	4.0	87.80	87.80	5.35	2.3	43.00	5.7	7.2	79.17
6509	13.6	(22)	---	56.62	10.2	9.3	10.4	69.5	62.0	3.4	3.4	4.0	3.85	85.00	88.31	5.1	2.1	41.18	5.3	6.7	79.10
6506	14.1	(22)	---	58.87	10.5	10.8	9.8	61.5	42.5	3.6	3.7	3.95	3.9	81.14	84.87	5.75	2.8	43.70	5.9	7.2	81.94
Specimens	(1)	(21)	(21)	(21)	(21)	(22)	(22)	(21)	(21)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(19)	(19)	(19)
Totals	313.5	---	292.10	1,412.5	208.70	231.40	231.40	1,196.0	1,196.0	81.35	81.55	90.10	89.30	---	---	121.10	53.75	108.40	129.20	108.40	129.20
Averages	14.25	---	10.58	67.3	10.32	9.49	10.32	67.3	58.0	3.70	3.71	4.10	4.06	90.28	91.52	5.51	2.44	44.38	5.71	6.80	83.90
Minima	13.5	---	9.7	61.5	10.0	8.7	9.8	61.5	42.5	3.3	3.2	3.8	3.7	84.44	86.05	5.1	2.0	35.00	5.3	6.3	77.46
Maxima	13.1	---	11.5	61.69	11.5	10.4	11.2	72.5	66.0	4.1	4.0	4.5	4.4	98.80	96.89	6.0	2.85	60.47	6.1	7.2	95.00

1 Somewhat ♀-like, but probably ♂.
 2 Asym., bet. 1.
 3 U-shaped palate.
 4 Intranasal shelves.
 5 Near.
 6 Left upper median incisor lost long ago.
 7 Somewhat ♀-like, but probably ♂.
 8 Scurvy.
 9 Atlas attached.
 10 Intranasal shelf.
 11 Somewhat ♀-like, but probably ♂.
 12 Atlas fused on left with occipital.

SIBERIA: CHUKCHI—Continued
(Chukchi Peninsula)

FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabela ad maxim.)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdlička's method)	Teeth wear	Menton-Nasion Height (m)	Alveol. Pt.-Nasion Height (b)
1242 1 (red)	Leningrad Mus.	Chukchi Peninsula	60		18.2	13.3	13.3	73.08	84.44	100.00	14.33				7.8
425-32	do	do	25		18.0	13.2	13.3	73.33	85.25	100.76	14.88				7.6
6507 2	Moscow Mus.	do	35		18.2	13.4	13.6	73.03	86.08	101.49	15.07				7.6
6498 3	do	do	45		17.8	13.2	13.3	74.16	85.81	100.76	14.77				7.5
6548	do	do	35		18.0	13.4	13.6	74.44	86.62	101.49	15.00				7.0
425-13 4	Leningrad Mus.	do	60		18.2	13.6	13.2	74.75	83.02	97.06	15.00				7.0
4222 3	Moscow Mus.	do	20		17.5	13.4	12.8	74.87	83.66	97.71	14.47				7.6
425-26	Leningrad Mus.	do	20		18.4	13.8	13.7	75.0	85.09	99.81	15.30				7.1
4610 1	do	do	50		18.5	13.9	13.0	75.14	80.95	93.53	15.13				(6.9)
6337	Moscow Mus.	do	45		18.1	13.6	12.9	75.14	81.39	94.85	14.87				10 10.9
6320 5	do	do	50		18.2	13.7	12.8	75.27	80.25	93.43	14.90				7.5
425-16	Leningrad Mus.	do	70		18.0	13.6	13.2	75.66	83.54	97.06	14.93				7.4
425-36	do	do	35		17.4	13.2	13.0	75.86	84.97	98.48	14.53				7.2
6332 2	Moscow Mus.	do	23		18.7	14.2	12.9	75.94	78.42	90.85	15.27				7.6
6496	do	do	90		17.6	13.4	13.6	76.11	87.74	101.49	14.87				7.1
425-45	Leningrad Mus.	do	20		17.3	13.2	13.0	76.30	85.85	98.18	14.50				7.2
425-49	do	do	25		17.8	13.6	13.0	76.40	82.80	95.69	14.80				7.8
6525	Moscow Mus.	do	35		17.8	13.6	13.2	76.40	84.05	97.06	14.87				7.4
6508 8	do	do	24		17.4	13.3	13.0	76.41	84.69	97.74	14.57				7.8
6519 8	do	do	28		17.4	13.3	12.8	76.41	83.59	93.94	14.50				7.7
425-38	Leningrad Mus.	do	50		17.0	13.0	12.6	76.41	81.00	96.62	14.90				7.7
6541	Moscow Mus.	do	25		17.4	13.4	13.8	77.47	85.06	97.76	14.63				7.7
6533	do	do	75		17.6	13.6	12.8	77.97	82.03	91.12	14.67				6.9
6545 11	do	do	22		18.1	14.0	13.6	77.35	84.74	97.14	15.23				7.2
6544	do	do	20		17.8	13.8	13.8	77.53	87.34	100.00	13.43				7.4
6513	do	do	25		17.0	13.2	13.1	77.65	86.73	99.24	14.43				7.8
8114 12	do	do	40		18.8	14.6	12.7	77.66	76.66	86.39	13.37				12.8

6536 13	Moscow Mus.	40	18.0	14.0	13.4	77.78	83.75	95.71.	15.13	7.4
425-37	Leningrad Mus.	35	18.1	14.1	12.7	77.90	78.68	90.07	14.37	7.3
6504 3	Moscow Mus.	35	17.2	13.4	13.4	77.91	87.58	100.00	14.67	7.5
6543 3	do	30	17.2	13.4	13.2	77.91	86.27	98.51	14.60	7.5
425-52	Leningrad Mus.	25	17.6	13.8	12.8	78.41	87.53	92.75	14.73	7.4
753-5 14	do	35	17.6	13.8	13.0	78.41	82.80	94.20	14.80	7.4
6534	Moscow Mus.	25	17.8	14.0	13.3	78.65	83.65	95.00	15.03	7.7
198-1 13	Leningrad Mus.	50	17.4	13.8	13.6	79.31	87.18	98.65	14.93	7.7
6510	Moscow Mus.	60	17.5	13.8	13.3	79.43	84.71	95.68	14.90	7.4
1243 (red) 15	Leningrad Mus.	96	18.6	14.8	13.7	79.67	82.04	92.67	15.70	7.7
425-41	do	40	17.4	14.1	13.3	81.03	84.44	94.33	14.93	7.0
4310-2	do	21	17.0	14.1	13.4	82.94	86.17	95.04	14.83	7.5
425-53	do	22	16.6	13.8	13.2	83.13	86.84	95.65	14.53	6.7
425-30	do	24	17.6	14.7	13.6	83.52	84.21	92.52	15.30	7.0
Specimens.		(41)	(41)	(41)	(41)	(41)	(41)	(41)	(41)	(38)
Totals.		1,512	560.9	510.8	510.8	77.07	82.92	96.12	609.82	280.7
Averages.		36.9	17.75	13.68	13.19	77.07	82.92	96.12	11.87	7.39
Minimum.		20	16.6	13.0	12.6	73.08	76.05	86.99	10.9	6.7
Maximum.		75	18.8	14.8	13.8	83.52	87.74	101.76	12.8	7.8

Footnotes at end of table.

SIBERIA: CHUKCHI—Continued
(Chukchi Peninsula)

FEMALES—Continued

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total $\left(\frac{c}{a} \times 100\right)$	Facial Index, upper $\left(\frac{c}{b} \times 100\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth, max- im.	Nasal Index	Upper Alveolar Arch— Length maxim.	Upper Alveolar Arch— Breadth maxim.	Upper Alveolar Arch— Index
1242 1 (red)	13.0		60.00	10.3	9.2	10.6	70.0	56.5	3.8	3.85	4.4	4.4	86.96	87.50	5.5	4.0	46.95	5.4	6.8	79.41
425-32	13.0		58.40	10.3	9.2	10.0	65.5	57.5	3.4	3.45	3.8	3.8	89.47	90.79	5.1	2.6	45.10	5.4	6.8	79.41
6507 1	14.2		53.52	11.0	9.8	10.8	68.0	54.0	3.5	3.45	4.0	3.95	87.50	87.31	2.85	2.0	44.70	5.4	6.6	81.82
6498 3	12.8		56.82	10.4	9.0	10.0	66.0	50.5	3.8	3.3	3.9	4.0	86.20	95.00	2.5	2.5	49.50	5.6	6.7	83.58
6548	12.8		54.09	9.9	8.7	10.0	70.0	50.0	3.4	3.3	3.8	3.9	89.47	84.62	2.4	2.4	47.50	5.3	5.9	80.83
425-43 4	(12.2)		54.09	10.5	9.4	10.2	67.5	52.0	3.4	3.4	3.9	3.9	91.03	87.18	2.6	2.6	47.50	5.3	5.9	80.83
6522 3	13.2		56.50	9.7	8.8	9.6	68.5	58.5	3.3	3.3	3.7	3.7	89.19	89.19	4.8	4.2	50.00	5.1	6.0	77.97
425-26	13.2		57.58	10.3	9.3	10.4	68.5	57.5	3.4	3.4	3.4	3.4	91.59	100.00	5.4	2.4	40.74	5.4	6.3	85.71
4610-1	13.6	80.15	52.21	10.1	8.8	9.9	67.5	48.5	3.6	3.6	4.0	4.0	93.0	90.00	5.0	2.6	47.50	5.8	6.7	85.08
6537	14.1		53.19	10.2	9.2	10.0	66.5	50.5	3.6	3.55	4.0	4.0	87.80	88.75	2.6	2.6	52.00	5.6	9.7	93.08
6526 5	12.5		59.20	9.7	8.6	9.5	66.0	57.5	3.6	3.55	3.75	3.65	96.00	97.20	2.2	2.2	44.00	5.6	9.7	93.08
425-46 1	12.7		55.12	9.6	8.4	9.7	69.0	50.0	3.65	3.65	4.0	4.2	91.95	87.20	3.0	2.5	47.00	5.5	6.1	90.10
425-36	13.0		55.98	10.2	9.0	9.9	67.0	54.5	3.8	3.75	4.1	4.0	92.68	89.30	4.75	2.0	64.74	5.5	6.7	80.60
6582 6	13.0		58.46	10.2	8.8	10.0	66.5	50.0	3.65	3.95	4.0	3.9	95.41	90.00	2.25	2.0	49.62	5.4	6.7	80.60
6496	13.3		54.14	9.5	8.6	9.7	69.0	58.5	3.7	3.7	4.0	3.9	95.00	94.87	5.1	1.5	42.10	5.1	6.5	78.46
425-45	12.7		55.91	9.3	8.5	9.5	66.5	49.5	3.5	3.5	3.7	3.75	94.07	93.53	3.1	2.3	47.05	5.2	6.3	82.54
425-49 1	12.9		60.47	10.3	8.9	10.0	63.5	51.0	3.7	3.6	3.9	3.8	94.87	90.00	3.3	2.55	48.11	5.5	6.2	88.71
6525	13.5		54.81	10.6	9.0	9.8	63.0	46.0	3.3	3.2	3.7	3.9	89.19	84.21	5.0	2.35	51.00	5.4	6.9	78.20
6508 7	12.8		60.91	9.9	9.0	9.8	63.0	46.0	3.3	3.2	3.8	3.8	94.87	94.74	3.45	2.35	45.12	5.5	6.5	84.02
6519 8	13.2		58.85	10.0	9.2	10.2	66.0	51.0	3.7	3.65	4.0	4.0	91.26	91.26	3.45	2.35	45.87	5.6	6.9	81.16
425-38	10		64.69	9.9	8.6	9.7	67.5	49.5	3.6	3.6	3.9	3.9	92.31	92.31	4.85	2.35	48.46	5.8	6.9	84.06
6541	13.2		54.69	10.4	9.1	9.4	60.0	54.5	3.9	3.85	4.1	4.1	94.44	96.83	4.9	2.35	45.99	5.5	6.6	89.55
6533	13.5		58.93	10.4	8.9	10.1	64.0	54.5	3.5	3.45	4.1	3.9	86.59	86.69	3.15	2.35	45.63	5.5	6.6	89.55
6545 11	13.2		53.91	10.3	9.2	10.0	67.0	63.5	3.6	3.45	3.9	3.85	88.46	88.46	4.8	2.4	52.03	5.5	6.7	74.63
6544	12.8		54.55	9.5	8.6	10.0	72.0	64.0	3.55	3.6	3.85	3.85	92.21	93.51	5.1	2.45	47.06	5.0	6.0	83.33
6513	13.0		56.92	9.3	8.2	9.4	67.0	52.5	3.8	3.85	3.8	3.7	109.0	104.05	5.4	2.45	47.06	5.0	6.0	83.33
8114 12	13.7	68.43	56.93	10.6	9.1	10.2	65.0	45.0	3.85	3.85	4.2	4.2	86.90	87.67	5.6	2.2	39.29	6.0	6.7	89.55

6536 ¹³	13.6	54.41	10.4	9.2	10.0	65.5	55.5	3.45	3.4	4.2	4.1	82.14	82.93	4.85	2.2	45.96	5.8	86.99	
425-37	13.3	54.89	10.2	9.0	9.8	65.5	53.0	3.8	3.7	3.8	3.9	100.	84.87	5.05	2.45	48.51	5.6	90.32	
6504 ³	13.5	56.59	9.8	8.6	9.7	66.5	54.5	3.55	3.0	4.0	4.0	88.75	90.00	5.1	2.4	47.06	5.4	81.98	
6543 ³	13.7	54.75	10.3	9.1	10.0	66.0	55.0	3.75	3.9	3.9	3.9	96.15	96.15	5.1	2.05	40.20	5.5	88.71	
425-52	13.4	54.75	10.3	9.1	10.0	66.0	55.0	3.75	3.9	3.9	3.9	96.15	96.15	5.1	2.05	40.20	5.5	88.71	
753-5 ¹⁴	13.0	56.92	9.7	8.4	8.5	66.5	50.5	3.55	3.75	4.0	4.0	88.75	83.75	5.2	2.8	44.28	5.1	83.61	
6534	13.6	56.62	10.7	9.5	10.0	63.0	50.0	3.0	3.05	4.0	4.0	90.00	91.25	5.1	2.4	47.06	6.1	82.43	
198-1 ¹³	13.0	59.25	9.9	8.7	10.2	69.5	56.5	3.0	3.0	3.7	3.7	91.89	94.59	5.0	2.2	43.14	5.5	87.30	
6510	12.9	57.96	10.2	9.2	9.8	65.5	60.0	3.4	3.5	3.7	3.9	83.67	85.69	5.15	2.45	49.00	5.5	87.30	
1243 (red) ¹³	13.2	56.35	11.0	9.6	10.5	65.5	52.0	3.7	3.65	3.95	3.9	82.35	82.35	4.95	2.2	42.72	5.9	88.10	
425-41	13.7	57.09	10.6	9.4	10.0	66.0	52.0	3.5	3.5	4.25	4.25	83.35	82.35	4.95	2.45	49.49	5.7	90.18	
4610-2	13.0	57.09	10.6	9.4	10.0	66.0	52.0	3.5	3.5	3.8	3.7	89.47	94.59	5.05	2.35	46.53	5.7	90.18	
425-53	12.8	54.34	9.7	8.8	9.8	71.0	56.5	3.25	3.35	3.7	3.6	87.84	83.06	4.8	2.35	48.91	4.0	80.33	
425-30	13.6	57.47	9.9	8.8	9.8	68.5	50.5	3.65	3.7	4.0	3.9	91.25	94.87	5.15	2.2	42.72	5.2	78.79	
Specimens.	(40)	(39)	(39)	(39)	(41)	(38)	(38)	(37)	(40)	(37)	(40)	(37)	(40)	(40)	(40)	(32)	(32)	(32)	(32)
1. Occipitals.	598.0	395.6	349.1	349.1	406.7	2, 538.0	2, 026.	132.35	142.60	145.10	156.15	156.15	204.05	95	95	174.8	208.2	208.2	208.2
2. Averages.	13.20	56.05	10.20	8.95	9.92	66.79	53.32	3.58	3.57	3.92	3.90	91.21	91.21	5.10	2.38	46.50	5.46	85.96	
3. Minimum.	12.5	50.15	9.3	8.2	9.4	60.0	45.0	3.25	3.2	3.6	3.4	82.14	82.25	4.75	2.05	39.29	4.9	74.5	
4. Maxima.	13.7	54.70	11.0	9.6	10.8	72.0	64.0	3.8	3.85	4.4	4.4	100.00	104.05	5.60	2.60	54.74	6.10	95.0	

1 Vault old syphilitic.

2 Somewhat ♂-like, but probably ♀.

3 Nasal shelves occasional; subnasal grooves frequent; occasional torus palatinalis.

4 Left upper median incisor lost long ago.

5 Right upper median incisor lost long ago.

6 Signs of old osteoporosis in both orbits; vault syphilitic.

7 Atlas synostosed with occiput.

8 Vault badly syphilitic.

9 Allowance made for wear of teeth.

10 N ear.

11 Right malar anomalous.

12 Somewhat ♂-like, but probably ♀.

13 Vault syphilitic.

14 Syphilitic vault; nose somewhat affected.

15 Somewhat ♂-like, but probably strong ♀.

SIBERIA: CHUKCHI
(Anadyr Region)
MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxm. (glabella ad maxm.)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
7589	Leningrad Mus.	Anadyr Region	35		19.0	13.6	13.5	71.6	82.8		15.37			13.4	8.3
42539	do	do	50		19.0	13.8	14.4	72.6	87.8		15.73			13.9	8.5
42534	do	do	30		19.0	14.1	13.4	74.2	81.0		15.50				7.5
831	V.-M.A.L. ²	do	Adult		18.8	14.2	13.8	75.6	82.1		15.53				8.2
4255	Leningrad Mus.	do	45		19.1	14.5	13.8	75.9	82.1		15.80				8.3
4251	do	do	60		19.2	14.6	13.6	76.0	80.5		15.80				7.6
4256	do	do	50		18.8	14.1	13.1	76.9	79.6		15.33				8.4
874	V.-M.A.L.	do	Adult		18.5	14.1	13.3	76.9	81.6		15.30				8.4
42535	Leningrad Mus.	do	50		18.3	14.0	13.4	76.3	83.0		15.23				7.9
42533	do	do	35		18.4	14.1	13.3	76.6	81.9		15.27				8.0
830	V.-M.A.L.	do	Adult		18.4	14.1	13.3	76.6	81.9		15.27				7.7
871	do	do	do		18.2	14.0	13.4	76.0	83.2		15.20				9.8
4252	Leningrad Mus.	do	75		18.5	14.3	13.6	77.3	82.9		15.47				
7582	do	do	30		18.5	14.3	13.2	77.3	86.6		15.67				
523	V.-M.A.L.	do	Adult		18.1	14.0	13.6	77.4	84.7		15.23				
42527	Leningrad Mus.	do	55		19.0	14.7	14.4	77.4	85.5		16.03				
75311	do	do	45		17.8	13.9	14.0	78.1	88.3		16.23				
825	V.-M.A.L.	do	Adult		17.3	13.6	13.6	78.6	83.0		14.83				
42540	Leningrad Mus.	do	50		18.4	14.5	13.6	78.8	82.7		15.50				
42529	do	do	55		18.0	14.2	13.3	78.9	82.6		15.17				
42544	do	do	30		19.1	15.1	13.3	79.1	77.8		15.83				
42543	do	do	35		18.4	14.6	13.7	79.4	83.0		15.57				
878	V.-M.A.L.	do	Adult		18.5	14.7	14.2	79.6	85.6		15.80				
4254	Leningrad Mus.	do	30		18.6	14.8	14.8	79.6	88.6		16.07				
4253	do	do	28		17.7	14.4	12.8	81.4	79.8		14.97				
819	V.-M.A.L.	do	Adult		18.0	14.5	13.5	82.2	82.8		15.43				
827	do	do	do		17.6	14.6	13.6	82.9	84.5		15.27				
Specimens			(18)		(27)	(27)	(27)	(27)	(27)		(27)			(8)	(24)
Totals			788		498.2	385.7	368.3	77.4	82.9		417.4			106.6	191.5
Averages			43.87		18.45	14.29	13.64	77.4	82.9		15.46			13.32	7.98
Minima			28		17.3	13.6	12.8	71.6	77.8		14.83			12.7	7.5
Maxima			75		19.2	15.1	14.8	82.9	88.6		16.07			13.9	8.5

Catalog No.	Diam. Bizygomatic	Facial Index, total	Facial Index, upper	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max. im.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—
7639	12.8	104.7	64.9	10.7	10.2	63.5	53.5	6	6	3.75	3.7	99.0	97.6	5.25	2.4	45.7	5.8	6.4	90.6	
42539	13.9	100.0	61.2	10.9	10.9	67.0	62.0	3.85	3.9	4.2	4.1	91.7	95.1	5.6	2.4	47.6	5.6	6.7	87.6	
42534	13.7	100.0	56.2	10.5	10.2	66.5	60.5	3.8	3.8	4.2	4.0	91.7	95.1	5.05	2.4	47.5	5.6	6.7	87.6	
831	14.6	99.5	56.2	10.5	10.2	67.0	54.5	3.4	3.3	3.6	4.0	96.1	92.5	5.5	2.35	47.5	5.9	7.0	87.7	
4255	13.9	100.0	59.7	10.8	10.6	66.0	57.5	3.0	3.05	4.2	4.1	92.0	96.3	5.5	2.35	42.7	5.7	6.4	87.5	
4251	15.0	100.0	60.7	11.3	10.1	67.0	61.0	3.05	3.0	4.15	4.0	95.9	94.0	5.5	2.4	45.6	6.0	7.0	85.7	
874	13.8	100.0	57.3	10.2	10.1	66.5	57.5	3.7	3.45	4.0	4.0	87.5	86.3	5.4	2.85	45.6	5.5	7.2	76.4	
42535	13.9	95.0	57.3	10.4	10.3	66.5	58.5	3.7	3.65	4.0	4.1	94.9	89.0	5.4	2.85	45.5	5.3	6.8	84.1	
42533	14.4	92.4	56.3	11.2	10.0	66.0	47.5	3.5	3.5	4.1	4.2	85.4	83.3	5.2	2.3	44.2	6.0	6.8	88.2	
830	13.3	100.0	57.9	10.0	10.8	68.0	47.5	3.75	3.7	4.1	4.0	88.0	84.2	4.95	2.4	43.8	5.4	6.4	84.4	
871	13.3	100.0	57.1	10.0	9.8	68.5	51.0	3.3	3.2	4.1	4.0	85.7	87.8	5.5	2.5	45.5	5.4	6.4	84.4	
929	14.5	100.0	57.1	10.0	9.8	68.5	51.0	3.3	3.2	4.1	4.0	85.7	87.8	5.5	2.5	45.5	5.4	6.4	84.4	
534	13.8	100.0	57.1	10.0	9.8	68.5	51.0	3.3	3.2	4.1	4.0	85.7	87.8	5.5	2.5	45.5	5.4	6.4	84.4	
823	13.8	100.0	57.1	10.0	9.8	68.5	51.0	3.3	3.2	4.1	4.0	85.7	87.8	5.5	2.5	45.5	5.4	6.4	84.4	
42327	13.8	100.0	57.1	10.0	9.8	68.5	51.0	3.3	3.2	4.1	4.0	85.7	87.8	5.5	2.5	45.5	5.4	6.4	84.4	
73311	14.5	100.0	57.1	10.0	9.8	68.5	51.0	3.3	3.2	4.1	4.0	85.7	87.8	5.5	2.5	45.5	5.4	6.4	84.4	
833	13.5	94.3	60.9	10.6	9.2	66.0	51.5	3.6	3.65	4.1	4.0	87.8	91.5	5.6	2.4	42.9	5.7	6.1	91.8	
42640	14.3	94.3	55.2	10.3	9.4	68.0	62.0	3.75	3.45	4.15	4.1	90.4	92.7	5.45	2.45	45.0	6.1	93.4	93.4	
42629	14.1	94.3	55.2	10.3	9.4	68.0	62.0	3.75	3.45	4.15	4.1	90.4	92.7	5.45	2.45	45.0	6.1	93.4	93.4	
853	14.1	94.3	55.2	10.3	9.4	68.0	62.0	3.75	3.45	4.15	4.1	90.4	92.7	5.45	2.45	45.0	6.1	93.4	93.4	
42644	15.6	85.3	52.6	11.1	9.8	64.5	57.0	3.8	3.7	4.3	4.3	88.4	86.1	5.2	2.3	44.2	5.9	7.4	79.7	
42643	14.3	85.3	52.6	11.1	9.8	64.5	57.0	3.8	3.7	4.3	4.3	88.4	86.1	5.2	2.3	44.2	5.9	7.4	79.7	
878	13.8	85.3	52.6	11.1	9.8	64.5	57.0	3.8	3.7	4.3	4.3	88.4	86.1	5.2	2.3	44.2	5.9	7.4	79.7	
4254	14.2	85.3	52.6	11.1	9.8	64.5	57.0	3.8	3.7	4.3	4.3	88.4	86.1	5.2	2.3	44.2	5.9	7.4	79.7	
4253	13.8	85.3	52.6	11.1	9.8	64.5	57.0	3.8	3.7	4.3	4.3	88.4	86.1	5.2	2.3	44.2	5.9	7.4	79.7	
4253	14.4	85.3	52.6	11.1	9.8	64.5	57.0	3.8	3.7	4.3	4.3	88.4	86.1	5.2	2.3	44.2	5.9	7.4	79.7	
819	14.5	85.3	52.6	11.1	9.8	64.5	57.0	3.8	3.7	4.3	4.3	88.4	86.1	5.2	2.3	44.2	5.9	7.4	79.7	
827	13.8	85.3	52.6	11.1	9.8	64.5	57.0	3.8	3.7	4.3	4.3	88.4	86.1	5.2	2.3	44.2	5.9	7.4	79.7	
Speimens	(27)	(8)	(24)	(23)	(26)	(23)	(23)	(27)	(27)	(26)	(27)	(26)	(27)	(17)						(17)
Totals	378.9	104.7	64.8	11.3	10.1	70.5	62.0	4.2	4.15	4.5	4.3	101.3	101.2	6.0	2.9	52.8	6.0	7.4	93.4	(17)
Averages	14.03	95.4	56.9	10.53	9.33	66.3	56.3	3.67	3.65	4.05	4.01	90.7	90.9	5.44	2.41	44.9	5.71	6.62	86.2	(17)
Minima	12.8	85.3	50.7	9.6	8.4	63.5	47.5	3.3	3.2	3.75	3.65	83.7	82.5	4.6	2.05	37.8	5.3	6.1	76.4	(17)
Maxima	15.6	104.7	64.8	11.3	10.1	70.5	62.0	4.2	4.15	4.5	4.3	101.3	101.2	6.0	2.9	52.8	6.0	7.4	93.4	(17)

¹ Allowance made for wear of teeth, where needed
² Voenno-meditsinskai Akademia (Military Medical Academy), Leningrad.

SIBERIA: CHUKCHI
(Anadyr Region)
FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabella ad maximum)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menon-Nasion Height (a) ¹	Alveol. Pt.-Nasion Height (b)
4258	Leningrad Mus.	Anadyr Region.	75		17.9	12.0	13.0	79.6	84.1		14.63				
4259	do.	do.	23		17.4	12.0	13.0	77.0	86.4		14.37				7.2
42516 (prob ♀)	do.	do.	70		18.6	14.0	13.2	74.1	86.2		15.37				8.1
8343	V. M. A. L.	do.	Adult.		17.6	13.7	12.8	79.0	83.1		14.53			11.7	7.8
42517	Leningrad Mus.	do.	do.		18.2	13.5	13.5	76.3	84.6		15.13				7.3
876	V. M. A. L.	do.	Adult.		18.8	14.2	12.6	76.5	76.4		15.20			11.7	7.1
42511	Leningrad Mus.	do.	70		17.8	13.3	13.3	77.8	85.0		14.87				7.2
42513	do.	do.	35		17.5	13.3	13.4	76.0	87.0		14.73				7.4
4239	do.	do.	18		17.8	13.6	12.6	76.4	80.3		14.67				6.8
42312	do.	do.	35		17.6	13.6	13.8	77.3	88.5		15.0				7.7
822	V. M. A. L.	do.	Adult.		18.1	14.0	13.5	77.4	92.0		14.70			12.3	7.6
821	do.	do.	do.		17.0	13.2	13.9	77.7	85.0		14.73				7.3
42515	Leningrad Mus.	do.	30		17.5	13.7	13.0	78.5	85.3		14.73				8.0
42514	do.	do.	45		17.6	13.8	13.3	78.4	84.7		14.90				7.4
8247	V. M. A. L.	do.	Sub-adult		17.2	13.5	13.0	78.5	84.7		14.57				7.4
880	do.	do.	Adult.		17.7	13.9	12.5	78.5	84.7		14.70			11.7	7.1
52452	Leningrad Mus.	do.	24		17.7	13.9	14.0	78.5	88.6		15.20				7.7
820	V. M. A. L.	do.	Adult.		17.5	13.8	12.6	78.9	80.5		14.63			10.8	7.2
579	do.	do.	Aged adult.		18.0	14.2	12.6	78.9	78.3		14.63				7.3
42518	Leningrad Mus.	do.	45		18.0	13.6	13.1	79.1	85.1		14.63				7.3
8355	V. M. A. L.	do.	Adult.		17.8	14.2	13.6	79.8	85.0		15.20			11.0	7.6
873	do.	do.	do.		17.8	14.2	12.7	76.8	79.4		14.60				7.3
572	do.	do.	do.		17.1	13.8	13.3	80.7	86.1		14.73				6.7
829	do.	do.	do.		15.8	12.8	12.8	81.0	89.5		13.80				6.7
875	do.	do.	do.		17.8	14.7	11.9	88.6	75.2		14.80			11.5	7.1
828	do.	do.	do.		16.9	14.2	12.6	81.0	81.0		14.57				7.1
826	do.	do.	do.		16.6	14.0	13.4	81.5	81.5		14.50				7.1
8257	do.	do.	do.		16.3	13.8	13.4	81.7	86.0		14.50				2(6.7)
Specimens.			(12)		(28)	(28)	(26)	(28)	(26)		(26)			(8)	(22)
Totals.			570		491.1	330.4	330.4	78.2	83.5		384.0			93.2	161.9
Averages.			43.3		17.54	13.72	13.05	78.2	79.2		14.77			11.65	7.36
Minima.			18		15.8	12.8	11.9	72.6	73.2		13.80			10.8	6.7
Maxima.			75		18.9	14.7	14.0	84.7	92.0		15.37			12.5	8.1

Catalog No.	Diam. Bizygomatic maxm. (c)	Facial Index, (a × 100) / c		Facial Index, upper (b × 100) / c		Basion-Subnasal Pt.	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right		Orbits—Height, left		Orbits—Breadth, right		Orbits—Breadth, left		Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth maxm.	Nasal Index	Upper Alveolar Arch—Length maxm.	Upper Alveolar Arch—Breadth maxm.	Upper Alveolar Arch—Index
		(21)	(22)	(23)	(24)							(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)								
4258	13.1	88.6	66.7	10.5	8.8	10.1	65.0	3.45	3.55	4.05	4.1	3.9	3.5	3.8	3.9	3.8	3.9	3.9	3.8	86.6	86.6	5.1	2.4	47.1	5.5	6.6	63.3
42510	12.7	88.6	66.7	10.4	9.2	9.9	67.0	3.45	3.55	4.0	4.0	3.9	3.5	3.8	3.9	3.8	3.9	3.9	3.8	91.2	91.2	4.95	2.4	46.5	5.5	6.6	63.3
42516 (prob. ♀)	13.1	88.6	66.7	10.4	9.4	10.4	66.5	3.8	3.8	3.9	3.8	3.9	3.5	3.8	3.9	3.8	3.9	3.9	3.8	100.0	100.0	5.5	2.45	44.6	5.3	6.4	63.8
834	13.2	88.6	66.7	10.4	9.3	10.2	66.5	3.55	3.6	3.9	3.8	3.9	3.5	3.8	3.9	3.8	3.9	3.9	3.8	92.3	92.3	5.15	2.4	44.3	5.3	6.4	63.8
42517	13.5	90.0	68.5	10.3	9.4	10.0	67.0	3.55	3.6	3.9	3.8	3.9	3.5	3.8	3.9	3.8	3.9	3.9	3.8	92.3	92.3	5.15	2.65	44.3	5.0	6.5	76.9
876	13.0	90.0	68.5	9.5	8.4	9.6	68.5	3.6	3.7	4.15	4.15	3.9	3.6	3.9	3.9	3.8	3.9	3.9	3.8	92.3	92.3	5.15	2.15	44.3	5.5	6.2	88.7
42511	13.3	90.0	68.5	10.1	8.7	10.0	68.0	3.6	3.6	3.7	3.7	3.7	3.6	3.6	3.7	3.7	3.7	3.7	3.7	92.3	92.3	5.15	2.45	44.3	5.5	6.2	88.7
42513	12.9	90.0	68.5	10.2	9.0	9.8	65.5	3.6	3.6	3.7	3.7	3.7	3.6	3.6	3.7	3.7	3.7	3.7	3.7	92.3	92.3	5.15	2.6	44.3	5.5	6.2	88.7
4259	12.7	90.0	68.5	9.9	9.0	10.4	70.0	3.65	3.75	4.0	3.9	3.9	3.65	3.75	4.0	3.9	3.9	3.9	3.8	92.3	92.3	5.15	2.2	44.3	5.5	6.2	88.7
42512	13.0	90.0	68.5	10.0	8.9	10.4	70.5	3.65	3.65	4.0	3.9	3.9	3.65	3.65	4.0	3.9	3.9	3.9	3.8	92.3	92.3	5.15	2.2	44.3	5.5	6.2	88.7
822	12.8	91.8	69.1	9.8	8.8	10.0	69.5	3.4	3.4	4.0	3.9	3.9	3.4	3.4	4.0	3.9	3.9	3.9	3.8	91.9	91.9	5.15	2.2	44.3	5.5	6.2	88.7
821	13.4	91.8	69.1	9.8	8.8	10.0	69.5	3.4	3.4	4.0	3.9	3.9	3.4	3.4	4.0	3.9	3.9	3.9	3.8	91.9	91.9	5.15	2.2	44.3	5.5	6.2	88.7
4255	13.3	91.8	69.1	10.2	9.0	9.8	65.0	3.45	3.45	3.85	3.85	3.85	3.45	3.45	3.85	3.85	3.85	3.85	3.85	92.2	92.2	5.15	2.0	44.3	5.5	6.2	88.7
42514	13.2	91.8	69.1	10.2	9.0	9.8	65.0	3.45	3.45	3.85	3.85	3.85	3.45	3.45	3.85	3.85	3.85	3.85	3.85	92.2	92.2	5.15	2.4	44.3	5.5	6.2	88.7
824	13.2	91.8	69.1	10.2	9.0	9.8	65.0	3.45	3.45	3.85	3.85	3.85	3.45	3.45	3.85	3.85	3.85	3.85	3.85	92.2	92.2	5.15	2.4	44.3	5.5	6.2	88.7
880	13.0	88.6	63.8	9.9	8.0	10.0	72.0	3.25	3.25	3.8	3.8	3.8	3.25	3.25	3.8	3.8	3.8	3.8	3.8	83.1	83.1	5.05	2.65	44.3	5.5	6.2	88.7
523452	13.7	88.6	63.8	9.9	8.0	10.0	72.0	3.25	3.25	3.8	3.8	3.8	3.25	3.25	3.8	3.8	3.8	3.8	3.8	83.1	83.1	5.05	2.65	44.3	5.5	6.2	88.7
820	13.5	91.2	69.5	9.7	8.7	10.2	69.5	3.5	3.6	3.9	3.8	3.9	3.5	3.6	3.9	3.8	3.9	3.9	3.8	90.0	91.3	5.1	2.5	44.3	5.5	6.2	88.0
879	13.5	80.0	65.3	9.6	8.6	10.0	68.0	3.3	3.3	3.8	3.8	3.8	3.3	3.3	3.8	3.8	3.8	3.8	3.8	86.8	86.8	4.9	2.5	44.3	5.5	6.2	88.0
42518	13.3	84.9	64.9	8.1	8.1	9.4	70.0	3.3	3.3	3.8	3.8	3.8	3.3	3.3	3.8	3.8	3.8	3.8	3.8	86.8	86.8	4.9	2.5	44.3	5.5	6.2	88.0
835	13.3	84.9	64.9	8.8	8.8	10.0	70.0	3.35	3.35	3.8	3.8	3.8	3.35	3.35	3.8	3.8	3.8	3.8	3.8	86.8	86.8	4.9	2.55	44.3	5.5	6.2	88.0
873	13.0	80.9	65.2	10.0	8.8	10.0	68.0	3.25	3.25	3.75	3.7	3.7	3.25	3.25	3.75	3.7	3.7	3.7	86.7	86.7	5.3	2.7	44.3	5.4	6.9	78.3	
872	13.1	80.9	65.2	9.7	8.8	9.8	69.0	3.4	3.4	3.75	3.7	3.7	3.4	3.4	3.75	3.7	3.7	3.7	86.7	86.7	5.3	2.2	44.3	5.4	6.9	78.3	
829	12.6	80.9	65.2	9.3	8.8	9.0	66.0	3.35	3.35	3.6	3.6	3.6	3.35	3.35	3.6	3.6	3.6	3.6	86.7	86.7	5.3	2.3	44.3	5.1	6.2	82.5	
875	13.6	80.9	65.2	8.8	8.8	9.8	69.0	3.35	3.35	3.6	3.6	3.6	3.35	3.35	3.6	3.6	3.6	3.6	86.7	86.7	5.3	2.3	44.3	5.1	6.2	82.5	
828	13.1	87.8	64.2	9.1	8.0	9.3	69.0	3.55	3.55	3.9	3.8	3.9	3.55	3.55	3.9	3.8	3.9	3.9	86.7	86.7	5.1	2.2	44.3	4.8	6.0	80.0	
826	12.3	87.8	64.2	8.4	8.4	9.0	67.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	86.7	86.7	4.9	2.2	44.3	4.8	6.0	80.0	
825	11.6	87.8	64.2	8.4	8.4	9.0	67.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	86.7	86.7	4.9	2.2	44.3	4.8	6.0	80.0	
Specimens	(8)	(22)	(21)	(24)	(25)	(20)	(23)	(25)	(23)	(25)	(23)	(25)	(23)	(25)	(23)	(25)	(23)	(25)	(23)	(25)	(25)	(26)	(19)	(26)	(19)	(19)	(19)
Totals	328.5	208.2	211.6	247.3	1,116.0	80.65	88.85	95.3	88.85	95.3	90.5	95.3	133.55	133.55	62.9	90.5	120.0	120.0	62.9	90.5	120.0	62.9	90.5	120.0	62.9	90.5	120.0
Averages	13.14	87.3	66.1	9.91	8.82	68.3	65.8	3.51	3.53	3.81	3.81	3.51	3.53	3.81	3.81	3.51	3.53	3.81	3.81	92.6	92.6	5.14	2.42	47.1	5.24	6.32	82.0
Minima	12.3	80.9	63.2	9.1	8.0	9.0	65.0	3.15	3.15	3.5	3.5	3.15	3.15	3.5	3.5	3.15	3.15	3.5	3.5	86.6	86.6	4.6	2.0	43.8	4.7	5.8	76.9
Maxima	13.7	91.8	61.8	10.5	9.4	10.9	79.0	3.8	3.8	4.2	4.2	3.8	3.8	4.2	4.2	3.8	3.8	4.2	4.2	100.0	100.0	5.5	2.8	60.9	5.9	6.9	89.4

1 Allowance made for wear of teeth, where needed.
 † Somewhat immature.

SIBERIA: CHUKCHI
(Miscellaneous)

MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxm. (glabella ad maximum)	Diam. lateral maxm.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity [†] in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
860	V. M. A. L.	Chaplin Cape	Adult		18.4	13.8	13.4	75.0	83.2		15.20	1,445			7.6
225028	U. S. N. M.	Arikameche Island (Hering Strait).	30		18.4	14.2	13.2	77.2	81.0		15.27	1,445			8.4
225025	do	Plover Bay	35		18.8	14.8	13.2	78.7	78.6		15.60	1,510			7.8
850	V. M. A. L.	Providoni Bay	Adult		17.8	14.2	14.1	79.8	88.1		15.37	1,515			8.1
225032	U. S. N. M.	do	65		18.7	15.0	13.7	80.2	81.3		15.80	1,575			7.6
225026	do	Plover Bay	40		18.3	14.8	13.6	80.9	82.2		15.57	1,575			7.6
Specimens			(4)		(6)	(6)	(6)	(6)	(6)		(6)	(4)		(1)	(5)
Totals			170		110.4	86.8	81.2	88.8	82.4		92.8	6,045		(11.4)	39.5
Averages			42.5		18.40	14.47	13.53	78.6	82.4		15.47	1,511			7.90
Minima					17.8	13.8	13.2	75.0	78.6		15.20	1,445			7.6
Maxima					18.8	15.0	14.1	80.9	83.1		15.80	1,575			8.4

FEMALES

225029	U. S. N. M.	Arikameche Island	35		18.2	13.8	13.6	75.8	85.0		15.20	1,450			7.2
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MALES

Catalog No.	Diam. Bizygomatic maxm. (c)	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxm.	Upper Alveolar Arch— Breadth maxm.	Upper Alveolar Arch— Index	Lower Jaw—Height at Symphysis	
860	13.3	---	57.1	10.6	9.4	10.3	66.5	55.0	3.6	3.65	4.1	4.0	87.8	91.2	5.2	2.7	51.9	5.8	7.2	80.6	---	
225028	14.7	---	57.1	10.2	9.3	10.5	68.0	62.5	3.6	3.6	4.0	4.0	88.8	90.0	5.9	2.3	39.0	6.1	7.1	85.9	---	
225025	14.4	---	54.2	10.8	9.5	10.2	64.0	53.0	3.55	3.55	4.0	4.0	88.8	88.8	5.4	2.2	40.7	6.1	6.3	84.1	---	
850	13.2	---	61.4	9.9	8.8	10.0	66.5	58.5	3.65	3.65	3.9	3.9	89.6	89.6	5.4	2.4	44.4	5.3	6.3	---	---	
225032	14.5	---	---	---	8.5	9.9	---	---	3.85	3.85	4.1	4.0	89.9	86.5	5.6	2.4	42.9	5.4	6.9	---	---	
225029	13.3	85.7	57.1	10.0	8.7	9.7	65.0	52.0	3.4	3.3	3.9	3.85	87.2	85.7	5.2	2.55	49.0	5.4	6.9	78.3	3.2	
Specimens	(6)	(1)	(5)	(5)	(6)	(6)	(5)	(5)	(6)	(5)	(6)	(5)	(6)	(5)	(6)	(6)	(6)	(4)	(4)	(4)	(4)	(1)
Totals	83.4	85.7	57.2	10.30	9.03	10.10	66.0	56.2	3.60	3.59	4.0	3.97	90.0	90.1	5.45	2.42	44.5	5.65	6.87	82.2	3.2	
Averages	13.80	85.7	57.2	10.30	9.03	10.10	66.0	56.2	3.60	3.59	4.0	3.97	90.0	90.1	5.45	2.42	44.5	5.65	6.87	82.2	3.2	
Minima	13.2	---	54.2	9.9	8.5	9.7	64.0	52.0	3.4	3.3	3.9	3.85	87.2	85.7	5.2	2.2	39.0	5.3	6.3	78.3	---	
Maxima	14.7	---	61.4	10.8	9.5	10.5	68.0	62.5	3.85	3.85	4.1	4.0	89.9	96.5	5.9	2.7	51.9	6.1	7.2	85.9	---	

FEMALES

225020	13.2	---	54.5	10.2	9.4	10.3	70.0	61.5	3.45	3.5	3.7	3.7	83.2	94.6	5.2	2.7	51.9	5.5	6.9	79.7	---
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CHUKCHI CRANIA, SIBERIA
(Abstract)

Measurement	Male				Female			
	Chukchi Peninsula	Anadyr Region	Miscellaneous	Chukchi All	Chukchi Peninsula	Anadyr Region	Miscellaneous	Chukchi All
Approximate age.....	(22) 42.1	(18) 43.8	(4) 42.5	(44) 42.8	(41) 36.9	(12) 43.3	(1)	(54) 38.3
Vault:								
Length.....	(22) 18.57	(27) 18.45	(6) 18.40	(55) 18.49	(41) 17.8	(28) 17.54		(70) 17.67
Breadth.....	(22) 14.27	(27) 14.29	(6) 14.47	(55) 14.30	(41) 13.7	(28) 13.72		(70) 13.70
Height.....	(21) 13.66	(27) 13.64	(6) 13.53	(54) 13.64	(41) 13.2	(26) 13.05		(68) 13.14
Cranial index.....	(22) 76.7	(27) 77.4	(6) 78.6	(55) 77.3	(41) 77.1	(28) 78.2		(70) 77.5
Mean height index.....	(21) 87.9	(27) 83.9	(6) 82.4	(54) 83.2	(41) 82.9	(26) 83.5		(68) 83.8
Module.....	(21) 15.50	(27) 15.46	(6) 15.47	(54) 15.48	(41) 14.57	(20) 14.77		(68) 14.84
Capacity.....			(4) 1,911					
Face:								
Total height.....	(1) 13.5	(8) 13.32	(1) 11.4	(10) 13.15	(4) 11.80	(8) 11.65		(12) 11.70
Upper height.....	(21) 7.96	(24) 7.98	(5) 7.90	(50) 7.96	(39) 7.37	(22) 7.36		(62) 7.37
Maximum breadth.....	(22) 14.25	(27) 14.03	(6) 13.90	(55) 14.11	(41) 13.18	(25) 13.14		(67) 13.16
Facial index: Total.....	(1) (89.4)	(8) 95.4	(1) (82.7)	(10) 94.1	(4) 88.6	(8) 87.3		(12) 87.7
Facial index: Upper.....	(21) 55.9	(24) 56.9	(5) 57.3	(50) 56.5	(39) 56.0	(22) 56.1		(37) 56.0
Base, etc.:								
Basion—Alveolar point.....	(21) 10.58	(23) 10.53	(5) 10.30	(49) 10.52	(39) 10.20	(21) 9.91		(61) 10.07
Basion—Subnasal point.....	(22) 9.49	(26) 9.33	(6) 9.03	(54) 9.36	(39) 8.95	(24) 8.82		(64) 8.91
Basion—Nasion.....	(22) 10.52	(26) 10.38	(6) 10.10	(54) 10.41	(41) 9.92	(25) 9.89		(67) 9.91
Facial angle.....	(21) 67.3	(23) 66.3	(5) 66.0	(49) 66.7	(38) 66.8	(20) 68.3		(59) 67.4
Alveolar angle.....	(21) 58.0	(23) 56.3	(5) 56.2	(49) 56.6	(38) 53.3	(20) 55.8		(59) 54.3

Orbits:														
Mean height.....	(22)	3.70	(27)	3.66	(6)	3.00	(54)	3.67	(40)	3.57	(25)	3.52	(66)	3.55
Mean breadth.....	(22)	4.08	(27)	4.03	(6)	3.99	(54)	4.04	(40)	3.91	(25)	3.83	(66)	3.88
Index.....	(22)	90.8	(27)	90.8	(6)	90.2	(54)	90.7	(40)	91.3	(25)	91.6	(66)	91.5
Nose:														
Height.....	(22)	5.51	(27)	5.44	(6)	5.45	(55)	5.47	(40)	5.10	(26)	5.14	(67)	5.12
Breadth.....	(22)	2.44	(27)	2.44	(6)	2.42	(55)	2.44	(40)	2.38	(26)	2.42	(67)	2.40
Index.....	(22)	44.4	(27)	44.9	(6)	44.5	(55)	44.6	(40)	46.6	(26)	47.1	(67)	47.8
Upper Alveolar Arch:														
Length.....	(19)	5.71	(17)	5.71	(4)	5.66	(40)	5.70	(32)	5.46	(19)	5.24	(52)	5.38
Breadth.....	(19)	6.80	(17)	6.62	(4)	6.87	(40)	6.73	(32)	6.51	(19)	6.32	(52)	6.44
Index.....	(19)	53.9	(17)	56.2	(4)	52.2	(40)	54.7	(32)	54.0	(19)	52.9	(52)	53.5

SIBERIA: MONGOL,
MALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxium. (glabella ad maxium)	Diam. lateral maxium.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
278782	U. S. N. M.	Urga	50	Asymmetry	121.0	14.4	13.8	74.2	81.7		15.87	1,520.0		13.8	8.4
278794	do	do	55	do	119.8	14.8	13.0	74.7	75.1		15.87	1,680.0			7.6
278772	do	do	26	do	121.8	14.2	12.0	75.0	72.9		14.97	1,550.0		12.7	8.0
278783	do	do	35	do	119.2	14.6	13.1	76.0	77.5		15.63	1,550.0			7.8
278768	do	do	45	do	119.2	14.6	13.7	76.0	81.1		15.83	1,730.0		17.4	7.4
278777	do	do	50	do	119.2	14.8	13.1	77.1	77.1		15.70	1,610.0		12.7	7.3
278769	do	do	65	do	119.2	14.8	13.4	77.1	78.8		15.80	1,630.0			7.9
278781	do	do	35	Asymmetry	118.1	14.0	13.2	77.5	82.2		15.10	1,450.0			8.1
278791	do	do	40	do	118.6	14.4	12.5	77.4	75.8		15.17	1,500.0			7.9
278793	do	do	50	do	117.7	14.5	12.4	77.5	74.7		15.20	1,500.0			7.8
278856	do	do	28	do	117.4	15.1	12.8	77.8	74.2		15.77	1,690.0		13.2	7.8
278850	do	do	45	do	119.5	15.2	13.2	77.9	76.1		15.97	1,620.0			8.2
278798	do	do	55	do	118.6	14.5	11.8	78.0	71.3		15.40	1,500.0			7.5
278848	do	do	18	do	118.3	14.3	13.6	78.1	83.1		13.40	1,530.0		12.6	7.7
278775	do	do	26	Slight frontal	118.6	14.6	14.0	78.5	84.3		13.73	1,740.0			8.0
278833	do	do	65	bilateral flattening.	118.4	14.5	13.2	78.8	80.2		13.37	1,480.0		12.4	7.6
278870	do	do	35	do	119.4	15.3	13.7	78.9	79.0		16.13	1,750.0			8.5
278873	do	do	50	do	119.0	15.0	14.0	78.9	82.4		16.00	1,720.0			7.8
278843	do	do	50	do	119.0	15.0	13.4	78.9	77.3		15.80	1,480.0		12.2	7.8
278776	do	do	35	do	118.5	14.6	12.8	78.9	78.8		15.30	1,550.0		13.6	8.0
278863	do	do	40	do	119.1	15.1	13.6	79.1	79.5		15.93	1,770.0			8.0
278802	do	do	50	do	118.2	14.4	12.7	79.1	77.9		15.10	1,800.0			8.1
278860	do	do	45	do	118.3	14.5	13.2	79.2	80.5		15.83	1,510.0			8.1
278824	do	do	24	do	118.4	14.6	13.4	79.3	79.5		15.47	1,500.0			6.6
278866	do	do	69	do	118.5	14.9	13.4	79.3	79.5		15.70	1,650.0			6.6
278790	do	do	35	do	119.1	15.2	13.9	79.6	81.0		16.07	1,650.0		13.6	8.5
278730	do	do	55	do	118.7	14.9	13.5	79.7	80.4		15.70	1,620.0		13.6	8.0
278909	do	do	45	do	118.7	14.9	13.6	79.7	80.2		15.73	1,600.0			8.0
278900	do	do	50	do	118.3	14.6	13.2	79.8	79.6		15.37	1,480.0			8.0
278829	do	do	70	do	118.3	14.6	13.1	79.8	79.6		15.33	1,430.0			8.0
278872	do	do	40	do	118.3	14.6	13.0	79.8	79.6		15.30	1,500.0			7.7
278833	do	do	18	do	118.5	14.8	13.6	80.0	81.7		15.63	1,620.0			7.5
278916	do	do	24	do	118.0	14.4	12.9	80.0	79.6		15.10	1,490.0			7.5

SIBERIA: MONGOL—Continued
MALES—Continued

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior max. (glabella ad maximum)	Diam. lateral max.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity, in c. c. (Hrdlicka's method)	Teeth wear	Menton-Nasion Height (a)	Alveol. Pt.-Nasion Height (b)
278845	U. S. N. M.	Urga	60	---	217.3	14.8	12.7	85.5	79.1	---	14.93	1,345.0	---	---	---
278759	do.	do.	60	---	217.5	15.0	12.8	85.7	78.8	---	15.10	1,480.0	---	---	7.8
278755	do.	do.	65	---	18.2	15.6	12.9	85.7	79.2	---	15.57	1,620.0	---	---	7.6
278757	do.	do.	60	---	18.4	15.8	12.7	85.9	74.5	---	13.63	1,860.0	---	---	8.2
278767	do.	do.	30	---	17.8	15.3	13.4	89.0	81.0	---	15.30	1,620.0	---	---	8.0
278884	do.	do.	35	---	18.6	16.0	13.2	89.0	79.3	---	15.93	1,710.0	---	---	7.7
278895	do.	do.	45	---	18.6	16.0	13.2	89.0	79.3	---	15.93	1,685.0	---	---	8.3
278754	do.	do.	40	---	18.0	15.5	13.2	89.1	78.8	---	15.57	1,530.0	---	---	8.2
278729	do.	do.	50	---	218.2	15.7	13.1	86.3	77.3	---	15.67	1,590.0	---	---	---
278725	do.	do.	26	---	17.6	15.2	13.3	86.4	81.1	---	15.37	1,660.0	---	---	7.1
278849	do.	do.	35	---	17.6	15.2	13.3	86.4	81.1	---	15.40	1,550.0	---	---	7.7
278760	do.	do.	45	---	18.7	16.2	13.5	86.6	77.4	---	16.13	1,750.0	---	---	8.8
278723	do.	do.	40	---	18.5	16.1	13.2	87.0	76.3	---	15.93	1,810.0	---	---	7.8
278731	do.	do.	50	---	18.3	16.1	13.2	87.4	76.8	---	15.77	1,610.0	---	---	---
278814	do.	do.	65	---	18.2	15.9	13.1	87.4	76.8	---	15.73	1,940.0	---	---	---
278857	do.	do.	40	---	18.2	15.9	13.2	87.4	76.8	---	15.60	1,740.0	---	---	8.1
278740	do.	do.	25	---	17.9	15.2	13.2	88.4	85.2	---	15.40	1,570.0	---	---	7.6
278722	do.	do.	60	---	17.2	15.2	13.8	88.4	80.7	---	15.53	1,530.0	---	---	8.3
278729	do.	do.	35	---	17.6	15.6	13.4	88.6	80.7	---	15.00	1,530.0	---	---	7.4
278724	do.	do.	35	---	17.5	15.5	12.0	88.6	72.7	---	15.00	1,530.0	---	---	7.4
278751	do.	do.	60	---	17.2	15.9	13.0	92.4	78.5	---	15.37	1,650.0	---	---	8.3
Specimens	(104)				(104)	(104)	(104)	(104)	(104)						
Totals	4,389				1,918.2	1,571.7	1,370.8				1,620.21	162,155		(29)	648.6
Averages	44.1				18.44	15.11	13.18	81.94	78.56		15.58	1,589.7		12.95	7.91
Minima	24				17.2	14.0	11.4	74.2	66.1		14.83	1,345.0		12.2	6.6
Maxima	75				19.8	16.2	14.4	92.4	86.2		16.33	1,810.0		14.3	9.0

Catalog No.	Diam. Bizygomatic	Facial Index, total $\left(\frac{a \times 100}{c}\right)$	Facial Index, upper $\left(\frac{b \times 100}{c}\right)$	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Racial Angle	Alveolar Angle	Orbits—Height, right		Orbits—Height, left		Orbits—Breadth, right		Orbits—Breadth, left		Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max. im.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—
									3	3	3	3	3	3	3	3								
278782	14.6	76	69	10.8	6	11	89	50	3	3	3	3	3	3	3	3	74	94	5	2	41	5	8	86.8
278794	14.6	92	59	10.8	9	11	72	55	3	3	3	3	3	3	3	3	93	91	3	3	63	3	6	81.0
278772	13.8	92	68	10.2	7	10	70	53	3	3	3	3	3	3	3	3	81	86	3	2	43	3	3	83.6
278783	13.6	85	59	10.2	9	10	68	53	3	3	3	3	3	3	3	3	87	92	3	2	46	3	3	78.1
278768	13.6	85	59	10.2	9	10	74	58	3	3	3	3	3	3	3	3	92	94	3	2	50	3	3	78.1
278777	14.8	85	49	9.6	8	10	70	56	3	3	3	3	3	3	3	3	87	92	3	2	50	3	3	78.1
278769	14.3	85	49	9.6	8	10	70	56	3	3	3	3	3	3	3	3	87	92	3	2	50	3	3	78.1
278781	13.9	85	60	8.9	3	8	71	61	3	3	3	3	3	3	3	3	92	96	3	2	52	3	3	76.2
278791	13.9	85	63	9.8	8	10	65	53	3	3	3	3	3	3	3	3	92	94	3	2	52	3	3	76.2
278793	14.4	91	64	10.6	8	10	68	48	3	3	3	3	3	3	3	3	94	99	3	2	52	3	3	76.2
278806	14.4	91	64	10.6	8	10	68	48	3	3	3	3	3	3	3	3	94	99	3	2	52	3	3	76.2
278800	14.3	90	67	10.4	9	10	67	52	3	3	3	3	3	3	3	3	94	99	3	2	52	3	3	76.2
278798	13.7	90	67	10.3	9	10	66	54	3	3	3	3	3	3	3	3	94	99	3	2	52	3	3	76.2
278794	14.0	90	66	10.3	9	10	68	53	3	3	3	3	3	3	3	3	102	106	3	2	55	3	3	90.8
278785	13.7	87	62	9.9	8	10	67	55	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	90.8
278775	13.7	87	62	9.9	8	10	70	56	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	90.8
278833	14.2	87	53	9.8	8	10	70	56	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	90.8
278870	15.1	86	56	10.2	9	10	71	53	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	90.8
278873	14.3	83	59	10.2	9	10	71	53	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	90.8
278843	14.7	83	59	10.2	9	10	74	61	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	90.8
278776	14.6	93	64	10.1	8	10	65	48	3	3	3	3	3	3	3	3	92	97	3	2	55	3	3	75.0
278865	14.2	87	56	10.8	8	10	70	53	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278803	13.9	87	56	10.8	8	10	70	53	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278896	14.6	85	55	10.0	9	10	71	58	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278899	14.8	85	55	10.0	9	10	68	58	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278824	13.8	87	47	9.6	8	10	73	57	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278886	14.5	87	47	9.6	8	10	73	57	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278790	14.7	87	57	10.4	9	10	68	56	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278736	14.6	83	60	10.1	8	10	68	56	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278809	15.5	81	61	9.7	8	10	74	62	3	3	3	3	3	3	3	3	105	109	3	2	55	3	3	75.0
278900	13.9	87	57	9.6	8	10	67	53	3	3	3	3	3	3	3	3	105	109	3	2	55	3	3	75.0
278829	14.5	85	55	9.9	8	10	71	54	3	3	3	3	3	3	3	3	105	109	3	2	55	3	3	75.0
278872	14.1	85	55	9.9	8	10	71	54	3	3	3	3	3	3	3	3	105	109	3	2	55	3	3	75.0
278883	14.7	82	62	9.6	8	10	74	64	3	3	3	3	3	3	3	3	105	109	3	2	55	3	3	75.0
278816	14.7	82	62	9.6	8	10	74	64	3	3	3	3	3	3	3	3	105	109	3	2	55	3	3	75.0
278916	14.3	86	59	10.2	9	10	68	50	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278785	14.4	86	59	10.2	9	10	68	50	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278785	14.4	86	59	10.2	9	10	68	50	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278852	14.0	86	60	9.8	8	10	67	53	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278796	14.2	80	54	10.4	8	10	71	58	3	3	3	3	3	3	3	3	99	102	3	2	55	3	3	75.0
278888	14.3	80	54	10.4	8	10	68	53	3	3	3	3	3	3	3	3	102	107	3	2	55	3	3	75.0

SIBERIA: MONGOL—Continued
MALES—Continued

Catalog No.	Diam. Pitzgomatic maxm. (c)	Facial Index, total	Facial Index, upper	Basion-Alveolar Pl.	Basion-Subnasal Pl.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max- im.	Nasal Index	Upper Alveolar Arch— Length maxm.	Upper Alveolar Arch— Breadth maxm.	Upper Alveolar Arch— Index
278789	14.3	87.4	54.5	10.0	8.9	9.8	65.5	47.0	3.45	3.6	4.05	3.9	85.9	90.0	3.0	53.1	5.5	6.8	80.9	
278877	14.3	87.4	50.3	9.9	8.8	9.8	68.0	56.5	3.9	3.05	3.9	3.9	100.0	101.3	2.55	53.1	5.5	7.0	78.6	
278820	14.6	87.4	50.7	10.4	9.4	10.6	71.0	55.0	3.6	3.05	4.0	4.0	100.0	101.3	2.85	51.8	5.5	6.7	83.6	
278907	13.7	87.4	56.2	10.1	9.2	10.4	70.0	56.0	3.55	3.65	3.9	3.9	88.8	93.6	2.8	47.9	5.6	6.4	76.6	
278889	14.8	87.4	50.0	9.4	8.6	10.4	75.5	60.0	3.35	3.35	3.9	3.9	86.9	85.0	2.5	45.6	4.9	6.4	76.6	
278828	13.7	87.4	57.3	10.3	8.0	9.3	68.5	45.5	3.25	3.25	3.7	3.7	87.8	87.8	2.5	44.8	5.5	6.3	89.5	
278927	14.3	87.4	50.5	9.2	8.0	9.4	65.5	55.5	3.8	3.75	3.9	4.0	90.0	93.0	2.8	44.8	5.5	6.3	89.5	
278915	13.4	87.4	50.5	9.2	8.0	9.4	65.5	55.5	3.8	3.75	3.9	4.0	97.4	93.8	2.6	48.2	5.2	6.7	77.6	
278854	13.9	87.4	53.2	9.7	8.8	9.9	69.5	58.5	3.5	3.45	3.7	3.8	94.6	90.8	2.6	48.2	5.2	6.7	77.6	
278845	13.5	87.4	54.1	9.9	8.4	9.6	66.0	42.5	3.25	3.4	3.9	3.9	83.3	87.3	2.75	61.9	5.3	6.3	84.1	
278842	14.6	87.4	56.2	10.1	8.9	10.4	67.0	56.0	3.35	3.3	3.75	3.7	89.3	89.2	2.85	48.7	5.2	6.9	75.4	
278862	13.7	87.4	56.2	10.1	9.1	10.0	67.0	56.0	3.25	3.4	3.6	3.6	90.3	94.4	2.6	46.4	5.2	6.9	75.4	
278879	14.7	87.4	51.4	9.5	9.5	9.8	76.0	64.0	3.7	3.75	4.15	4.0	89.2	93.8	2.7	49.6	5.0	6.4	78.1	
278808	14.8	87.4	55.1	10.3	8.4	10.3	68.0	60.0	3.4	3.5	3.8	3.75	89.5	93.3	2.5	46.6	5.6	6.6	84.9	
278830	13.8	89.9	55.1	10.3	9.4	10.3	68.0	60.0	3.45	3.45	3.75	3.7	92.0	93.2	2.7	50.0	5.6	6.6	84.9	
278894	15.4	87.4	58.1	10.8	9.2	10.8	66.5	51.5	4.2	4.2	4.1	4.1	102.4	102.4	3.0	51.7	5.9	7.0	84.3	
278806	13.5	87.4	56.5	10.4	8.8	10.0	64.5	47.0	3.35	3.5	3.95	3.9	84.8	89.7	2.6	48.6	5.8	7.0	86.3	
278910	14.7	87.4	55.1	10.6	9.4	11.0	70.5	55.0	3.8	3.65	4.2	4.1	90.5	89.0	3.0	61.7	5.5	7.0	78.6	
278821	13.9	87.4	50.4	9.3	8.4	10.0	74.5	57.0	3.25	3.35	3.6	3.6	90.8	93.1	2.75	53.9	5.1	6.7	83.6	
278822	15.0	87.4	56.0	9.9	8.6	10.4	68.5	52.5	3.8	3.95	4.15	4.05	91.6	93.2	2.5	50.0	5.6	6.7	83.6	
278827	13.9	89.9	54.0	10.3	8.8	9.7	64.0	48.0	3.35	3.4	3.7	3.65	90.5	93.2	2.5	49.5	5.5	6.4	86.9	
278855	(13.1)	(93.9)	(68.8)	10.0	10.4	10.4	71.0	58.0	3.7	3.75	3.8	3.75	87.4	100.0	2.5	49.5	5.6	6.4	87.6	
278827	14.9	87.9	53.7	9.9	8.4	9.8	65.5	46.5	3.85	3.95	4.2	4.2	91.7	94.0	2.8	48.7	5.5	6.9	79.7	
278835	14.2	90.9	54.2	9.6	8.6	10.2	71.5	57.0	3.4	3.4	3.75	3.7	90.7	91.9	2.8	50.5	5.0	6.4	78.1	
278847	13.7	87.4	54.2	9.6	8.4	9.6	68.0	57.0	3.45	3.25	3.4	3.4	90.8	87.8	2.3	47.9	4.8	6.4	82.9	
278866	15.0	87.4	54.2	9.6	8.4	9.6	68.0	57.0	3.8	3.75	4.2	4.2	90.5	89.3	2.8	48.8	5.5	7.1	77.6	
278744	15.1	88.7	45.6	9.5	8.4	10.1	68.0	55.0	3.6	3.75	4.1	4.0	87.8	93.8	2.1	48.4	5.5	7.1	77.6	
278743	14.8	87.4	53.1	9.5	8.6	9.7	66.5	46.0	3.8	3.75	3.95	3.95	86.2	94.9	2.95	51.9	5.3	6.7	82.9	
278802	14.1	87.4	58.9	10.3	8.9	10.2	65.5	50.5	3.9	4.0	4.0	4.0	97.6	97.6	2.8	49.1	5.5	6.7	82.9	
278801	14.3	87.4	56.1	10.4	9.4	10.8	68.0	51.0	3.6	3.55	4.0	4.0	90.0	88.8	2.7	50.9	5.7	7.0	82.9	
278861	15.5	87.4	56.1	10.8	9.4	10.8	68.0	51.0	3.4	3.3	4.0	4.0	79.1	82.5	3.2	51.6	5.8	7.0	82.9	
278800	13.7	87.4	56.1	10.4	9.3	10.8	68.0	51.0	3.65	3.3	4.0	4.0	91.3	82.5	3.2	51.6	5.8	7.0	82.9	
278780	14.4	87.4	62.8	9.8	9.0	10.2	70.0	62.0	3.7	3.7	3.9	3.9	94.9	94.9	2.6	48.1	5.2	6.4	81.3	

278844	13.7	50.4	9.7	8.8	9.6	68.5	55.0	3.3	3.35	3.7	3.7	89.8	90.5	5.1	2.7	52.9	5.4	0.6	81.8
278850	14.3	67.3	10.1	8.0	10.2	66.5	46.0	3.4	3.4	3.9	3.7	87.9	91.9	5.05	2.75	49.2	3.6	0.9	81.2
278851	14.1	95.0	69.6	9.9	8.6	65.0	53.0	3.7	3.7	3.8	3.7	97.4	100.0	5.8	2.45	49.2	3.6	0.7	85.0
278917	11.5	53.1	9.9	8.8	10.2	69.5	54.0	3.3	3.3	3.5	3.4	93.1	89.7	5.55	2.9	52.3	5.4	0.7	80.9
278816	13.9	50.7	9.6	8.4	10.0	70.0	52.5	3.0	3.5	3.5	3.6	94.7	97.2	5.45	2.2	49.4	5.4	0.6	81.8
278875	15.3	---	9.4	9.0	10.4	---	---	3.7	3.5	4.4	3.6	84.1	90.5	5.95	3.05	61.3	---	---	---
278735	14.0	---	9.4	8.6	10.4	66.0	55.5	3.6	3.0	3.9	3.7	92.3	97.3	5.4	2.5	46.3	5.3	7.0	75.7
278748	15.1	---	9.4	8.2	9.8	---	---	3.75	3.7	4.0	4.0	91.5	97.5	5.8	2.75	47.4	---	---	---
278792	14.4	98.6	10.9	9.6	10.6	64.0	57.0	3.65	3.45	3.95	3.95	92.4	93.7	5.9	3.0	60.9	6.0	7.5	80.0
278758	14.4	---	10.2	8.9	10.0	---	---	3.35	3.45	3.7	3.7	90.5	93.2	5.35	2.6	48.6	5.4	6.7	80.6
278834	14.3	88.1	8.9	8.0	9.8	71.5	59.5	3.5	3.55	3.9	3.9	89.7	91.0	5.55	2.7	48.6	5.0	6.5	76.9
278845	13.9	---	8.9	8.0	9.8	---	---	3.5	3.5	3.9	3.8	89.7	92.1	5.6	2.75	49.10	---	---	---
278759	14.2	---	9.7	8.4	9.6	65.5	54.0	3.6	3.9	3.9	3.9	92.3	92.3	5.1	2.65	52.0	---	---	---
278755	13.6	64.9	---	8.4	10.8	---	---	3.55	3.55	4.0	3.9	87.5	91.0	5.55	2.65	47.7	---	---	---
278757	13.1	64.7	---	8.9	10.4	69.5	59.0	3.5	3.5	4.0	3.9	90.0	89.7	5.8	3.0	61.7	---	---	---
278757	13.1	---	9.9	8.9	10.4	---	---	3.9	3.9	3.9	3.9	100.0	100.0	5.5	2.65	48.2	5.1	0.7	76.1
278757	14.2	---	9.6	8.6	10.1	69.0	59.0	3.9	3.9	3.9	3.9	88.5	87.2	5.5	2.5	45.4	5.8	7.3	79.5
278805	14.0	---	10.5	9.1	10.4	68.0	48.5	3.45	3.4	3.9	3.9	88.5	87.2	5.5	2.5	45.4	5.4	6.9	78.3
278805	14.9	45.70	---	9.0	10.4	---	---	3.75	3.8	4.1	4.1	91.5	92.7	6.0	2.6	43.3	5.4	7.0	77.1
278754	14.2	97.2	67.7	8.8	10.2	---	---	3.9	3.8	4.2	4.1	92.9	92.7	5.7	2.75	48.2	---	---	---
278729	14.7	---	---	8.6	10.0	---	---	3.4	3.4	4.0	4.1	85.0	82.9	4.8	2.6	54.2	5.5	0.6	83.9
278725	14.2	86.9	66.0	9.7	9.6	67.5	47.0	3.45	3.5	3.9	3.9	88.5	89.7	5.75	2.7	47.0	5.3	6.8	77.9
278743	14.3	88.8	63.8	10.0	10.3	69.5	55.0	3.7	3.7	4.5	4.5	87.6	85.8	6.2	2.9	46.8	5.7	6.9	82.6
278700	15.5	---	10.0	8.4	10.0	64.0	47.5	3.9	3.85	4.45	4.2	87.1	86.9	5.2	2.95	56.7	---	---	---
278723	15.5	---	10.4	9.1	10.2	66.0	54.0	3.7	3.65	4.25	4.2	87.1	86.9	5.4	2.7	50.0	---	---	---
278731	14.4	---	---	8.4	9.8	---	---	3.5	4.0	4.0	3.8	87.2	92.1	5.4	3.0	56.1	---	---	---
278814	14.4	---	---	8.7	10.0	---	---	3.4	3.5	3.9	3.8	87.2	92.1	5.55	3.0	53.5	5.5	6.0	83.8
278867	14.6	55.6	9.9	8.4	10.2	68.0	48.0	3.7	3.7	4.1	4.15	90.2	89.2	5.75	2.5	46.3	5.2	6.8	76.9
278740	14.0	---	10.0	8.9	9.8	66.0	54.0	3.2	3.45	3.75	3.7	85.3	89.2	5.4	2.5	45.1	4.8	6.4	76.0
278722	14.2	---	9.4	8.2	9.5	64.5	51.5	3.85	3.65	3.9	3.9	98.7	98.7	6.1	2.75	45.1	---	---	---
278724	14.5	85.6	61.0	7.4	9.0	64.5	46.5	3.6	3.65	4.0	4.0	90.0	91.5	5.5	2.5	45.6	---	---	---
278751	14.5	83.8	67.2	8.1	9.6	---	---	3.65	3.65	4.0	4.0	91.5	91.5	6.0	2.6	45.3	5.4	6.6	81.8
Specimens.....	(98)	(81)	(80)	(103)	(103)	(78)	(78)	(102)	(98)	(102)	(98)	(102)	(98)	(103)	(103)	(103)	(71)	(71)	(71)
Totals.....	1,405.2	---	797.5	907.7	1,063.1	5,350.5	4,227.0	366.5	354.05	400.1	380.6	---	580.45	282.05	---	---	385.2	477.3	---
Averages.....	14.34	90.67	65.17	8.81	10.32	68.71	54.19	3.89	3.81	3.92	3.88	91.60	88.02	5.64	2.73	48.59	5.43	6.72	80.70
Minima.....	13.5	83.0	45.6	7.4	8.6	61.0	42.5	3.1	3.55	3.6	3.6	79.1	82.6	4.8	2.2	40.4	4.8	6.0	72.9
Maxima.....	15.5	98.6	62.8	10.9	11.1	75.0	66.5	4.2	4.2	4.45	4.5	105.6	104.2	6.5	3.2	58.5	6.0	7.5	90.8

SIBERIA: MONGOL

FEMALES

Catalog No.	Collection	Locality	Approximate age of subject	Deformation	Diam. antero-posterior maxim. (glabella ad maximum)	Diam. lateral maxim.	Basion-Bregma height	Cranial Index	Mean Height Index	Height-Breadth Index	Cranial Module	Capacity in c. c. (Hrdlicka's method)	Teeth, wear	Menton-Height (a)	Alveol. Pt.-Nasion Height (b)
278913	U. S. N. M.	Urga.	30	---	18.6	13.6	12.6	71.7	79.2	---	14.80	1,450	---	11.8	7.2
278779	do.	do.	26	---	17.8	13.1	12.5	72.8	80.1	---	14.57	1,250	---	11.8	7.0
278778	do.	do.	23	---	17.8	13.5	12.7	72.8	81.2	---	14.67	1,450	---	11.1	6.8
278790	do.	do.	28	---	18.2	13.8	13.0	70.6	81.9	---	15.00	1,500	---	11.5	7.3
278797	do.	do.	35	---	17.5	13.3	12.4	70.9	80.5	---	14.40	1,433	---	11.5	6.9
278770	do.	do.	40	---	18.5	14.1	12.0	70.9	79.0	---	14.87	1,510	---	11.5	7.5
278788	do.	do.	24	---	17.6	13.7	12.5	77.8	79.9	---	14.60	1,410	---	11.1	6.9
278787	do.	do.	70	---	18.2	14.2	13.0	78.0	80.2	---	15.13	1,470	---	---	---
278795	do.	do.	35	---	18.6	14.5	13.4	78.0	81.0	---	15.13	1,550	---	---	---
278792	do.	do.	55	---	17.6	13.8	12.4	78.4	79.0	---	14.60	1,300	---	---	---
278793	do.	do.	65	---	18.0	14.6	12.9	78.6	77.1	---	13.37	1,389	---	---	---
278784	do.	do.	35	---	18.2	14.2	13.0	78.6	80.7	---	13.37	1,389	---	11.5	6.7
278841	do.	do.	40	---	18.6	14.4	12.3	79.1	79.5	---	14.97	1,340	---	---	---
278801	do.	do.	25	---	17.7	14.0	12.7	79.1	80.1	---	14.80	1,470	---	11.8	7.3
278926	do.	do.	25	---	17.7	14.0	12.4	79.1	78.2	---	14.70	1,410	---	11.3	6.9
278876	do.	do.	55	---	17.8	14.1	13.4	79.2	81.0	---	15.10	1,410	---	---	---
278804	do.	do.	26	---	18.4	14.6	13.2	79.3	80.0	---	15.40	---	---	---	---
278825	do.	do.	26	---	17.9	14.2	12.6	78.3	78.5	---	14.90	1,460	---	12.3	7.4
278885	do.	do.	30	---	16.8	13.4	11.8	72.8	78.1	---	14.00	1,260	---	---	---
278892	do.	do.	40	---	17.8	14.2	12.0	79.8	75.0	---	14.67	1,330	---	11.9	7.2
278902	do.	do.	35	---	17.4	13.9	12.5	79.9	79.9	---	14.60	1,350	---	---	---
278909	do.	do.	40	---	18.0	14.4	12.4	80.0	76.5	---	14.93	1,420	---	12.0	7.0
278951	do.	do.	30	---	18.2	14.6	13.0	80.2	79.3	---	15.27	1,450	---	---	---
278903	do.	do.	40	---	17.3	13.9	12.3	80.3	78.8	---	14.50	1,170	---	---	---
278823	do.	do.	25	---	17.1	13.8	12.2	80.7	79.0	---	14.37	1,300	---	---	---
278839	do.	do.	40	---	17.9	14.5	12.0	81.0	74.1	---	14.80	1,345	---	11.0	6.7
278815	do.	do.	24	---	18.0	14.6	12.8	81.1	78.5	---	15.13	1,500	---	12.5	7.4
278838	do.	do.	45	---	17.2	14.0	12.1	81.4	77.6	---	14.43	1,335	---	11.2	6.8
278840	do.	do.	35	---	17.9	14.6	12.7	81.6	78.2	---	15.07	1,590	---	12.4	7.6
278863	do.	do.	40	---	17.4	14.2	12.4	81.6	78.5	---	14.67	1,370	---	---	---
278807	do.	do.	24	---	16.4	13.4	11.8	81.7	79.2	---	13.87	1,170	---	7.2	6.9
278868	do.	do.	45	---	17.5	14.3	13.0	81.7	81.8	---	14.93	1,395	---	---	---
278810	do.	do.	45	---	16.9	13.8	13.2	81.7	83.0	---	14.63	1,360	---	---	---
278824	do.	do.	26	---	17.6	14.4	12.8	81.8	80.0	---	14.93	1,405	---	---	---
278874	do.	do.	30	---	17.0	13.9	12.9	81.8	83.5	---	14.60	1,290	---	---	---
278911	do.	do.	23	---	17.8	14.6	13.2	82.0	75.4	---	15.20	1,540	---	---	---
278893	do.	do.	45	---	17.2	14.1	11.8	82.0	75.4	---	14.37	1,260	---	---	---
278832	do.	do.	25	---	17.4	14.3	12.8	82.2	80.8	---	14.83	1,390	---	11.8	7.2

SIBERIA: MONGOL—Continued

FEMALES—Continued

Catalog No.	Diam. Bizygomatic maxim. (c)	Facial Index, total	Facial Index, upper	Basion-Alveolar Pt.	Basion-Subnasal Pt.	Basion-Nasion	Facial Angle	Alveolar Angle	Orbits—Height, right	Orbits—Height, left	Orbits—Breadth, right	Orbits—Breadth, left	Orbital Index, right	Orbital Index, left	Nose—Height	Nose—Breadth max. im.	Nasal Index	Upper Alveolar Arch—Length maxim.	Upper Alveolar Arch—Breadth maxim.	Upper Alveolar Arch—Index
275013	13.0	79.4	56.4	9.4	8.5	10.0	73.0	58.0	3.5	3.7	3.7	3.75	64.6	69.3	5.2	2.2	42.5	5.1	6.4	79.7
275014	12.5	77.0	56.0	9.7	8.0	10.2	73.5	55.0	3.6	3.8	3.8	3.8	62.4	64.7	5.3	2.65	50.0	5.1	6.4	79.7
275015	12.7	87.1	62.6	8.8	8.0	9.6	71.5	55.0	3.4	3.5	3.5	3.4	97.1	100.0	3.25	2.1	45.7	4.7	6.2	77.8
275016	13.6	69.7	59.7	10.9	9.4	10.2	65.0	44.0	3.45	3.45	3.55	3.8	87.3	90.8	5.2	2.8	53.9	6.0	7.2	83.3
275017	12.9	86.2	59.5	9.8	8.6	9.4	65.0	49.0	3.35	3.55	3.65	3.55	94.4	100.0	5.0	2.6	52.0	5.5	6.4	85.9
275018	13.4	86.2	66.0	9.1	7.8	9.1	63.5	48.5	3.75	3.9	3.9	3.9	96.2	96.2	5.35	2.35	43.9	4.9	6.2	79.0
275019	12.7	87.4	74.3	9.4	8.5	9.4	68.0	55.5	3.8	3.7	3.80	3.75	98.7	98.7	5.05	2.45	45.5	4.8	6.3	76.2
275020	13.3	87.4	61.4	9.4	8.2	10.0	68.5	58.0	3.4	3.4	3.6	3.6	94.4	94.4	4.95	2.55	51.5	5.3	6.5	81.6
275021	13.0	87.4	60.8	9.9	8.8	10.2	68.5	58.0	3.7	3.55	3.8	3.8	97.4	95.4	5.3	2.7	50.9	5.0	6.0	83.3
275022	13.0	87.4	60.2	9.3	8.6	9.8	71.0	63.5	3.8	3.8	4.0	4.0	93.8	95.0	5.2	2.5	48.1	5.0	6.0	83.3
275023	13.0	87.4	60.2	9.3	8.6	9.8	71.0	63.5	3.8	3.8	4.0	4.0	93.8	95.0	5.2	2.5	48.1	5.0	6.0	83.3
275024	14.0	87.1	60.8	10.0	8.9	10.2	70.5	46.5	3.4	3.45	3.9	3.8	87.2	90.8	5.15	2.9	56.9	5.5	6.4	85.9
275025	13.8	87.1	62.6	9.7	8.6	9.6	67.0	56.0	3.55	3.6	3.6	3.6	85.5	87.8	5.0	2.75	55.0	5.1	5.9	86.4
275026	13.1	90.1	66.6	8.8	7.8	9.2	68.5	58.0	3.5	3.6	3.7	3.7	98.6	91.6	5.0	2.35	47.0	4.8	6.1	78.7
275027	13.0	86.9	63.1	9.5	8.6	9.8	71.5	54.5	3.6	3.6	3.8	3.65	96.1	95.6	5.2	2.8	53.9	4.9	6.0	81.7
275028	13.0	86.9	63.1	9.5	8.6	9.8	71.5	54.5	3.5	3.45	3.55	3.5	98.0	98.6	5.4	2.8	51.9	4.8	6.1	81.7
275029	13.0	86.9	63.1	9.5	8.6	9.8	71.5	54.5	3.7	3.65	3.9	3.9	91.9	93.6	5.45	2.5	45.9	4.9	6.3	77.8
275030	13.2	93.9	66.6	9.1	8.0	10.0	70.0	55.5	3.25	3.9	3.7	3.7	96.2	100.0	5.05	2.35	46.5	4.9	6.3	77.8
275031	12.6	90.2	61.6	9.1	8.0	8.6	70.0	55.5	3.2	3.8	3.9	3.8	96.2	100.0	5.05	2.35	46.5	4.9	6.3	77.8
275032	12.6	90.2	61.6	9.1	8.0	8.6	70.0	55.5	3.2	3.8	3.9	3.8	96.2	100.0	5.05	2.35	46.5	4.9	6.3	77.8
275033	12.7	90.2	61.6	9.1	8.0	8.6	70.0	55.5	3.3	3.8	3.9	3.7	96.2	100.0	5.05	2.35	46.5	4.9	6.3	77.8
275034	12.7	90.2	61.6	9.1	8.0	8.6	70.0	55.5	3.3	3.8	3.9	3.7	96.2	100.0	5.05	2.35	46.5	4.9	6.3	77.8
275035	12.7	90.2	61.6	9.1	8.0	8.6	70.0	55.5	3.3	3.8	3.9	3.7	96.2	100.0	5.05	2.35	46.5	4.9	6.3	77.8
275036	12.7	90.2	61.6	9.1	8.0	8.6	70.0	55.5	3.3	3.8	3.9	3.7	96.2	100.0	5.05	2.35	46.5	4.9	6.3	77.8
275037	12.7	90.2	61.6	9.1	8.0	8.6	70.0	55.5	3.3	3.8	3.9	3.7	96.2	100.0	5.05	2.35	46.5	4.9	6.3	77.8
275038	12.7	90.2	61.6	9.1	8.0	8.6	70.0	55.5	3.3	3.8	3.9	3.7	96.2	100.0	5.05	2.35	46.5	4.9	6.3	77.8
275039	13.8	89.9	66.3	9.7	8.7	10.0	70.5	58.0	3.35	3.45	3.65	3.65	92.0	89.0	4.65	2.4	51.6	5.2	6.2	83.9
275040	13.6	89.9	66.3	9.7	8.7	10.0	70.5	58.0	3.25	3.25	3.65	3.65	92.0	89.0	4.65	2.4	51.6	5.2	6.2	83.9
275041	13.2	90.9	67.8	9.8	8.8	9.6	68.5	54.0	3.3	3.4	3.8	3.8	97.5	93.0	5.4	2.65	49.1	5.3	6.5	81.5
275042	13.9	89.9	67.2	9.8	8.8	9.8	68.0	53.0	3.3	3.4	3.6	3.6	97.5	93.0	5.2	3.05	53.7	4.6	6.5	70.8
275043	13.4	89.1	60.0	9.1	8.2	9.4	71.0	52.0	3.45	3.45	3.6	3.6	96.8	96.0	5.2	2.7	51.9	4.9	6.4	76.6
275044	12.7	93.4	68.3	9.0	7.8	9.0	66.0	52.0	3.4	3.8	3.8	3.8	96.8	96.0	5.2	2.7	51.9	4.9	6.4	76.6
275045	12.8	87.5	53.1	9.1	8.0	9.2	69.0	48.0	3.65	3.6	3.8	3.8	97.4	94.7	5.1	2.5	49.0	4.8	6.1	78.7
275046	13.8	89.9	67.0	9.8	8.6	9.4	67.0	56.0	3.15	3.25	3.7	3.7	93.2	92.8	5.45	2.5	45.9	5.6	6.7	83.6
275047	13.2	89.9	67.0	9.8	8.6	9.4	67.0	56.0	3.45	3.45	3.7	3.8	93.2	92.8	5.45	2.5	45.9	5.6	6.7	83.6
275048	12.8	89.9	67.0	9.8	8.6	9.4	67.0	56.0	3.7	3.55	3.8	3.8	97.4	93.4	5.05	2.3	47.1	5.0	6.4	78.1
275049	12.5	89.9	67.0	9.9	9.0	9.8	68.5	56.0	3.5	3.55	3.8	3.95	97.4	93.4	5.05	2.3	47.1	5.0	6.4	78.1
275050	12.8	89.9	67.0	9.9	9.0	9.8	68.5	56.0	3.5	3.55	3.8	3.95	97.4	93.4	5.05	2.3	47.1	5.0	6.4	78.1
275051	12.8	89.9	67.0	9.9	9.0	9.8	68.5	56.0	3.5	3.55	3.8	3.95	97.4	93.4	5.05	2.3	47.1	5.0	6.4	78.1
275052	13.1	88.0	63.1	9.2	7.7	9.2	73.5	52.0	3.35	3.4	3.8	3.8	88.2	89.5	5.0	2.7	51.0	4.7	6.2	75.8
275053	12.8	88.0	63.1	9.2	7.7	9.2	73.5	52.0	3.25	3.35	3.7	3.6	87.8	91.7	5.1	2.6	51.0	4.7	6.2	75.8
275054	13.3	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.3	3.45	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275055	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275056	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275057	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275058	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275059	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275060	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275061	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275062	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275063	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275064	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275065	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275066	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275067	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275068	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275069	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275070	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275071	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275072	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275073	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275074	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275075	13.6	88.0	63.1	9.2	8.3	9.2	70.0	58.0	3.6	3.55	3.8	3.8	86.8	90.8	5.1	2.9	56.9	5.1	2.9	66.9
275076	13.6	88.0	63.1	9.2	8.3	9.2	70.0	5												

275592	13.0	56.2	8.9	7.9	9.4	70.0	53.0	3.65	3.7	3.8	3.65	98.0	101.4	5.4	2.9	53.7	4.6	5.6	82.1
278832	12.7	66.7	9.7	8.4	9.4	65.5	54.5	3.3	3.4	3.8	3.75	91.0	90.7	5.2	2.2	49.9	5.0	6.0	83.9
278864	14.0	62.9	9.7	8.4	9.6	60.0	50.0	3.55	3.55	3.9	3.8	91.0	97.1	5.2	2.5	48.1	5.3	6.2	85.6
278869	13.0	63.1	9.6	8.0	9.0	69.5	61.0	3.3	3.4	3.7	3.6	89.9	91.4	5.15	2.7	52.1	4.9	6.3	77.8
278906	13.3	63.4	9.6	8.6	9.9	59.5	50.5	3.2	3.15	3.65	3.65	87.7	87.7	5.05	2.56	54.3	4.9	6.7	73.7
278846	13.1	65.0	9.6	8.6	9.7	67.5	60.0	3.2	3.3	3.75	3.65	88.0	90.4	5.2	2.8	41.2	5.1	6.3	82.7
278730	12.8	64.5	9.2	8.2	9.6	66.0	55.0	3.7	3.75	3.75	3.7	98.7	101.4	4.86	2.85	43.5	5.1	6.2	82.3
278700	12.1	64.9	9.2	8.0	9.4	68.0	53.0	3.3	3.3	3.8	3.6	86.8	91.7	4.8	2.5	42.1	4.5	6.6	77.3
278813	12.7	65.8	8.0	7.0	8.8	69.0	53.5	3.4	3.35	3.7	3.7	91.2	90.6	5.6	2.75	49.1	4.8	6.2	72.6
278850	13.8	66.1	10.3	8.6	9.6	63.0	42.0	3.4	3.5	4.1	3.9	97.2	97.2	5.25	2.7	61.4	5.0	6.8	73.6
278826	14.1	66.6	9.0	8.0	9.7	69.0	52.5	3.7	3.8	4.1	3.9	97.2	90.6	5.25	2.7	61.4	5.0	6.8	73.6
278817	12.9	68.5	9.1	8.0	9.8	66.5	52.5	3.5	3.55	3.8	3.6	92.1	98.6	4.7	2.3	43.9	4.8	6.1	78.7
278836	13.0	67.2	9.9	8.4	9.8	65.0	40.0	3.45	3.45	3.8	3.8	97.8	90.8	5.0	2.65	51.0	5.3	6.5	81.6
278812	12.7	94.6	9.1	8.1	9.2	68.0	54.0	3.3	3.35	3.7	3.6	82.2	93.0	5.1	2.5	49.0	5.05	6.2	81.5
278867	13.9	68.9	9.8	9.1	10.0	71.5	57.0	3.35	3.35	3.8	3.65	83.2	91.8	5.1	2.5	49.0	4.9	5.9	83.1
278871	13.5	48.2	9.1	8.3	9.0	68.0	42.0	3.4	3.35	3.5	3.4	97.1	98.6	5.5	2.6	47.3	4.9	6.2	79.0
278831	13.3	64.1	9.5	8.4	9.4	67.0	50.5	3.45	3.45	3.7	3.6	97.2	97.2	5.3	2.7	60.9	5.2	6.5	78.8
278878	14.1	68.78	8.6	8.6	10.0	70.5	56.0	3.35	3.35	4.0	3.9	83.8	85.9	5.05	2.75	54.6	5.3	5.8	91.4
278721	13.5	62.6	9.8	8.8	9.8	63.0	45.0	3.65	3.65	4.2	4.1	86.9	87.0	5.0	2.5	60.0	5.2	6.3	82.5
278881	12.8	67.0	9.8	8.7	9.8	68.0	53.0	3.2	3.25	3.5	3.5	91.4	92.9	5.25	2.5	62.5	4.9	6.3	82.5
278720	13.9	61.1	8.9	8.1	9.1	68.0	58.0	3.2	3.3	3.8	3.8	84.2	86.8	5.3	2.55	48.1	4.9	6.3	77.8
278882	13.4	53.7	9.2	8.3	9.2	67.0	56.0	3.6	3.7	3.8	3.8	94.7	97.4	5.3	2.6	45.3	4.9	6.2	79.0
278723	13.4	53.7	9.4	8.4	9.3	63.0	55.0	3.4	3.4	3.8	3.8	97.4	89.5	5.2	2.6	60.0	5.3	6.1	83.9
278908	13.3	54.9	9.8	8.8	9.4	63.0	55.0	3.45	3.4	3.9	3.95	88.6	86.1	5.3	2.85	63.8	5.4	6.4	81.4
278892	13.4	48.5	9.4	8.4	9.4	70.0	60.0	2.95	2.85	3.5	3.45	84.3	82.6	4.85	2.55	62.6	5.4	6.4	81.4
278898	12.6	67.9	8.8	8.2	9.2	69.0	65.0	3.6	3.7	3.6	3.65	100.0	101.4	5.4	2.6	48.2	4.7	6.6	71.2
278746	12.7	91.3	9.0	8.0	9.0	63.0	51.5	3.8	3.75	3.65	3.7	104.1	101.4	5.05	2.5	49.6	4.9	6.4	76.6
278726	13.4	69.0	9.8	8.5	9.3	62.0	48.0	3.55	3.6	3.9	3.9	91.0	92.5	5.7	2.8	49.1	4.7	6.4	76.6
278865	13.4	63.0	8.8	7.8	9.4	71.5	54.0	3.6	3.6	3.9	3.8	92.9	94.7	5.2	2.8	44.2	4.7	5.8	81.0
278733	13.0	60.0	9.0	8.0	9.4	72.5	49.5	3.2	3.3	3.6	3.6	97.2	91.7	5.0	2.45	49.0	4.4	6.1	72.1
278807	13.8	53.6	9.4	8.4	10.2	73.5	54.0	3.5	3.5	3.6	3.7	97.2	91.6	5.55	2.4	43.2	5.1	6.2	82.3
278737	(12.4)	(85.6)	(8.5)	(8.0)	(9.0)	(72.5)	(65.0)	3.2	3.25	3.7	3.6	86.5	90.9	5.05	2.5	49.5	(4.5)	(5.5)	(81.8)
278727	13.5	63.3	9.2	8.5	9.6	70.5	62.5	3.55	3.55	3.7	3.7	97.3	95.9	5.3	2.5	47.2	4.6	6.3	73.0
278742	12.8	63.9	9.3	8.6	9.7	67.0	49.5	3.6	3.55	3.7	3.7	98.7	95.9	5.3	2.4	45.3	4.9	6.3	77.8
278740	13.4	54.5	9.0	8.2	9.1	69.0	50.5	3.6	3.7	3.75	3.7	98.7	101.1	5.3	2.55	43.1	4.7	6.1	77.1
278750	12.4	58.8	9.3	8.2	9.2	68.0	50.5	3.6	3.6	3.8	3.8	91.7	92.6	4.8	2.3	47.9	4.8	6.0	81.4
278858	13.1	68.1	9.1	8.2	9.1	69.0	51.0	3.6	3.6	3.8	3.6	97.7	98.6	4.8	2.3	57.0	4.8	6.0	75.0
278738	13.0	60.4	8.5	8.7	9.6	63.0	53.0	3.6	3.5	3.7	3.6	97.3	98.6	4.5	2.4	45.7	4.5	6.0	70.0
278768	12.8	62.3	8.5	8.7	9.6	67.0	43.3	3.35	3.35	3.7	3.75	88.2	89.2	4.7	2.8	61.4	3.6	6.0	70.9
278732	12.8	62.3	8.5	8.7	9.6	67.0	43.3	3.35	3.35	3.7	3.7	90.5	89.2	4.7	2.8	61.4	3.6	6.0	70.9
278736	13.1	67.4	9.1	8.0	9.4	70.0	53.0	3.1	3.2	3.6	3.65	80.1	88.9	4.8	2.4	44.4	5.3	6.3	84.1
278762	13.6	67.4	10.1	8.5	9.4	63.0	46.0	3.4	3.45	3.75	3.65	90.7	94.6	3.2	2.35	45.2	5.2	6.0	73.4
278763	13.0	60.0	8.4	7.4	8.8	70.0	54.5	3.5	3.5	3.75	3.7	93.3	94.6	4.65	2.65	47.0	4.9	6.2	73.0
278925	14.5	49.0	9.7	8.8	9.8	69.5	52.0	3.8	3.8	4.0	3.9	95.0	97.4	5.55	2.55	45.9	4.8	6.3	76.2
Specimens	(80)	(78)	(71)	(60)	(81)	(70)	(70)	(79)	(81)	(79)	(81)	(81)	(81)	(81)	(81)	(81)	(65)	(66)	(66)
Totals	1,057.3	667.7	607.7	670.7	770.1	4,895.5	3,710.5	273.4	281.7	297.5	301.2	417.95	417.95	417.95	208.6	2.58	330.15	415.4	415.4
Averages	89.28	8.36	8.40	8.36	9.51	68.65	53.01	3.46	3.48	3.77	3.72	91.90	93.63	5.16	2.58	49.91	5.0	6.23	79.48
Minima	12.4	82.1	8.4	7.4	8.6	62.0	40.0	2.95	2.85	3.4	3.4	82.9	82.9	4.4	2.2	41.1	4.0	5.6	70.3
Maxima	14.5	98.4	10.9	9.4	10.2	74.5	66.0	3.8	3.8	4.2	4.1	104.1	101.4	5.7	3.05	58.7	6.0	6.0	91.4

1 Near.

MONGOLS

(Abstract)

Measurement	Males ¹			Females ¹		
	Group A	Group B	Group C	Group A	Group B	Group C
Approximate age of subject...	(31)	(61)	(12)	(29)	(29)	(24)
Vault:	44.0	44.2	41.3	36.2	34.2	30.5
Length.....	(31)	(61)	(12)	(29)	(29)	(24)
Breadth.....	18.82	18.37	17.88	17.86	17.34	16.87
Height.....	(31)	(61)	(12)	(29)	(29)	(24)
Height.....	14.70	15.21	15.68	14.07	14.39	14.75
Height.....	(31)	(61)	(12)	(29)	(29)	(24)
Height.....	13.20	13.18	13.17	12.58	12.67	12.54
Cranial Index.....	(31)	(61)	(12)	(29)	(29)	(24)
Cranial Index.....	78.12	82.81	87.74	78.76	82.93	87.45
Cranial Index.....	(31)	(61)	(12)	(29)	(29)	(24)
Cranial Index.....	78.76	78.48	78.47	78.81	79.81	79.89
Cranial Index.....	(31)	(61)	(12)	(29)	(29)	(24)
Cranial Index.....	15.57	15.58	15.58	14.84	14.80	14.72
Cranial Index.....	(31)	(59)	(12)	(28)	(29)	(24)
Capacity.....	1,574.5	1,587.9	1,638.3	1,404.9	1,413.3	1,408.5
Face:	(9)	(16)	(4)	(14)	(10)	(5)
Total height.....	12.98	12.99	12.73	11.67	11.64	11.70
Upper height.....	(26)	(47)	(9)	(25)	(26)	(22)
Upper height.....	7.95	7.89	7.90	7.16	7.06	7.04
Maximum breadth.....	(30)	(57)	(11)	(29)	(29)	(22)
Maximum breadth.....	14.29	14.32	14.58	13.18	13.22	13.26
Facial index, total.....	(9)	(15)	(4)	(14)	(10)	(5)
Facial index, total.....	90.40	91.40	88.52	89.63	88.53	89.72
Facial index, upper.....	(26)	(46)	(9)	(25)	(26)	(22)
Facial index, upper.....	55.57	55.16	54.15	54.33	53.45	53.08
Base, etc.:	(26)	(46)	(8)	(23)	(25)	(23)
Basion-Alveolar point.....	10.05	9.96	9.75	9.52	9.46	9.23
Basion-Subnasal point.....	(31)	(60)	(12)	(28)	(29)	(23)
Basion-Subnasal point.....	8.93	8.83	8.45	8.49	8.40	8.24
Basion-Nasion.....	(31)	(60)	(12)	(29)	(29)	(23)
Basion-Nasion.....	10.45	10.37	9.75	9.64	9.50	9.35
Facial angle.....	(26)	(44)	(8)	(23)	(25)	(22)
Facial angle.....	69.75	68.55	66.25	68.91	68.44	68.61
Alveolar angle.....	(26)	(44)	(8)	(23)	(25)	(22)
Alveolar angle.....	55.33	54.20	50.44	53.37	52.84	52.82
Orbits, height:	(31)	(60)	(11)	(29)	(27)	(23)
Right.....	3.61	3.59	3.58	3.49	3.42	3.47
Left.....	(29)	(59)	(10)	(29)	(28)	(24)
Left.....	3.61	3.61	3.63	3.50	3.45	3.48
Breadth:	(31)	(60)	(11)	(29)	(27)	(23)
Right.....	3.90	3.92	4.0	3.79	3.79	3.72
Left.....	(29)	(59)	(10)	(29)	(28)	(24)
Left.....	3.88	3.87	4.0	3.74	3.72	3.69
Index:	(31)	(60)	(11)	(29)	(27)	(23)
Right.....	92.63	91.58	88.93	92.17	90.37	93.39
Left.....	(29)	(59)	(10)	(29)	(28)	(24)
Left.....	93.07	93.40	90.74	93.60	92.94	94.13
Nose:	(31)	(61)	(11)	(28)	(29)	(24)
Height.....	5.70	5.61	5.60	5.15	5.16	5.18
Breadth.....	(31)	(61)	(11)	(28)	(29)	(24)
Breadth.....	2.72	2.75	2.70	2.60	2.59	2.53
Nasal index.....	(31)	(61)	(11)	(28)	(29)	(24)
Nasal index.....	47.78	49.09	48.18	50.59	50.18	48.79
Upper Alveolar Arch:	(23)	(41)	(7)	(22)	(23)	(21)
Length.....	5.47	5.42	5.34	5.10	5.0	4.89
Breadth.....	(23)	(41)	(7)	(22)	(23)	(21)
Breadth.....	6.70	6.75	6.67	6.34	6.27	6.27
Index.....	(23)	(41)	(7)	(22)	(23)	(21)
Index.....	81.62	80.30	80.09	80.56	79.80	77.98
Lower jaw:	(10)	(19)	(4)	(15)	(10)	(4)
Height at symphysis.....	3.61	3.68	3.64	3.25	3.27	3.26

¹ Grouped by cranial index.

SIBERIAN CRANIA

(Abstract)

MALES

Measurement	Sam-oyed	Ostiak	Vogtl	Tungus M. series	Tungus I. series	Buriat	Ucheli		Gillak		Yakut	Yukagir	Orochi	Koriak	Kamchadal	Chukchi	Mongol (Outer)
							Type D	Type B	Sakhalin Island	Ochotsk Sea L. Amur							
Approximate age	{ (10) 45.5	(16) 47.8	(11) 38.6	(6) Adult	(27) 39	Adult	(9) Adult	(2) Adult	(7) Adult	(7) Adult	(7) Adult	(1) Adult	(1) Adult	(1) Adult	(14) 42.8	(104) 44.1	
Vault:	{ (1) 17.86	(15) 18.31	(11) 19.09	(6) 17.82	(29) 18.06	(4) 18.05	(9) 17.98	(2) 18.80	(7) 18.63	(7) 18.50	(7) 17.8	(1) 18.1	(1) 18.49	(1) 18.44	(55) 18.49	(104) 18.44	
Length	{ (10) 14.67	(15) 14.28	(11) 14.45	(6) 14.33	(29) 15.05	(4) 13.83	(9) 15.03	(2) 13.60	(7) 15.0	(7) 14.63	(7) 15.0	(1) 14.2	(1) 14.30	(1) 15.11	(55) 14.30	(104) 15.11	
Breadth	{ (10) 12.76	(15) 12.84	(11) 13.17	(6) 12.68	(29) 13.14	(4) 13.43	(9) 13.49	(2) 13.65	(7) 13.51	(7) 13.09	(7) 13.1	(1) 13.8	(1) 13.64	(1) 13.18	(55) 13.64	(104) 13.18	
Height	{ (10) 82.1	(15) 74.5	(11) 75.7	(6) 83.8	(29) 82.4	(4) 74.1	(9) 83.6	(2) 72.5	(7) 80.5	(7) 79.1	(7) 81.3	(1) 78.5	(1) 77.5	(1) 81.9	(55) 77.5	(104) 81.9	
Craniat index	{ (10) 78.0	(15) 78.5	(11) 78.5	(6) 77.5	(29) 79.3	(4) 82.7	(9) 81.7	(2) 84.3	(7) 80.4	(7) 79.0	(7) 79.9	(1) 85.5	(1) 83.2	(1) 78.6	(55) 83.2	(104) 78.6	
Mean height index	{ (10) 78.5	(15) 77.4	(11) 78.5	(6) 77.5	(29) 79.3	(4) 82.7	(9) 81.7	(2) 84.3	(7) 80.4	(7) 79.0	(7) 79.9	(1) 85.5	(1) 83.2	(1) 78.6	(55) 83.2	(104) 78.6	
Module (mean diam.)	{ (10) 16.0	(15) 15.18	(11) 15.57	(6) 15.15	(29) 15.42	(4) 15.30	(9) 15.50	(2) 15.35	(7) 15.71	(7) 15.40	(7) 15.30	(1) 15.37	(1) 15.48	(1) 15.85	(55) 15.48	(104) 15.85	
Capacity	{ (10) 53.9	(15) 53.8	(11) 53.8	(6) 54.0	(29) 55.2	(4) 55.9	(9) 55.1	(2) 55.2	(7) 55.2	(7) 55.2	(7) 55.0	(1) 55.1	(1) 55.5	(1) 55.2	(55) 55.5	(104) 55.2	
Face:	{ (3) 12.37	(8) 12.17	(3) 12.33	(5) 12.50	(8) 12.73	(2) 12.35	(2) 12.85	(2) 13.30	(3) 12.87	(3) 12.90	(3) 12.90	(1) 13.15	(10) 13.15	(29) 12.95	(50) 13.15	(32) 12.95	(80) 13.15
Total height	{ (8) 7.53	(9) 7.57	(14) 7.25	(6) 7.72	(24) 7.70	(4) 7.70	(2) 8.22	(7) 7.90	(9) 8.08	(9) 8.08	(9) 8.08	(1) 7.4	(1) 7.96	(32) 7.91	(50) 7.96	(52) 7.91	(80) 7.91
Upper height	{ (10) 13.97	(15) 13.71	(11) 13.71	(6) 14.30	(27) 14.0	(4) 13.78	(2) 13.62	(8) 13.88	(12) 14.53	(12) 14.53	(12) 14.53	(1) 12.8	(1) 11.11	(98) 14.34	(55) 11.11	(103) 14.34	(103) 14.34
Max. breadth	{ (3) 89.4	(8) 88.0	(3) 87.1	(5) 87.2	(8) 90.7	(2) 89.2	(2) 93.6	(2) 89.6	(3) 88.5	(3) 88.0	(3) 88.0	(1) 94.1	(1) 91.7	(23) 90.7	(10) 91.7	(23) 90.7	(80) 90.7
Facial index: Total	{ (8) 53.9	(9) 53.8	(13) 53.8	(6) 54.0	(24) 55.1	(4) 55.9	(2) 55.2	(7) 55.1	(3) 55.2	(3) 55.2	(3) 55.0	(1) 55.1	(1) 55.5	(31) 55.2	(56) 55.5	(31) 55.2	(80) 55.2
Facial index, upper	{ (7) 9.83	(14) 10.41	(11) 10.47	(6) 10.22	(24) 9.90	(4) 10.30	(3) 10.70	(7) 10.77	(6) 10.33	(6) 9.92	(6) 9.92	(1) 9.6	(1) 10.52	(80) 9.97	(49) 10.52	(80) 9.97	(80) 9.97
Basion-Alveolar point	{ (10) 8.70	(15) 8.15	(11) 9.33	(6) 9.35	(28) 8.80	(4) 9.15	(5) 9.30	(7) 9.54	(7) 9.0	(7) 9.0	(7) 9.0	(1) 8.6	(1) 9.30	(103) 8.81	(54) 9.30	(103) 8.81	(103) 8.81
Basion-Subnasal point	{ (10) 10.21	(15) 10.18	(11) 10.36	(6) 10.13	(28) 9.90	(4) 10.48	(5) 10.42	(8) 10.44	(7) 10.37	(7) 10.20	(7) 10.20	(1) 9.6	(1) 10.41	(103) 10.32	(54) 10.41	(103) 10.32	(103) 10.32
Basion-Nasion	{ (7) 67.2	(14) 68.0	(11) 68.0	(6) 67.1	(24) 67.3	(4) 66.2	(5) 66.2	(7) 66.1	(6) 67.0	(6) 67.0	(6) 67.0	(1) 69.0	(1) 66.0	(78) 68.7	(49) 66.0	(78) 68.7	(78) 68.7
Facial angle	{ (7) 53.7	(14) 53.7	(11) 53.7	(6) 53.2	(24) 53.2	(4) 53.8	(5) 53.2	(7) 53.9	(6) 53.8	(6) 53.8	(6) 53.8	(1) 53.5	(1) 53.5	(73) 53.7	(49) 53.5	(73) 53.7	(73) 53.7
Alveolar angle	{ (7) 54.9	(14) 54.9	(11) 54.9	(6) 54.9	(24) 54.9	(4) 54.9	(5) 54.9	(7) 54.9	(6) 54.9	(6) 54.9	(6) 54.9	(1) 54.9	(1) 54.9	(54) 54.9	(49) 54.9	(54) 54.9	(54) 54.9

Cranial index.....	(8) 82.5	(115) 80.2	(27) 75.8	(10) 78.	(9) 82.7	(24) 81.9	(13) 78.9	(2) 85.8	(14) 83.8	(1) 73.4	(13) 78.9	(2) 82.1	(1) 78.5	(1) 76.4	(70) 77.5	(82) 82.7 (71,7-9,1,5)
Mean height index.....	(8) 76.2	(115) 78.7	(26) 77.5	(10) 75.5	(9) 77.8	(24) 78.6	(13) 72.8	(2) 81.	(13) 80.4	(1) 84.0	(10) 78.	(2) 77.1	(1) 88.6	(1) 83.8	(68) 83.8	(82) 79.3
Module (mean diameter).....	(8) 14.53	(115) 14.57	(26) 14.48	(10) 14.52	(9) 14.70	(24) 14.84	(13) 14.72	(2) 14.40	(13) 14.62	(1) 15.10	(10) 14.81	(2) 14.80	(1) 14.40	(1) 14.77	(68) 14.84	(82) 14.979
Capacity.....	(3) 11.30	(15) 11.21	(22) 11.07	(3) 11.37	(7) 11.07	(4) 12.20	(3) 12.0	(2) 12.15	(2) 12.15	(1) 12.15	(2) 11.90	(1) 11.70	(1) 11.67	(1) 11.70	(12) 11.70	(29) 14.00
Face:	(8) 6.98	(110) 6.90	(22) 6.72	(10) 6.72	(9) 6.92	(17) 7.25	(10) 7.33	(2) 7.05	(13) 7.22	(1) 6.9	(12) 7.26	(1) 6.6	(1) 6.8	(1) 7.0	(66) 7.07	(73) 7.00
Upper height.....	(8) 13.08	(114) 13.11	(25) 12.90	(10) 13.08	(9) 13.18	(22) 13.01	(13) 13.18	(2) 13.05	(10) 13.40	(1) 13.1	(12) 13.33	(1) 13.1	(1) 12.8	(1) 13.5	(12) 13.16	(80) 13.22
Maximum breadth.....	(3) 86.9	(13) 86.3	(7) 87.1	(3) 82.2	(3) 83.8	(4) 89.6	(4) 89.6	(2) 89.3	(3) 89.3	(1) 89.3	(2) 88.2	(1) 87.7	(1) 87.7	(1) 87.7	(12) 87.7	(29) 89.3
Facial index: Total.....	(8) 53.4	(109) 53.4	(21) 51.9	(10) 55.1	(9) 52.5	(17) 53.3	(10) 55.5	(2) 51.7	(9) 53.4	(1) 52.7	(12) 51.5	(1) 51.5	(1) 51.9	(1) 51.9	(69) 53.6	(73) 53.6
Facial index: Upper.....	(7) 9.67	(109) 9.85	(21) 9.47	(10) 9.76	(9) 9.82	(15) 9.60	(10) 9.93	(2) 10.10	(10) 10.31	(1) 10.5	(10) 9.36	(1) 10.4	(1) 9.3	(1) 9.6	(61) 10.07	(71) 10.40
Base, etc.:	(8) 8.65	(114) 8.78	(26) 8.52	(10) 8.54	(9) 8.71	(24) 8.46	(13) 8.79	(2) 8.90	(10) 9.11	(1) 9.2	(10) 8.38	(1) 8.3	(1) 8.1	(1) 8.7	(64) 8.91	(80) 8.38
Basion-Alveolar point.....	(8) 9.71	(109) 9.65	(26) 9.60	(10) 9.39	(9) 9.59	(24) 9.08	(13) 9.88	(2) 9.60	(12) 9.87	(1) 10.0	(11) 9.74	(2) 10.15	(1) 9.2	(1) 9.8	(67) 9.91	(81) 9.51
Basion-Subnasal point.....	(7) 68.7	(109) 67.3	(26) 70.	(10) 65.	(9) 67.1	(15) 68.2	(10) 67.3	(2) 65.3	(10) 62.2	(1) 61.0	(10) 69.8	(1) 69.0	(1) 67.5	(1) 70.5	(59) 67.4	(70) 68.7
Alveolar angle.....	(7) 31.4	(109) 32.3	(26) 34.8	(10) 48.5	(9) 50.5	(22) 52.1	(13) 51.1	(2) 51.	(10) 51.9	(1) 49.5	(10) 55.5	(1) 55.5	(1) 49.5	(1) 53.0	(59) 54.3	(70) 53.0
Orbits:	(8) 3.38	(113) 3.43	(24) 3.40	(10) 3.30	(9) 3.26	(22) 3.48	(13) 3.53	(2) 3.39	(11) 3.41	(1) 3.3	(11) 3.37	(1) 3.71	(1) 3.5	(1) 3.8	(66) 3.55	(81) 3.47
Mean height.....	(8) 3.75	(113) 3.83	(24) 3.79	(10) 3.75	(9) 3.61	(22) 3.79	(13) 3.90	(2) 3.98	(11) 3.80	(1) 3.9	(11) 3.71	(1) 3.71	(1) 3.7	(1) 3.8	(66) 3.88	(81) 3.75
Mean breadth.....	(8) 90.1	(113) 89.8	(24) 89.8	(10) 93.3	(9) 90.2	(22) 91.8	(13) 90.	(2) 85.3	(11) 89.7	(1) 84.7	(11) 90.3	(1) 94.6	(1) 94.6	(1) 91.5	(66) 91.5	(81) 92.7
Nose:	(8) 5.17	(114) 5.06	(25) 4.96	(10) 5.25	(9) 4.95	(21) 5.29	(13) 5.27	(2) 4.92	(11) 5.09	(1) 4.75	(12) 5.28	(1) 4.9	(1) 4.8	(1) 4.9	(67) 5.12	(81) 5.16
Height.....	(8) 2.41	(114) 2.49	(25) 2.49	(10) 2.59	(9) 2.51	(21) 2.69	(13) 2.64	(2) 2.58	(11) 2.47	(1) 2.9	(12) 2.59	(1) 2.5	(1) 2.4	(1) 2.4	(67) 2.40	(81) 2.58
Breadth.....	(6) 46.7	(114) 46.3	(25) 46.3	(10) 49.3	(9) 50.6	(21) 50.1	(13) 50.1	(2) 48.6	(11) 48.6	(1) 46.0	(12) 49.1	(1) 51.	(1) 54.2	(1) 54.2	(52) 46.8	(81) 46.9
Nasal index.....	(6) 5.09	(101) 5.28	(18) 5.06	(10) 5.23	(9) 5.11	(16) 5.09	(13) 5.24	(1) 5.5	(9) 5.30	(1) 5.6	(12) 5.13	(1) 5.2	(1) 5.38	(1) 5.0	(52) 5.38	(66) 5.0
Upper Alveolar Arch:	(7) 6.14	(101) 6.25	(18) 6.09	(10) 6.21	(9) 6.40	(16) 6.34	(10) 6.50	(1) 6.5	(9) 6.49	(1) 6.3	(12) 6.51	(1) 6.4	(1) 6.41	(1) 6.29	(52) 6.41	(66) 6.29
Length.....	(7) 82.8	(101) 84.6	(18) 83.0	(10) 84.2	(9) 79.9	(16) 80.2	(10) 80.5	(1) 84.6	(9) 81.7	(1) 83.9	(12) 78.9	(1) 81.3	(1) 83.5	(1) 83.5	(52) 83.5	(66) 79.5
Breadth.....	(7) 82.8	(101) 84.6	(18) 83.0	(10) 84.2	(9) 79.9	(16) 80.2	(10) 80.5	(1) 84.6	(9) 81.7	(1) 83.9	(12) 78.9	(1) 81.3	(1) 83.5	(1) 83.5	(52) 83.5	(66) 79.5
Lower jaw:	(7) 82.8	(101) 84.6	(18) 83.0	(10) 84.2	(9) 79.9	(16) 80.2	(10) 80.5	(1) 84.6	(9) 81.7	(1) 83.9	(12) 78.9	(1) 81.3	(1) 83.5	(1) 83.5	(52) 83.5	(66) 79.5
Height at symphysis.....	(7) 82.8	(101) 84.6	(18) 83.0	(10) 84.2	(9) 79.9	(16) 80.2	(10) 80.5	(1) 84.6	(9) 81.7	(1) 83.9	(12) 78.9	(1) 81.3	(1) 83.5	(1) 83.5	(52) 83.5	(66) 79.5

1 Preenile adult.
2 Cranial capacity.

NOTES ON THE NON-ESKIMO CRANIA

Less than a score of years ago Alaska from the point of view of anthropology was regarded as one of the simplest regions, with only the Indians and the Eskimo to be considered. How far this concept was from reality will be appreciated from a study of the data herein presented.

The Alaska Indians in general offer much in common, though there are some regional differences among them. The only marked exception is the group on the Shageluk Slough of the Yukon, which approaches the dolichoid Shoshonean-Algonkin strains. The Eskimo, too, are fairly homogeneous, with local differences. But there were four groups at least in southwestern Alaska that, although belonging to the same basic complex, were distinctly different from the rest. Two of these, the Koniag and the Aleut, used to be erroneously counted with the Eskimo; but there were also two others, older and until recently not even suspected, that for a long time occupied the regions of the Koniags and the Aleuts but were more or less completely replaced by the latter.

Of these four groups, the Koniags, the latest inhabitants of Kodiak Island, were related to the Aleuts, as well as to the southern Alaska Indians, yet had some individuality of their own. The Aleuts, shown to be completely different from the Eskimo, have marked Asiatic (Tungus) affinities. Both the Pre-Koniags and the Pre-Aleuts were entirely distinct from the Koniags and the Aleuts, as well as from each other, and were related to different types of the mainland Indian.

Thus Alaska was a mosaic of differing types of people, and the main groups have doubtless now been discovered. These peoples were not very ancient, none in all probability reaching much beyond the Christian Era. If there is any type still more ancient, evidence of it lies in the frozen grounds that cannot yet be explored. It would seem, however, that at best there could have been only sparse and few stations of earlier man—there is no indication of anything on a larger scale.

Notwithstanding the differences in the various Alaska strains, there was found nowhere any sharp line of demarcation. The masses differed, sometimes very markedly, but many of the individuals merged with others of separate groups. This was partly due, no doubt, to intermixture, but in the main the cause is the same as between the various mainland tribes; it is the same basic racial derivation. Even the Eskimo in Alaska and the Indian merge to such a degree that in the case of many individual crania even an expert cannot be sure what he has before him.

This matter naturally raises the question as to the meaning of existing differences between these and other American native groups. In general there is not one of the many American tribes, nor any two

or more separate parts of even the same tribe, that do not present some physical differences. Yet all these tribes are basically closely related, and all belong plainly to one and the same stem of humanity. The differences are manifested, though never collectively, in most of the physical characters of both the living and the skeleton. The most marked ones are in stature, shape of the head, and robustness of the parts.

These differences parallel those within the other two main stems of mankind, the White and the Black, and their explanation is not yet possible, but it may be approached. It is clear that all these differences could not have existed from the beginnings of the species, for none of the human varieties of present times are of such antiquity; many in fact must be rather recent. Therefore they must have arisen in the course of man's biological history and can have been due only to internal or external contemporaneous agencies. In an extended sense therefore they were not inherent but were acquired. Just what the reasons were that underlay these organic acquisitions it is not possible to fathom clearly, but we may be sure that the causes, multiple and elusive as they may be, are all natural, and as such all subject to eventual definitive determination. They may legitimately be called the causes of "raciogeny," and their study will constitute perhaps the most attractive and important task of future anthropology. For the present it may suffice to view all these human subtypes, types, or varieties, American or other, as so many more or less fixed results of the reactions between a plastic class of organisms and various sufficiently potent internal and external agencies.

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THE CATFISHES OF VENEZUELA, WITH DESCRIPTIONS
OF THIRTY-EIGHT NEW FORMS

By LEONARD P. SCHULTZ

IN THE winter of 1942, at the invitation of Dr. Guillermo Zuloaga, assistant chief of explorations, Standard Oil Co. of Venezuela, Caracas, I undertook to study and make collections of fishes in the Maracaibo Basin of Venezuela. I proceeded to Venezuela under the auspices of the Smithsonian Institution and the United States Department of State and was a guest there of the Standard Oil Co. of Venezuela and of the Lago Petroleum Corporation, Lago Maracaibo. To the officials of these companies I must express my deep appreciation, for it was a great pleasure to accept this wonderful opportunity.

This report on the catfishes of Venezuela is based on collections made by me in the Maracaibo Basin and in other localities of the country, totaling 9,920 specimens, as well as on additional specimens in the collections of the United States National Museum. It is planned to report later on the other groups of fishes represented in the collections made during this trip.

I wish especially to thank the following for their aid and hospitality during the course of my work: Hon. Frank P. Corrigan, United States Ambassador, Caracas, Renwick S. McNiece, American Consul, Maracaibo, and Thomas Maleady, second secretary, American Embassy, Caracas, for their fullest cooperation in helping me obtain the necessary papers connected with my extensive travels in Venezuela and making my visit to that country so pleasant; Dr. Walter Dupouy, director of the Museo de Ciencias Naturales, Caracas, who

was especially helpful in regard to my work on the fishes; Mr. and Mrs. William H. Phelps and Mr. and Mrs. William H. Phelps, Jr., who made me so comfortable in their homes in Caracas; and Dr. Guillermo Zuloaga, W. H. Phelps, Jr., and Roger H. Sherman for taking me on a short collecting trip in the upper part of the Río Guarico, which I shall long remember.¹

Nearly four months were spent in various parts of Venezuela from February through May, and during this time I was able to collect about 34,700 fish specimens, as well as numerous specimens of crustaceans, mollusks, amphibians, reptiles, and insects, which are now in the collections of the United States National Museum.

ITINERARY

I left Washington, D. C., on February 1, 1942, for Miami, Fla., and departed from there on February 3 by plane, arriving in Maracaibo that evening, and proceeding the next day to Caracas by air. From February 4 to 11, I made numerous new acquaintances and obtained necessary travel papers and collecting permits from the Venezuelan Government officials, who were most cooperative at all times.

Upon arriving again at Maracaibo on February 11, I was a guest of the Lago Petroleum Corporation, whose officials cooperated fully and helped me in every possible way to make collections in the Maracaibo Basin and in the Andes. My equipment arrived at Maracaibo and was assembled so that collecting actually began on February 20, 1942. From then until March 14, I made various trips on the western side of Lago Maracaibo as far south as the Río Negro (Santa Ana system) and as far as 35 kilometers north of Sinamaica in a caño leading into the Golfo de Venezuela.

Between March 14 and March 26, I collected along the eastern side of Lago Maracaibo from the Río Motatán northward to the Río Cocuiza at El Mene, east of Altagracia, as well as in Lago Maracaibo off Lagunillas.

¹ In addition, I take this opportunity to express my thanks and sincere appreciation to the following persons who cooperated and helped me in every way possible: John Allen, geologist, La Salina; Chester L. Babin, district superintendent, Lagunillas; Raymond L. Bodenhamer, warehouseman, La Salina; Walter W. Butcher, geologist, Maracaibo; James A. Cox, warehouseman, Lagunillas; John Durr, geologist, La Salina; Don Juan F. Emanuel, Maracaibo; Dr. Alvin J. Freie, division geologist, Maracaibo; Marcus G. Geiser, gravity meter operator, Lagunillas; John Kallimnic, Maracaibo; Will S. Link, public relations supervisor, Maracaibo; Henry E. Linam, general manager, Standard Oil Co. of Venezuela, Caracas; Rafael Navarro, Maracaibo; Bethea Martin, geologist, La Salina; Serafin Martínez, senior clerk, Maracaibo; Edward E. Peake, district superintendent, La Salina; Chesley B. Pickle, party chief, Lagunillas; Frank J. Pospisil, geologist, La Salina; Arthur T. Proudfit, division manager, Lago Petroleum Corporation, Maracaibo; Joseph Ratway, geologist, La Salina; Bernard C. Reishauge, geologist, Maracaibo; George H. Seely, resident engineer, Lagunillas; Mr. Slightholm, Lagunillas; Aden Stiles, Maracaibo; Dr. Frederick A. Sutton, senior geologist, Maracaibo; and John Taylor, Maracaibo.

Mrs. Aime M. Awl, artist, United States National Museum, drew all the figures of the new species and retouched some of those photographed.

I wish to express my thanks also to my wife, who spent much time helping me with the checking of the manuscript and proof.

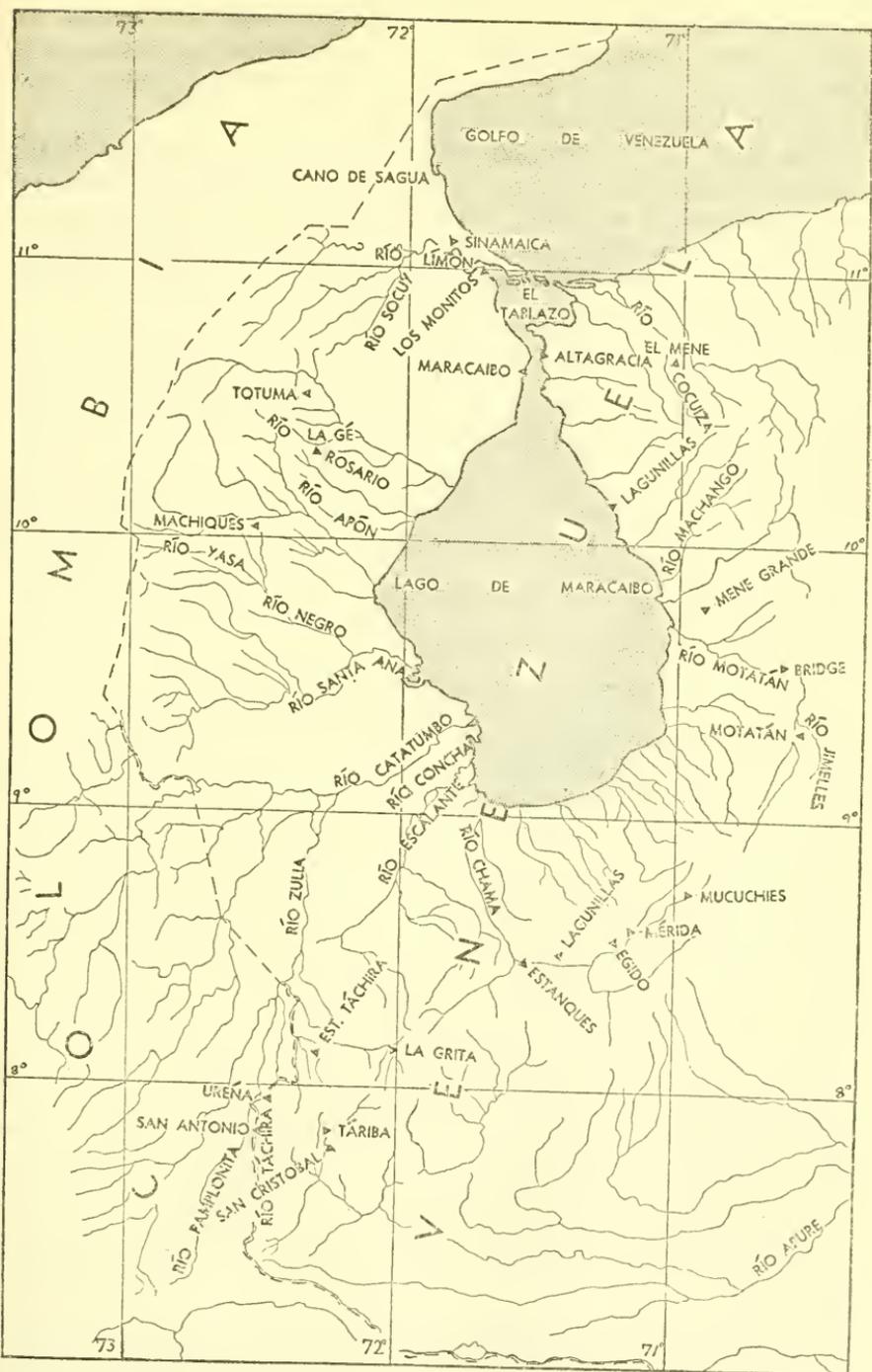


FIGURE 1.—Map of the Maracaibo Basin of Venezuela, showing collecting localities visited by the author in 1942 and other localities recorded in this report.

In order to obtain fishes from the headwaters of the rivers at the southern end of Lago Maracaibo, a trip into the high Andes was made from March 27 to April 4. The Río Chama, Río Catatumbo, and Orinoco systems yielded many specimens.

From April 7 to 23 collections were made in Lago Maracaibo in the vicinity of Lagunillas and Pueblo Viejo, eastern side of the lake.

Between April 29 and May 5 collections were made in the lake and in rivers at the southern end of Lago Maracaibo. Chesley Pickle kindly took me and my equipment in the *Indiana* so that I could stay on the boat *Emma* as guest of John Taylor.

A second trip was made to Caracas on May 9 by airplane, and while there I was the guest of Mr. and Mrs. William H. Phelps, who entertained me graciously and to whom I extend my sincere thanks and appreciation for an enjoyable stay in Caracas.

Upon returning again to Maracaibo on May 14, I secured specimens of fishes from the Maracaibo market until the 21st, when it was necessary to send my specimens and equipment to the dock for shipment back to the United States.

I returned by plane to Miami, Fla., on May 24, and arrived in Washington, D. C., on May 26, 1942.

LIST OF COLLECTING STATIONS

The following is a list of the localities (see map, fig. 1, of Maracaibo Basin) where collections of fishes were made by me while in Venezuela from February through May 1942:

February 20, 3 to 5 km. north of Maracaibo at Salina Santa Rosa, Salina Rica, and in Lago Maracaibo, opposite these salt marshes.

February 21-22, Río Palmar, about 100 km. west and a little southwest of Maracaibo, near an oilfield called Totuma. The river here was 100 to 300 feet wide and made up of a succession of rapids and ponds, with muddy to sandy bottoms in the quiet pools and rubble to sand in the rapids.

February 24, Río Socuy, about 3 km. above its mouth, Río Limón system north of Maracaibo. The river here was 100 to 150 feet in average width, with sandy to muddy bottom and very deep holes in the sharp bends.

February 26, Río Apón, about 35 km. by road south of Rosario. This river, about 100 feet wide, has a sandy bottom, muddy in pools.

February 26, Río San Ignacio, south of Rosario. This creek is dry except for isolated pools during the dry season.

February 26, Río San Juan, about 12 km. south of Rosario. This shallow stream is about 10 feet wide, with sandy to muddy bottom.

February 27, Lago Maracaibo at Maracaibo Yacht Club located at northern end of city of Maracaibo. The lake here had gravel to sand bottom. Specific gravity 1.006.

March 1, Lago Tulé, about 80 km. west of Maracaibo, is a body of water about three-quarters of a mile long and half a mile wide, about 10 feet deep, bottom mud, shores weedy and junglelike. This lake is said to overflow into the Río Socuy system.

March 2-3, Río Negro, a tributary of the Río Santa Ana, below the mouth of the Río Yasa, 75 km. by road south of Rosario. This river, 35 to 50 feet wide, with deep muddy holes and gravelly riffles, had cut itself a steep, clay-banked channel 10 feet or more below the general level of the ground.

March 5, Lago Maracaibo at Maracaibo Yacht Club.

March 6, Río Palmar at the bridge about 70 km. southwest of Maracaibo. This stream, 75 to 100 feet wide, has a gravelly to sandy bottom, current rapid. No deep pools.

March 6, Lago Maracaibo, 7 km. south of Maracaibo. Sandy beach.

March 8, a small pond, tributary to the Río Gé, Río Palmar system, 2 km. west of Rosario.

March 10, Campo de Lago Petroleum Corporation, Maracaibo.

March 11, Los Monitos, 45 km. north of Maracaibo, a tidal caño connected with the lower Río Limón.

March 11, caño $\frac{3}{4}$ km. west of Sinamaica, about 60 km. north of Maracaibo. This is a tidal caño connected with the lower Río Limón.

March 11, Ciénaga del Guanavana, about 10 km. north of Sinamaica. This swamp was muddy and shallow, about 3 feet deep in places during the dry season. The bottom was made up of shell and vegetable debris.

March 12, Caño de Sagua, about 35 km. north of Sinamaica. Salinity 1.021.

March 12, channel of Salina Rica, 5 km. north of Maracaibo.

March 15, Lago Maracaibo, 2 km. off Lagunillas, water depth 15 feet, bottom muddy. Specific gravity 1.004.

March 16, Río Machango at bridge about 35 km. south of Lagunillas. This stream has a muddy bottom. It was about 20 feet wide, with high clay banks.

March 17, Río Motatán at the bridge 22 km. by road north of Motatán. This river is very swift, with rubbly to gravelly bottom and 200 feet or more wide.

March 17, Río San Juan (tributary of Río Motatán), at bridge about 20 km. south of Mene Grande. This river, with deep pools and riffles, was 100 to 150 feet wide; riffles mostly rubble and the pools with muddy bottoms.

March 19, a roadside pond, tributary to the Río Cocuiza during the rainy season, is about 50 km. by road east of Altagracia and 10 km. west of El Mene. Bottom mud.

March 20, Río San Juan at bridge, same as March 17. This stream was nearly dry, except for the deep pools.

March 20, Río San Pedro (tributary of Río Motatán), at bridge about 18 km. south of Mene Grande. This stream, with riffles and pools, was nearly dry except for the pools. Its width was about 50 feet.

March 21, Río Machango, about 20 km. above bridge south of Lagunillas. The river here was 75 to 100 feet wide, but now almost dry except for deep pools and a trickle of water over the stony riffles.

March 21, a hot spring, temperature 109° F., tributary to Río Machango, 20 km. above the bridge south of Lagunillas. Fish were taken in water 100° F. and at lower temperatures.

March 24, Río Motatán, about 8 km. below Motatán. This river was 80 to 125 feet wide and flowing rapidly, torrential in places. Bottom rubble to gravel. Depth to 4 feet, no pools.

March 24, Río Jimelles, 12 km. east of Motatán, tributary to Río Motatán. Width of river 50 to 100 feet, depth to 2 or 3 feet, current rapid to torrential.

March 25, Río Motatán, 4 km. above Motatán. Width 75 to 150 feet; depth to 4 feet; current torrential.

March 28, Río Chama above Mucuchies. Width 15 to 30 feet; current rapid to torrential; pools up to 4 feet in depth. Bottom stones, gravel, and sand.

March 29, Río Barregas, tributary of Río Chama, just below Egido, Estado de Mérida. Current rapid; bottom boulders, rubble to gravel and sand; depth to 2 feet; width 15 feet.

March 29, Río Gonzáles, tributary of Río Chama at town of La Gonzáles, Estado de Mérida. Width 50 feet; bottom of big boulders, rubble to sand; depth to 4 feet; current very rapid.

March 30, dry quebrada 4 km. below Lagunillas, Estado de Mérida, Río Chama drainage.

March 30, Río Chama, 10 km. below Lagunillas, Estado de Mérida; width of river bed 400 feet; collected from channel 25 feet wide, depth to 2 feet, current torrential; bottom rubble and sand.

March 31, Río Cobre (tributary to Río Quinta, latter tributary to Río La Grita of Catatumbo system), below La Grita, Estado de Táchira; width 20 feet; depth to 3 feet; bottom large rubble to sand; current torrential.

March 31, Río Torbes, 1 km. above Táriba, Estado de Táchira, Orinoco drainage. Width 30 to 50 feet; depth to 3 feet; big boulders, rubble to gravel and sand; current very rapid.

April 1, Río Táchira, 7 km. north of San Antonio, Estado de Táchira. Width of river bed up to 200 feet, but only a small flow of water among rubble bottom; current rapid; depth in a pool up to 2 feet.

April 3, a quebrada at Estanques, Estado de Mérida, Río Chama system; width 20 feet; bottom rubble to gravel; current rapid.

April 7, Lago Maracaibo, 20 km. off Pueblo Viejo at surface.

April 7-8, Lago Maracaibo, 1 to 2 km. off Pueblo Viejo; use of flashlight at night.

April 7-9, Lago Maracaibo, 1 km. off Pueblo Viejo; depth 2 meters; gill nets set over night.

April 10, Lago Maracaibo near Palmarejo; fishes received from Mr. Pospisil from hook and line fishing.

April 11-12, Lago Petroleum Corporation camp at Lagunillas, Estado de Julia.

April 14, Lago Maracaibo off dock at Lago Petroleum Corporation camp at Lagunillas.

April 16-18, Lago Petroleum Corporation camp at Lagunillas.

April 30, Río de Los Pajaros, 3 km. above Lago Maracaibo (southwestern end of the Lake); a caño 200 feet wide; 15 feet deep; bottom mud and debris; shores swamp and dense jungle.

May 1, Río Agua Caliente, 2 to 3 km. above Lago Maracaibo; caño 300 feet wide, 15 feet deep; bottom mud and debris; shores swamp and dense jungle.

May 2, Río Conecha at its mouth and in Lago Maracaibo, gill nets set at 5 feet and 18 feet depth; bottom mud; shores swamp and dense jungle.

May 12, Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua; water to 4 feet depth; width 40 feet, bottom rubble to sand and mud; aided in this collection by Dr. G. Zuloaga, Roger Sherman, and William H. Phelps, Jr.

May 12, quebrada just south of Caracas, at El Valle, tributary to Río Guaire (Río Tuy system), Distrito Federal; width 10 to 20 feet, depth to 3 feet; bottom rock, sand, mud; aided in this collection by Dr. G. Zuloaga, Roger Sherman, and William H. Phelps, Jr.

May 15-19, Maracaibo market (probably these fish were taken in El Tablazo or in channel entrance of Lago Maracaibo).

May 16, Lago Maracaibo at Maracaibo Yacht Club.

DEFINITION OF TERMS

Terms used in this report upon the catfishes of Venezuela are defined as follows:

Standard length is measured from tip of snout to midbase of caudal fin; *length of head* is distance from tip of snout to rear end of operculum unless otherwise specified, as in the family Loricariidae; *width of head* is across bony base just in front of insertion of first pectoral ray; *depth* is greatest depth of body; *snout* is from tip of snout to front of eye; *distance between nostrils* or *nostrils to eye* is measured from edge of nasal openings; *interorbital space* is distance between the eyes; *postorbital length of head* is distance from eye to rear end of operculum; *caudal peduncle length* is measured from base of last anal ray to midbase of caudal fin; distances involving the *anus* are measured from center of anus.

Simple, flexible, nonpungent rays are represented by small and *pungent spines* by large Roman numerals. *Branched rays* are indicated by Arabic numerals.

Other terms will be found self-explanatory as the species involved are carefully studied.

SUMMARY OF RESULTS IN THE MARACAIBO BASIN

Catfishes belonging to 11 different families of Nematognathi were collected in the Maracaibo Basin, as follows: Bagreidae, Pimelodidae, Auchenipteridae, Ageneiosidae, Bunocephalidae, Cetopsidae, Pygidiidae, Doradidae, Callichthyidae, Astroblepidae, and Loricariidae.

I was able to collect 51 species and subspecies in 36 genera from the Maracaibo Basin and 8 species and subspecies in 7 genera in the headwaters of the Orinoco system. For the Maracaibo Basin, 36 genera and 53 species and subspecies are known. A species of *Pygidium* from above Mérida in the Río Chama system and *Bagre bagre* were not collected by me.

For all Venezuela, 127 species and subspecies in 63 genera are recognized in this study. Without doubt these totals will be greatly increased as soon as adequate collections are made in the Orinoco system and in the coastal streams and when further collections are made in the Maracaibo Basin.

Certain elements among the Nematognathi are distinctive for the Maracaibo Basin, but in general the fauna of this great basin has much in common with that of the Orinoco and Magdalena systems.

The number of genera and number of species of catfishes occurring in the Maracaibo Basin of Venezuela are distributed among the 11 families as follows:

The Bagreidae, marine catfishes, as was expected, had no distinctive

species found only in the Maracaibo Basin. There were three genera and four species.

The Auchenipteridae are represented by one genus and one species, closely related to a form in the Magdalena Basin.

The Pimelodidae were represented by 11 genera and 13 species in the Maracaibo Basin. Two of these genera have not been found elsewhere in South America. The other genera have representatives that occur outside of the Maracaibo Basin.

The Agenciosidae were represented by a single genus and species, related to a form in the Magdalena Basin.

In the Bunocephalidae two genera and three species occur in the Maracaibo Basin and these genera are not found elsewhere in South America.

The Cetopsidae had but a single genus and species in the Maracaibo Basin, and this one was related to a similar form outside the basin.

The Pygidiidae are represented by two genera and six species. A new genus and new species are especially distinctive for this basin, as the subfamily to which it belongs was never before reported outside of the Amazon Basin.

The Doradidae, not previously reported from the Maracaibo Basin, were represented by a new genus and species.

The Callichthyidae, represented by one genus and species, appear to be the same as in adjoining basins.

The Astroblepidae, with one genus and three species, had but one species confined to the Maracaibo Basin.

In the Loricariidae 12 genera and 19 species were collected, and only one was a new genus as yet found only in the Maracaibo Basin.

In this report 38 new forms are described: Four new species and one new subspecies from the Orinoco system; six new genera, 16 new species, and 17 new subspecies from the Maracaibo Basin.

No attempt will be made to discuss in detail the distribution of Venezuelan fishes until all the material collected by me has been identified.

TAXONOMIC SECTION

Order NEMATOGNATHI

Fishes without scales, bodies naked, or with bony plates; first four vertebrae united to form the Weberian apparatus; subopercle absent; opercle well developed or vestigial; maxillary reduced, forming the basis for the maxillary barbel; mental and nasal barbels present or absent; adipose fin usually present, variable, absent in certain groups; air bladder well developed or minute, united with the Weberian apparatus; paired and median fins usually well developed, with certain exceptions.

KEY TO THE FAMILIES OF CATFISHES, OR BAGRE, REPORTED FROM VENEZUELA

- 1a. $\overline{\text{M}}$ Mouth terminal or inferior in position, but lower lip not reverted or folded back to form a disklike mouth.
- 2a. Anterior and posterior nasal openings close together, posterior openings covered with a valve; skin naked, no plates; a pair of maxillary and 2 pairs of mental barbels present; teeth villiform, conical or granular on jaws, present or absent on vomer and palatines; gill membranes broadly attached to each other and to isthmus with or without a free fold across it; eyes superior in position; pelvics inserted behind base of dorsal fin; adipose fin present, base restricted; branched caudal fin rays usually 13 to 15 (marine catfishes).....**Bagreidae** (p. 182)
- 2b. Nostrils distinctly separated by skin covering head, anterior and posterior nasal openings usually far apart.
- 3a. Skin smooth and naked, without bony plates completely covering sides and no series of plates along the lateral line with backward-projecting spines;
- 4a. Adipose fin present, long or short; opercle well developed; maxillary barbels sometimes obscured in a groove; pelvics inserted under or a little behind base of dorsal; 14 to 16 branched caudal fin rays.
- 5a. Mental barbels 4, usually arranged in 2 pairs; air bladder well developed.
- 6a. Gill membranes not joined to each other but extending far forward before their attachment to isthmus; eyes superior in position.
- 7a. Teeth villiform, in a band on lower jaw and usually a similar band on premaxillaries; pelvics usually inserted under rear of base of dorsal fin; adipose fin base long or short.
Pimelodidae (p. 185)
- 7b. Numerous teeth in a single row in each jaw, these teeth evenly spaced and incisorlike, rounded distally; pelvics inserted a little behind dorsal base; adipose fin base very long.
Callophysidae (p. 235)
- 6b. Gill opening not extending far forward, gill membranes joined to isthmus or in front of or above pectoral fin; eyes lateral in position, margins of eyes not free; dorsal rays I, 4 to I, 6; no teeth on palatines; pelvics inserted behind base of dorsal fin; adipose fin short.....**Auchenipteridae** (p. 236)
- 5b. Mental barbels absent; teeth villiform on jaws only; gill membranes joined to isthmus, gill opening not extending forward; eyes lateral, margin not free; air bladder much reduced, enclosed in bony processes of cervical vertebrae.....**Ageneiosidae** (p. 240)
- 4b. Adipose fin absent.
- 8a. Dorsal fin in middle or anterior part of body; a pair of maxillary barbels and 2 pairs of mental barbels; opercle and interopercle without spines; gill membranes joined to isthmus, gill opening restricted, not extending forward along isthmus; pelvics inserted under dorsal or behind it.
- 9a. Caudal fin rays usually $i+6$ to $8+i$, or about 6 to 10 if they are all simple rays; anal rays always fewer than 11; teeth villiform; gill openings usually a small slit in front of pectorals; head and skin with knobs, sometimes with platelets along anal or dorsal fins; pectoral spines strongly serrated; opercle vestigial; air bladder well developed; body depressed forward, expanded to form head; anus near middle of length.....**Bunocephalidae** (p. 243)

- 9b. Branched caudal fin rays usually 15, rarely 14 or 16; branched anal rays 20 to 29; skin naked; body excessively streamlined; teeth villiform to incisor on jaws and vomer; gill membranes joined to isthmus, or gill openings sometimes restricted to in front of pectoral base; eyes nearly concealed in skin, margins fused; opercle well developed; pelvics inserted under last dorsal ray or behind dorsal base; dorsal rays $i, 6$ **Cetopsidae** (p. 250)
- 8b. Dorsal fin posteriorly on body, usually in posterior half of standard length; anal also far back; opercle and interopercle spinous; no mental barbels; usually twin barbels at each corner of mouth; nasal barbels present or absent; pelvics inserted under or in front of dorsal fin; branched caudal fin rays usually 10 to 12.
Pygidiidae (p. 256)
- 3b. Body covered with bony plates or at least a series along lateral line posteriorly, these with backward-projecting spines.
- 10a. A series of bony plates along midsides, these with a backward-directed spine, at least posteriorly; a pair of maxillary and 2 pairs of mental barbels present; barbels sometimes branched or fimbriated; gill membranes united with isthmus; air bladder much specialized; adipose fin present, short, base usually somewhat restricted; branched caudal fin rays usually 15; dorsal rays $I, 4$ to $I, 6$; anal rays about 10 to 16; dorsal and pectoral spines strong, with a locking mechanism; humeral process present; pectoral spine serrated. **Doradidae** (p. 269)
- 10b. Two longitudinal rows of plates completely covering sides of body; twin barbels at each rictus or corners of mouth; teeth villiform; gill membranes broadly joined to isthmus; nostrils not together but only a little distance apart; eyes superior or lateral; adipose, if present, represented by a spiny projection and membrane; branched caudal fin rays usually 12, occasionally 11; dorsal rays 7 to 12.
Callichthyidae (p. 275)
- 1b. Mouth inferior; lower lip reverted, forming with upper lip a disklike mouth; gill membranes broadly united with isthmus; nasal openings close together; no mental barbels; maxillary barbel more or less joining with lips to form disklike mouth; adipose fin, if present, represented by a bony projection and a membrane.
- 11a. Body naked, with plates; teeth bicuspid, in a narrow band on each jaw; pelvics inserted under dorsal base; branched caudal fin rays usually 11..... **Astroblepidae** (p. 278)
- 11b. Body completely covered with bony plates, in rows; teeth erect, with bilobed or spoon-shaped tips, on jaws, none on vomer or palatines; premaxillary elements separated at midline each with a single series of active teeth, dentary similar; branched caudal fin rays usually about 10 or about 14; intestinal canal coiled upon itself; air bladder minute.
Loricariidae (p. 285)

Family BAGREIDAE

This family includes the marine catfishes, with representatives in brackish waters. They are naked forms, with a pair of maxillary barbels and one or two pairs of mental barbels, but differ from other related forms in having the anterior and posterior nasal openings close together, with the rear nasal opening covered with a valve; insertion of pelvic fins behind base of dorsal fin; adipose fin base shorter than

its length and posteriorly free from the caudal peduncle; gill membranes broadly attached to each other, with or without free fold across isthmus.

KEY TO THE SPECIES OF BAGREIDAE REPORTED FROM VENEZUELA

- 1a. Mental barbels in one pair; maxillary barbels broad, bandlike; dorsal and pectoral spines usually with long bandlike filaments.
- 2a. Anal rays about 20 to 24, including rudiments; distance of dorsal from tip of snout 2.9 to 3 in length; distance of adipose from dorsal fin 2.8 to 3 in length; longest anal ray about as long as base of anal fin, the latter $5\frac{1}{2}$ to $6\frac{1}{2}$ in standard length.....*Bagre marinus* (Mitchill)
- 2b. Anal rays 32 to 35; distance from tip of snout to origin of dorsal $3\frac{1}{3}$ in length; distance of adipose fin from dorsal fin base $2\frac{3}{4}$ in length or longer; base of anal fin $4\frac{1}{2}$ in length or longer; longest anal ray less than half length of anal fin base; vomerine and palatine patches of teeth separate (after Eigenmann).....*Bagre bagre* (Linnaeus)
- 1b. Mental barbels in two pairs.
- 3a. No groove across snout at rear of posterior nasal openings; palatine teeth granular in a patch at each side of front of mouth; no vomerine teeth; barbels short, maxillary reaching to front of pectorals; anal rays about vi or vii, 16; gill rakers about 6+14; pectoral rays I, 10; dorsal I, 6.....*Arius spixii* (Agassiz)
- 3b. A groove across snout between posterior margins of rear nasal openings, and front of this groove with a membrane on adults, smooth in young, but somewhat finely papillate; vomerine patches of teeth, villiform, across front of roof of mouth; maxillary barbels short, not reaching quite to tips of pelvises in young and not to tips of pectorals in adults; anal rays about vi, 12; gill rakers about 6+17; pectoral rays I, 10; dorsal I, 6.....*Selenaspis herzbergii* (Bloch)

Genus BAGRE Oken

- Bagre* OKEN, Isis, 1817, p. 1183 (after *les Bagres* of Cuvier, Règne animal, vol. 2, 1817; type by tautonomy, *Silurus bagre* Linnaeus). (Ref. copied.)
- Breviceps* SWAINSON, The natural history and classification of fishes . . . , vol. 1, p. 328. 1838 (preoccupied).
- Felichthys* SWAINSON, *ibid.*, vol. 2, p. 305, 1839. (Type, *Silurus bagre* Linnaeus.)
- Ailurichthys* BAIRD and GIRARD, Proc. Acad. Nat. Sci. Philadelphia, vol. 7, p. 26, 1854 (*Silurus marinus* Mitchill).

BAGRE MARINUS (Mitchill)

- Silurus marinus* MITCHILL, Trans. Lit. Philos. Soc. New York, vol. 1, p. 433, 1814.
- Aelurichthys marinus* STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 41, p. 158, 1879 (Orinoco near Ciudad Bolívar).

U.S.N.M. No. 121205, a specimen 273 mm. in standard length, bought by Leonard P. Schultz at the market in Maracaibo, probably caught in El Tablazo or Gulf of Venezuela, May 15, 1942; U.S.N.M. No. 126417, 3 specimens from Gulf of Venezuela, Estanques Bay, December 8, 1924, U.S.S. *Niagara*; U.S.N.M. No. 126416, 2 specimens, Gulf of Venezuela off Cape Macolla, January 10 and February 18, 1925, U.S.S. *Niagara*.

BAGRE BAGRE (Linnaeus)

Silurus bagre LINNAEUS, *Systema naturae*, ed. 12, vol. 1, p. 505, 1766.

Galeichthys gronovii CUVIER and VALENCIENNES, *Histoire naturelle des poissons*, vol. 15, p. 40, 1840 (Maracaibo).

Bagre bagre FOWLER, *Proc. Acad. Nat. Sci. Philadelphia*, vol. 83, p. 408, 1931 (Punta Tigre at mouth of St. Juan River, Venezuela).

Genus ARIUS Cuvier and Valenciennes

Arius CUVIER and VALENCIENNES, *Histoire naturelle des poissons*, vol. 15, p. 53, 1840. (Type, *Pimelodus arius* Buchanan.)

ARIUS SPIXII (Agassiz)

Pimelodus spixii AGASSIZ, in Spix, *Selecta genera et species piscium* . . . Brasiliam . . . , p. 19, 1829.

Arius spixii REGAN, *Proc. Zool. Soc. London*, 1906, pt. 1, p. 386 (Brazil; Guiana; Caroni River, Trinidad; Venezuela).

The following specimens were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121206, 11 specimens, 120 to 162 mm. in standard length. Río de Los Pajaros, 3 km. above Lago Maracaibo, April 30.

U.S.N.M. No. 121208, 2 specimens, 165 and 243 mm., Río Agua Caliente, 2 to 3 km. above Lago Maracaibo, May 1.

U.S.N.M. No. 121207, 3 specimens, 137 to 142 mm., mouth of Caño de Sagua, 35 km. north of Sinamaica, March 12.

U.S.N.M. No. 121210, 13 specimens, 110 to 137 mm., Lago Maracaibo, 1 km. off Pueblo Viejo, April 7-9.

U.S.N.M. No. 121209, 1 specimen, 131 mm., Lago Maracaibo at Yacht Club, Maracaibo, May 16.

The following specimens from the Gulf of Venezuela were collected by the U. S. S. *Niagara*:

U.S.N.M. No. 125527, 1 specimen, 66 mm. in standard length, off Jacuque Point, January 26, 1925.

U.S.N.M. No. 125526, 4 specimens, 116 to 160 mm., off Point Macolla, April 19, 1925.

Genus SELENASPIS Bleeker

Selenaspis BLEEKER, *Ichthyologiae Archipelagi Indici Prodrromus*, vol. 1, p. 62, 1858. (Type, *Silurus herzbergii* Bloch.)

SELENASPIS HERZBERGII (Bloch)

Silurus herzbergii BLOCH, *Naturgeschichte der ausländischen Fische*, vol. 8, p. 33, pl. 367, 1794.

Arius herzbergii REGAN, *Proc. Zool. Soc. London*, 1906, pt. 1, p. 386 (Trinidad; Brazil; Guiana; Venezuela).

The following specimens were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121203, 8 specimens, 105 to 139 mm. in standard length, Lago Maracaibo at the Yacht Club, Maracaibo, May 16.

U.S.N.M. No. 121204, 24 specimens, 40 to 244 mm., mouth of Caño de Sagua, 35 km. north of Sinamaica (salinity 1.021), March 12.

U.S.N.M. No. 121202, 2 specimens, 122 and 132 mm., Lago Maracaibo at Yacht Club, Maracaibo, March 5.

The following 16 examples were collected by F. F. Bond for the University of Michigan Museum of Zoology and were lent me through the courtesy of Dr. Carl L. Hubbs:

14 specimens, 47 to 86 mm., Laguna de Tacarigua, Estado de Miranda, Venezuela, February 3, 1939.

2 specimens, 173 and 188 mm., tributary of Lago Maracaibo, 10 km. south of Lagunillas, March 23, 1938.

Family PIMELODIDAE

KEY TO THE GENERA OF PIMELODIDAE REPORTED FROM VENEZUELA (INCLUDING CERTAIN OTHER RELATED GENERA)

- 1a. Gill membranes not joined to one another but extending far forward before their attachment to isthmus, sometimes with a narrow free fold; pelvics usually inserted under rear of base of dorsal fin.
- 2a. No prominent or distinct small to large patches or bands of teeth in roof of mouth other than on premaxillaries (occasionally a few scattered obsolete villiform teeth may be detected on vomer of *Pimelodus*, but these do not form a prominent patch); dentaries with a band of teeth; dorsal rays i, 6 or I, 6, rarely with 5 branched rays; eyes superior in position, not visible from below.
- 3a. Premaxillaries, vomer, and palatines edentulous except the first when fish are about 32 mm.; dentary with a narrow band of villiform teeth; pectoral spine pungent but not serrated anteriorly; first simple ray of dorsal flexible, not spinous; adipose fin very long; anal base short; caudal fin deeply forked; 1 pair of maxillary and 2 pairs of mental barbels, their bases almost in a straight line; margin of eye free above, but ventrally margin more or less fused or not free; predorsal plate and supraoccipital process meeting; dorsal surface of head bony, not covered with skin posteriorly; postcleithral process lacking; both sides of gill arches with papillae in rows at bases of filaments; gill rakers numerous, about 10+22; occipital fontanel a narrow slit, short; dorsal rays i, 6; anal v, 6 or 7; pectoral I, 10 or 11; pelvic i, 5.

Sovichthys, new genus
- 3b. A distinct and wide band of villiform teeth on premaxillaries and on dentary; no rows of papillae at base of gill filaments on gill arches as in 3a.
- 4a. Width of head across base of pectorals equal to length of head or nearly so, snout noticeably depressed; dorsal and pectoral spines pungent; dorsal surface of head covered with skin.
- 5a. Margin of eye free, not fused with flesh around rim of eye; caudal fin forked, lobes more or less rounded, the two shortest mid-caudal fin rays with membrane deeply incised; adipose fin long; anal base short; predorsal plate not meeting supraoccipital process; postcleithral process short, broad-based; posterior nostril a little closer to eye than to anterior nostril; bases of the 2 pairs of mental barbels nearly or in a straight line.

Rhamdia Bleeker

- 5b. Margin of eye not free, eye small; adipose fin short, with much restricted base; anal base short; postcleithral process a short knob in adults, a very small spiny projection in young; bases of anterior pair of barbels much farther forward than bases of posterior pair.
- 6a. Anterior edge of pectoral spine smooth; gill rakers 1 or 2+3 or 4; predorsal plate meeting and fitting into a small notch of supraoccipital process; posterior nostril about equal distance from eye and anterior nostril; caudal fin forked, lobes more or less pointed; outer ends of premaxillary band of teeth with backward-projecting angles.....**Zungaro** Bleeker
- 6b. Anterior edge of pectoral spine serrated; gill rakers 2 or 3+6 to 8; predorsal plate meeting or not meeting supraoccipital process, not fitting into a notch in it; posterior nostril closer to eye than anterior nostril; caudal fin more or less forked in young, lobes rounded, but caudal fin usually rounded in adults; outer ends of premaxillary band of teeth rounded in small ones or with backward-projecting angles in adults.

Pseudopimelodus Bleeker

- 4b. Head much longer than its width across base of pectorals; lateral ends of premaxillary band of teeth rounded at all ages; caudal fin deeply forked.
- 7a. Barbels bandlike, long, with membranous border and reaching to anal fin; adipose fin long, 2 to 2.2 in standard length; first dorsal ray more or less pungent; first pectoral ray articulate, not pungent; supraoccipital process extending onto predorsal plate; head $4\frac{1}{2}$, depth 6, in standard length; eye $3\frac{1}{2}$ to $5\frac{1}{2}$ in snout; head depressed.....**Pinirampus** Bleeker
- 7b. Barbels round or nearly so in cross section, filiform, sometimes a little compressed basally.
- 8a. Dorsal and pectoral spines strongly pungent, very sharp-pointed; predorsal plate meeting tip of supraoccipital process; anal fin base short.
- 9a. Postcleithral process platelike, broad-based, triangular in shape, eye contained one or more times in width of base of this bone; dorsal truncate; anal emarginate; adipose base about as long as anal base; bases of mental barbels not in a straight line, inner pair farther forward; margin of eye distinctly free all way around; top of head bony.

Pimelodus Lacepède

- 9b. Postcleithral process a spiny projection, width across its base about $\frac{1}{2}$ to $\frac{1}{4}$ eye; dorsal and anal rounded posteriorly; adipose base short to long, usually longer than anal base, which is short; bases of mental barbels in a straight line or nearly so; margin of eye free dorsally but more or less fused ventrally; top of head covered with thin skin.
- Pimelodella** Eigenmann and Eigenmann
- 8b. Dorsal ray flexible, not pungent; pectoral spines weakly pungent or flexible; predorsal plate not quite meeting supraoccipital process; posterior margins of dorsal and anal fins mostly truncate.
- 10a. Postcleithral process absent; first ray of pectorals not pungent but flexible.

- 11a. Base of each lobe of caudal fin with embedded black pigment spot, this pair visible at all ages; bases of anterior pair of mental barbels much in front of bases of posterior pair; margin of eye free dorsally, more or less fused ventrally; posterior pair of nasal openings closer to anterior ones than to eye; underside of snout flat, in same plane as underside of head and belly.-----**Megalonema** Eigenmann
- 11b. No pair of embedded pigment spots in caudal region; bases of mental barbels in a straight line or nearly so; margin of eye not free; posterior nasal openings closer to eye than to anterior nasal openings; underside of head convex; usually a pale saddle across occiput.
Cetopsorhamdia Eigenmann and Fisher
- 10b. Postleithral process represented by a very small spine off upper posterior base of pectoral fin; pectoral spine weakly pungent; dorsal margin of eye free in well-preserved specimens, otherwise the margin dorsally and ventrally appearing fused; posterior nostrils much closer to eye than to anterior nasal opening; bases of mental barbels in a straight line or nearly so.-----**Nannorhamdia** Regan
- 2b. Prominent and distinct paired patches or bilaterally symmetrical patches or bands of teeth in roof of mouth behind premaxillary band of teeth; dentaries with a band of teeth; teeth more or less conical, villiform, sometimes depressible; head broad, depressed anteriorly, snout sometimes produced, spatula-shaped; margin of eye free; nostrils widely separated, the posterior one always much closer to anterior nasal opening than to eye; inner edge of operculum with one or two folds of skin or "pouches", dorsal rays I, 6 to I, 10. (See fig. 3.)
- 12a. Upper jaw shorter than lower jaw, latter projecting a little beyond tip of snout; inner or anterior mental barbels near tip of chin or lower lip; maxillary barbels not extending beyond base of adipose fin; adipose fin longer than anal fin base; patches of villiform teeth in upper surfaces of mouth; dorsal rays I, 6; anal v, 8; pectoral I, 9.
Hemisorubim Bleeker
- 12b. Upper jaw equal to or longer than lower jaw; bases of mental barbels remote from edge of lower lip.
- 13a. Upper jaw and lower jaw equal; maxillary barbels bandlike, extending to middle of pectorals; caudal forked; vomerine patch of teeth broad at sides; no teeth on palatines; dorsal rays I, 6; anal 16; pectoral I, 9.-----**Platynemateichthys** Bleeker
- 13b. Lower jaw distinctly shorter than upper jaw when closed.
- 14a. Upper jaw or snout greatly prolonged, flattish, with teeth on underside of snout, mostly in front of lower jaw; dorsal rays I, 6.
- 15a. Eyes lateral so that they can be seen from above or below; band of premaxillary teeth, mostly on underside of snout, horseshoe-shaped; patches of teeth in roof of mouth; maxillary barbel not reaching past dorsal fin; distance across angles of mouth about equal to widest part of head; adipose fin shorter than anal fin; anal v, 14; pectoral I, 8. (Fig. 3, h.)
Sorubim Agassiz
- 15b. Eyes superior, not visible from below.
- 16a. Patch of premaxillary teeth arrow-shaped; adipose fin longer than anal fin base; vomer and palatine patches of teeth widely separated; first half of maxillary barbel ossified and

rest flexible, extending past caudal fin; width of mouth about $1\frac{1}{2}$ in length of head. (Fig. 3, f.)

Platystomatichthys Bleeker

- 16b. Adipose fin base shorter than anal fin base; eye nearer to end of snout than end of operculum; premaxillary band of teeth very wide, not arrow-shaped; 2 patches of vomer and palatine teeth; width across angle of mouth $\frac{1}{2}$ length of head; maxillary barbel reaching to anal fin; color darker above, paler below, with black spots on head, back, dorsal and pectoral fins; an interrupted blackish longitudinal band from axil of pectoral to base of anal fin.-----

Sorubimichthys Bleeker

- 14b. Upper jaw not greatly prolonged and flattish but normal, lower jaw only a little shorter than upper jaw; eyes superior.
- 17a. Dorsal rays I, 9 or I, 10; small patches of palatine teeth remote from vomer and transversely arranged; maxillary barbels long, reaching past caudal fin; adipose longer than anal fin base; caudal deeply forked; eyes superior.

Sciades Müller and Troschel

- 17b. Dorsal rays I, 7 or I, 8; patches of vomerine and palatine teeth separated, each patch smaller than eye, the two vomerine patches of teeth meeting in midline in large adult; width of head 1.2 in its length; maxillary barbels heavy, reaching to caudal fin; width of mouth $1\frac{1}{2}$ in width of head and $1\frac{1}{10}$ in length of head; interorbital space concave; inner mental barbel remote from lip; occipital process longer than wide and meeting predorsal plate; adipose fin much longer than anal; gill rakers 4 or 5+11. (Fig. 3, d.)-----

Perrunichthys, new genus

- 17c. Dorsal rays I, 6 or I, 7; vomerine and palatine patches of teeth if widely separated larger than eye;
- 18a. Occipital process very broad, as is predorsal plate, and not meeting the latter; toothed areas of vomer and palatine contiguous, in large pentagonal patches; head as broad as long; dorsal I, 7; maxillary barbel not reaching past dorsal fin; adipose fin with rays distally; width of head at angle of mouth 2 in head; gill rakers 4+15.
- 18b. Occipital process longer than broad and meeting or almost meeting predorsal plate.

Phractocephalus Agassiz

- 19a. Teeth on premaxillary longer, depressible, and slenderer than short villiform teeth on vomer and palatines arranged in a band; width of head about $1\frac{1}{4}$ to $1\frac{3}{4}$ in its length; dorsal rays I, 6; maxillary barbel reaches to adipose or as far as caudal fin; width of mouth $1\frac{1}{4}$ in head and $1\frac{1}{4}$ in width of head; occipital process not quite meeting predorsal plate; caudal deeply forked; adipose fin longer than anal base. (Fig. 3, e)-----

Brachyplatystoma Bleeker

- 19b. Villiform teeth in roof of mouth and on dentaries, all uniform.
- 20a. Teeth on vomer in form of a band behind premaxillary band of teeth (see fig. 3, c); width of head 1.2 in its length; maxillary barbel not reaching past dorsal fin; width of mouth at angle of jaws 1.4 in width of head.

Paulicea Ihering

20b. Teeth not in form of a band behind premaxillary band of teeth.

21a. Width of head equals length of head; no patches of palatine teeth, but two patches of vomerine teeth; dorsal rays I, 6 or I, 7; maxillary barbel reaching or not reaching as far as adipose fin; width of mouth $1\frac{1}{2}$ in width of head.

Steindachneria Eigenmann and Eigenmann

21b. Length of head longer than width of head, latter 1.5 to 2.3 in its length; premaxillary band of teeth very wide, with a backward-projecting arm, laterally.

22a. Palatine patch of teeth comma-shaped, confluent with vomerine patch; width of head 2.2 in its length; maxillary barbel not reaching past dorsal fin, width of mouth nearly equal to width of head, 3.2 in length of head; adipose about equal length of anal fin base; back and sides of body with blackish bars; all fins with black spots; anal rays v, 9; pectoral I, 8; gill rakers about 3+9. (Fig. 3, a)-----*Pseudoplatystoma* Bleeker

22b. Palatine patches of teeth oval and separated from vomerine patches.

23a. Vomerine patches of teeth widely separated; premaxillary band of teeth with a concavity lacking teeth at inner midline but almost enclosed posteriorly by a toothed armlike projection toward midline; maxillary barbels longer than total length, ossified out as far as opposite dorsal fin, thence flexible and bandlike, ending in a long hairlike filament; total length of adipose fin much longer than base of anal fin; width of head $1\frac{1}{10}$ in its length; width of mouth across angles $1\frac{1}{10}$ in width of head and $2\frac{7}{10}$ in length of head; gill rakers about 5+12. (Fig. 3, g.)

Platysilurus Haseman

23b. Vomerine patches of teeth confluent in midline; premaxillary band of teeth wide without partially enclosed edentulous space at inner side at midline; maxillary barbel reaching a little past caudal fin but not ossified or bandlike; width of head $1\frac{1}{2}$ in length of head; width of mouth across angles $1\frac{1}{2}$ in width of head and 2.2 in length of head; gill rakers about 4+11; adipose fin much longer than anal fin base. (Fig. 3, b.)

Duopalatinus Eigenmann and Eigenmann

1b. Gill opening not extending far forward, gill membranes joined to isthmus or in front of pectoral fin; dorsal rays I, 6; teeth villiform in a band on premaxillaries and on dentaries; no teeth on vomer or palatines; margin of eye not free; pelvics inserted far behind base of dorsal fin; pectoral spine pungent, about I, 7; anal base long, of 16 to 40 branched rays; postcleithral process a triangular, broad-based spiny projection. (AUCHENIPTERIDAE).

SOVICHTHYS, new genus

This remarkable new genus of Pimelodidae differs greatly from all other members of that family, except *Iheringichthys* Eigenmann and Norris, 1900, in lacking teeth on the premaxillaries, except in the young. *Sovichthys* is remarkable in having about 14 to 17 minute tubes in the skin, associated with tiny papillae or pores, extending at right angles to the lateral line and mostly encircling the body.

The Pimelodidae are usually defined as catfishes with nares widely separated, remote from the orbits; four mental barbels and two maxillary barbels; a well-developed adipose fin; gill membranes free from isthmus; the skin without bony plates; teeth in villiform bands on premaxillaries and dentaries. However, the description of the character of the premaxillary teeth as usually understood must be modified if *Iheringichthys* and *Sovichthys* are to remain in that family. The premaxillaries are edentulous in the adults of both these genera and in the half-grown of *Sovichthys*. On a specimen of *Sovichthys* at a length of 32 mm. a very small patch of delicate villiform teeth was found near the midline on each premaxillary, but at a length of 59 mm. the teeth were absent and a firm plate could be felt where the teeth were to be expected. The teeth in a specimen of *Iheringichthys megalops* (U.S.N.M. No. 52611), 134 mm. in standard length, were well developed on the premaxillaries. In the adults of *Sovichthys* the premaxillaries are thickly covered with the skin and tissues of the upper lip and each dentary has a narrow band of delicate villiform teeth.

The supraoccipital process has a wide base, then tapers backward and meets the predorsal plate; the first simple ray of the dorsal is not spinous but articulated and is longer than the first branched ray; pectoral spines not locking open; the first ray of the pectoral fin is distinctly a spine, the front margin near tip with small teeth pointing basally, and with posterior edge of this spine having numerous sharp teeth pointing toward base of spine, in adults the anterior margin of the spine being rough; frontal fontanel present but narrow; occipital fontanel narrow, its anterior end beginning opposite rear margin of orbits; no postcleithral process from pectoral girdle behind and above base of pectoral; snout produced, mouth inferior; margin of eye free; gill membranes free from the isthmus, extending forward, joined in midline anteriorly; in front of this juncture is a pouch that extends to under inner pair of mental barbels; another pouch occurs between upper lip and base of maxillary barbel that extends nearly to midline under upper lip, separated from its fellow on opposite side by a membranous partition; interorbital space flat; air bladder well developed and in contact with skin behind pectoral girdle; inside of gill cavity, below orbit, are three folds of tissue; along front of gill arches at base

of gill filaments are two or three rows of short papillae; the gill rakers are triangular in shape and of a fleshy nature; the posterior side of the gill arches is broad with three or four rows of papillalike fleshy gill rakers, the inner row composed of more or less elongate ridges; at upper ends of gill arches occur a few folds of tissue; the fifth gill arch without gill filaments has a series of fleshy gill rakers, and then below is a band of villiform teeth.

Remarks.—The following key indicates some of the essential characters that separate *Sovichthys* from *Itheringichthys*.

- 1a. Pectoral spine pungent, serrated anteriorly and strongly serrated posteriorly; locking mechanism fully and functionally developed; posterior process of cleithrum broad and extending backward nearly half length of pectoral spine; dorsal spine pungent, with locking mechanism fully and functionally developed; unlocking mechanism functions by pulling out short spine between predorsal plate and base of dorsal spine (encircling tubes in skin with pores extending at right angles to lateral line not observed by me and not described); origin of adipose fin more than two orbit diameters behind base of dorsal fin.....*Itheringichthys* Eigenmann and Norris²
- 1b. Pectoral spine pungent, not serrated anteriorly but serrated posteriorly; locking mechanisms of pectoral spine and of dorsal first simple ray not developed and nonfunctional; no small spine between predorsal plate and base of first dorsal ray; first dorsal ray flexible and thus not pungent; no backward-projecting process of cleithrum over base of pectoral fin; about 14 to 17 lines or tubes in skin, associated with tiny papillae or pores, extending at right angles to lateral line and mostly encircling body; origin of adipose fin immediately behind (about one orbit diameter) base of dorsal fin.

Sovichthys, new genus

Named *Sovichthys* in honor of the Standard Oil Co. of Venezuela, an organization that has aided in the industrial development of Venezuela and helped make possible this study of the fishes of the Maracaibo Basin.

Genotype.—*Sovichthys abuelo*, new species.

SOVICHTHYS ABUELO, new species

BAGRE ABUELO

PLATE 1, A

Holotype.—U.S.N.M. No. 121183, a specimen 215 mm. in standard length, taken by Leonard P. Schultz, April 30, 1942, in the Río de Los Pajaros, 3 km. above Lago Maracaibo, at a depth of 15 feet.

Paratypes (all collected by Leonard P. Schultz).—U.S.N.M. No. 121198, 4 specimens, collected along with the holotype and bearing same data; U.S.N.M. No. 121188, Río Agua Caliente, 2 to 3 km.

² *Itheringichthys* Eigenmann and Norris, Rev. Mus. Paulista, vol. 4, p. 354, 1900. (Type, *Pimelodus labrosus* Kröyer.)

Bergiella Eigenmann and Norris, Rev. Mus. Paulista, vol. 4, p. 355, 1900. (Type, *Pimelodus westermanni* Reinhardt.)

I have observed in the literature that three species have been referred to this genus: *I. labrosus* (Kröyer), *I. westermanni* Reinhardt, and *I. megalops* Eigenmann and Ward.

above Lago Maracaibo, May 1, 1942, 3 examples, 170 to 183 mm.; U.S.N.M. No. 121186, caño half a mile west of Sinamaica, March 11, 1942, 2 specimens, 141 and 155 mm.; U.S.N.M. No. 121185, Río Palmar at bridge, 70 km. southwest of Maracaibo, taken March 6, 1942, 3 examples, 169 to 177 mm.; U.S.N.M. No. 121187, Ciénaga del Guanavana, about 10 km. north of Sinamaica, March 11, 1942, 3 specimens, 32, 136, and 146 mm.; U.S.N.M. No. 121184, Río Negro below mouth of Río Yasa, March 2, 1942, 4 examples, 138 to 172 mm.; U.S.N.M. No. 121211, Río Apón, about 35 km. south of Rosario, Maracaibo Basin, February 26, 1942, 17 specimens, 124 to 176 mm.; U.S.N.M. No. 121212, Río Socuy, 3 km. above mouth, February 24, 1942, 57 examples, 59 to 220 mm.

Description.—Based on the holotype and paratypes. Detailed measurements were made on the holotype and two paratypes, data for these being expressed in hundredths of the standard length and recorded below, first for the holotype, then for the two paratypes in parentheses, respectively. Standard length (in mm.) 215 (162; 101).

Length of head to tip of supraoccipital process 30.2 (28.9; 30.5); length of head to end of gill cover 23.2 (22.0; 23.7); greatest depth of body 19.4 (17.3; 17.8); width of head at base of pectorals 15.1 (14.1; 14.6); length of snout 9.86 (10.2; 9.52); diameter of eye 5.11 (4.37; 6.44); diameter of bony orbit 5.58 (5.86; 7.23); width of fleshy interorbital 7.95 (8.88; 7.03); width of bony interorbital space 6.65 (6.30; 5.64); distance from eye to posterior nostril 4.65 (4.63; 3.96); distance between posterior and anterior nostrils 2.84 (3.08; 3.07); postorbital length of head 9.30 (7.90; 9.12); total length of adipose fin 3.91 (4.13; 3.77); greatest height of adipose fin 4.88 (5.74; 6.44); least depth of caudal peduncle 7.44 (7.78; 7.23); length of caudal peduncle 19.3 (19.8; 19.9); length of first simple ray of dorsal 25.4 (29.9; 35.0); length of pectoral spine 19.5 (21.3; 21.8); length of longest pelvic fin ray 18.0 (20.2; 20.3); length of longest anal ray 14.1 (15.5; 14.9); length of upper caudal fin lobe 33.0 (37.0; 35.2); length of lower caudal fin lobe 28.2 (30.9; 32.8); length of shortest midcaudal fin rays 8.93 (9.38; 9.12); distance from tip of snout to dorsal fin origin 29.8 (34.4; 34.9); distance from snout to anal origin 72.6 (78.4; 71.8); snout to adipose origin 51.6 (46.6; 52.1); snout to pelvic insertion 44.6 (42.0; 42.6); snout to pectoral insertion 22.1 (20.3; 23.0); snout to anus 49.0 (47.1; 47.0); anus to anal origin 24.2 (26.9; 23.7); length of maxillary barbel 102.0 (136.0; 156.0); length of outer mental barbel 30.0 (38.9; 42.1); length of inner mental barbel 16.7 (21.0; 24.8); width of base of supraoccipital process 4.65 (4.93; 4.96); length of supraoccipital process from rear end of occipital fontanel to its tip 5.58 (5.86; 7.23).

Counts were made as follows: Dorsal rays i, 6 (i, 6; i, 6); anal v, 6 (v, 7; v, 7); pectoral I, 11 (I, 11; I, 10); pelvic always I, 5; branched rays of caudal fin 15 or 16 usually 16; number of gill rakers on first gill

arch -- (10+22; 10+22). Five specimens had v, 7 anal rays and four had v, 6; one fish had I, 10 pectoral rays, 6 had I, 11, and one I, 12; gill rakers on first gill arch were in 6 specimens counted, one with 9+21, two with 10+20, one 10+21, and two 10+22.

In addition to the characters discussed under the description of the genus, a few other features of this new species should be described. The maxillary barbel in the young extends to tips of caudal fin rays or a little beyond, but in the adults only to the base of the caudal fin; outer mental barbels to base of pelvics or a little beyond; inner mental barbels about halfway out the pectoral fins; center of eye behind middle of head; origin of adipose near rear base of dorsal fin or not more than three-fourths diameter of eye behind base of last dorsal ray; least depth of caudal peduncle $2\frac{1}{2}$ in its length; barbels round in shape; pectoral spines not locking open; length of pectoral spine one-half length of adipose fin and reaching or almost reaching base of pelvics; the latter reaching two-thirds the way to anal origin.

Color.—Darker above, paler below, upper surfaces profusely black-spotted, these spots often on dorsal and adipose fins; another color phase from muddy waters is pale, with but a few of the black spots evident; also this pale color phase has a more or less darkish blotchy band along upper midsides, above and below, which is a pale band without spots; in small specimens the general darker pigment of upper sides extends a little below the lateral line, then the lower sides are abruptly pale or white; paired and caudal fin darkish, without spots; mental barbels white, maxillary barbels blackish or grayish; in alcohol some of the specimens still retain a dull yellowish color in all the fins; underside of head dull yellowish.

Remarks.—This new species is distinguished from all others in the family Pimelodidae by a combination of characters as follows: First dorsal ray simple, articulated; pectoral fin with a strong spine; no teeth on premaxillaries, vomer, or palatines; gill arches with papillae both anteriorly and posteriorly and fleshy gill rakers, triangular in shape; gill cavity with folds of tissue below orbit; pectoral spine not locking; supraoccipital process meeting the predorsal plate; adipose fin very long, its origin just behind base of dorsal fin.

Named *abuelo*, the common name of this species as given to me by the people living in the Maracaibo Basin. Probably called *abuelo*, meaning grandfather, because of its extremely long "beard" or maxillary barbels usually nearly as long as, or longer than, its total length.

Genus RHAMDIA Bleeker

Rhamdia BLEEKER, Ichthyologiae Archipelagi Indici Prodromus, vol. 1, pp. 197, 207, sp., 1858; Nederl. Tijdschr. Dierk., vol. 1, p. 101, 1863. (Type, *Pimelodus quelen* Quoy and Gaimard.)

KEY TO THE SPECIES OF RHAMDIA REPORTED FROM VENEZUELA

- 1a. Maxillary barbel extending past middle of adipose fin or to caudal peduncle; interorbital space 2.6 to 2.7 in head; pectoral spine with teeth on posterior margin and small ones anteriorly; depth $5\frac{1}{2}$; head 3.5 to 4 in standard length; anal rays vi, 9; gill rakers 5+14; pectoral I, 9.
Rhamdia sebae (Cuvier and Valenciennes)
- 1b. Maxillary barbel not reaching past tips of pelvics; depth 6 to $6\frac{1}{2}$ in standard length; dorsal I, 6; pectoral I, 9; anal 11 to 13; distance of adipose fin from dorsal $1\frac{1}{4}$ to $1\frac{3}{4}$ in head.
- 2a. Pectoral spine slightly serrated along both edges; head $4\frac{2}{3}$ in standard length; coloration uniform, dorsal blackish with a pale band across its basal portion.....*Rhamdia humilis* (Günther)
- 2b. Pectoral spine nearly smooth behind, with hooks along anterior margin decreasing in size toward base; head 4 to $4\frac{2}{3}$ in standard length; premaxillary band of teeth slightly wider at sides, with small backward-projecting angle.....*Rhamdia guairensis* Eigenmann
- 1c. Maxillary barbel extending past tips of pelvics but not past middle of adipose fin; interorbital 2.8 in head; pectoral spine serrated on both margins; depth 5 to $5\frac{1}{2}$; head 4 to 4.5; anal about vi, 9; gill rakers about 4+8 from a Guiana specimen.....*Rhamdia quelen* (Quoy and Gaimard)

RHAMDIA SEBAE (Cuvier and Valenciennes)

Pimelodus sebae CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 15, p. 169, 1840.

The specimens from the Maracaibo Basin, here tentatively identified as *R. sebae*, may represent a distinct subspecies. This form, though fully described on the following pages, was not given a new name because critical comparative material is lacking at present.

The following specimens were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121190, 16 specimens, 20.5 to 201 mm. in standard length, from the Río Machango at the bridge south of Lagunillas, March 16.

U.S.N.M. No. 121196, a specimen 209 mm. collected in Lago Maracaibo near the mouth of the Río Concho, May 2.

U.S.N.M. No. 121193, 3 specimens, 101 to 148 mm., taken in the Río San Juan at the bridge, Motatán system, March 20.

U.S.N.M. No. 121192, 5 examples, 170 to 269 mm., obtained on March 11 from a caño half a mile west of Sinamaica.

U.S.N.M. No. 121197, 2 specimens, 91 and 277 mm., taken March 2 in the Río Negro below the mouth of the Río Yasa.

U.S.N.M. No. 121191, a specimen 264 mm., collected February 26 in the Río San Juan, about 12 km. south of Rosario, Estado de Zulia.

U.S.N.M. No. 121199, an example, 112 mm., taken February 21, 1942, in the Río Palmar near Totuma, about 100 km. southwest of Maracaibo.

U.S.N.M. No. 121194, 2 specimens, 34 and 40 mm., collected March 17 in the Río Motatán at bridge 22 km. north of Motatán.

U.S.N.M. No. 121195, 4 specimens, 87 to 105 mm., taken in the Río San Pedro at bridge (Motatán system), March 20.

This species was taken most frequently over muddy to sandy bottoms of pools in rivers, as well as in swamps and in Lago Maracaibo.

Detailed measurements of three specimens were made, and these data are expressed in hundredths of the standard length and recorded below. Standard length (in mm.) 188; 101; 277.

Length of head to tip of supraoccipital 28.5; 28.2; 29.2; length of head to end of operculum 27.7; 28.2; 27.8; greatest depth of body 19.1; 18.3; 18.4; width of head at base of pectorals 20.5; 20.3; 21.8; length of snout 10.7; 11.7; 11.9; diameter of eye 3.62; 5.15; 3.72; width of fleshy interorbital space 11.3; 9.70; 12.1; length of maxillary barbel 86.7; 94.1; 68.6; length of outer mental barbel 31.9; 36.6; 27.8; length of inner mental barbel 22.3; 23.6; 20.4; total length of adipose fin 38.6; 40.6; 37.2; height of adipose fin 6.70; 6.83; 4.94; length of base of anal fin 13.2; 14.4; 12.4; least depth of caudal peduncle 10.2; 11.4; 9.40; length of caudal peduncle 19.2; 19.8; 20.6; distance between anterior and posterior nasal openings 3.62; 3.56; 3.72; distance from eye to posterior nasal opening 5.58; 5.15; 5.56; distance from tip of snout to origin of dorsal fin 34.3; 34.4; 35.7; snout to origin of anal fin 68.4; 68.8; 72.2; snout to adipose origin 54.0; 54.1; 58.4; snout to pectoral insertion 24.7; 24.0; 24.8; snout to pelvic insertion 47.0; 48.7; 50.2; anus to anal origin 15.2; 12.0; 14.8; length of dorsal spine 12.0; 13.1; 11.3; length of pectoral spine 13.1; 14.9; 13.8; length of longest (third branched) ray of anal fin 12.5; 14.6; 12.3; length of longest ray of pelvic fins 13.8; 16.3; 14.7; snout to anus 54.8; 57.8; 58.2; length of longest ray of upper lobe of caudal fin 22.5; 27.3; 21.5; length of longest ray of lower lobe of caudal fin 22.6; 28.6; 21.7; postorbital length of head to end of operculum 14.1; 12.7; 13.9; width of head across rictus of mouth 14.5; 15.1; 16.2; tip of chin to base of inner mental barbel 4.63; 4.85; 4.62; tip of chin to base of outer mental barbel 5.58; 6.44; 6.35.

The following counts were made, respectively: Dorsal rays I, 6; I, 6; I, 6; anal vi, 8; v, 9; vi, 8; pectoral I, 9; I, 10; I, 9; pelvics always i, 5; branched caudal rays 7+9; 7+9; 7+9; gill rakers on first gill arch --; 4+8; 4+10. Head depressed anteriorly, snout rounded and broad, the distance across the mouth at angles $1\frac{7}{10}$ in the head to end of operculum; width of head at base of pectorals $1\frac{1}{2}$ to $1\frac{1}{2}$ in head; adipose fin about $2\frac{1}{2}$ to $2\frac{1}{2}$ in standard length; height of adipose fin $1\frac{3}{4}$ in interorbital space and 6 or 7 times in its total length; lower jaw a little shorter than upper jaw; all teeth similar, villiform, and in a band (with lateral ends rounded) on premaxillaries and on dentaries; gill membranes extending forward, free from the isthmus, in front of which is a pouch; dorsal and pectoral fins each with a sharp, stiff spine; posterior edge of pectoral spines serrated, anterior edge rough basally, with serrations distally but pointing basally; dorsal spine smooth; eye with a free margin; interorbital space nearly flat, a trifle convex; all barbels blackish; mental barbels all in a nearly

straight line; anterior nostrils tubular, forward of base of maxillary barbel; anterior and posterior barbels widely separated; supraoccipital process covered with skin and not meeting the predorsal plate; gill rakers about 4+8 to 10; caudal lobes rounded, upper lobe with 7 branched rays and lower with 9; caudal peduncle compressed. No teeth on vomer or palatines; posterior margins of dorsal, anal, pectoral, and pelvic fins rounded; lower lobe of caudal fin rounded, broader than upper lobe; upper and lower lobes separated by a deep incision of the membrane between the two shortest mid-caudal fin rays; adipose fin very long, its origin about an eye diameter behind base of dorsal fin; maxillary barbel flattish, reaching to caudal peduncle or a little shorter, outer mental barbel extends to tips of pectorals or to base of pelvics; inner mental barbel reaching to base of pectorals or one-third out their length; pelvic fins reach two-thirds the way to origin of anal fin, and pectorals two-thirds the way to the insertion of the pelvic fins; the free margin of the eye becomes less free ventrally on the small specimens and on those as short as 20.5 and 26 mm. the margin of the eye is not free (it is thought that the identification of the two small specimens is correct); the top of the head is covered with rather thick skin, so that the posterior end of the supraoccipital process is obscured, but it does not meet the embedded predorsal plate; fontanel in middorsal line between the orbits small, closed or nearly closed in adults.

Color.—The general color is blackish above, paler below, with the belly and underside of head nearly white; a blackish blotch occurs over the tympanic area of air bladder just behind head and forms a faint darkish band just in front of dorsal fin base, most distinct on the half grown and young; all fins grayish to blackish; in the young the lateral line is blackish; posteriorly the interradiial membrane of the dorsal fin is blackish along its middle third with a hyaline area anteriorly, less distinct in the larger specimens; peritoneum pale.

RHAMDIA HUMILIS (Günther)

Pimelodus humilis GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 129, 1864 (Venezuela).

Rhamdia humilis EIGENMANN and EIGENMANN, Occ. Pap. California Acad. Sci., vol. 1, p. 126, 1890 (Venezuela).—EIGENMANN and ALLEN, Fishes of western South America, p. 94, 1942 (Venezuela).

RHAMDIA GUAIRENSIS Eigenmann

Rhamdia guairensis EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 6, 1920 (Río Guaire near Caracas, Venezuela).

RHAMDIA QUELEN (Quoy and Gaimard)

Pimelodus quelen QUOY and GAIMARD, Voyage autour du monde . . . *Uranie*, Zool., pl. 49, figs. 3-4, 1824.

Rhamdia quelen EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 6, 1920 (Río Castaño and Río Bue, Maracay; El Concejo, Río Tiquirito).—PEARSE, Univ. Wisconsin Studies, No. 1, pp. 23, 45, 1920 (Río Castaño, Venezuela).

The specimens from British Guiana on which the key is based may differ from those in the Valencia Basin of Venezuela.

Genus ZUNGARO Bleeker

Zungaro BLEEKER, Nederl. Tijdschr. Dierk., vol. 1, p. 101, 1863. (Type, *Pimelodus zungaro* Humboldt.) (Ref. copied.)

ZUNGARO ZUNGARO (Humboldt)

Pimelodus zungaro HUMBOLDT, Recueil d'observations de zoologie. . . , vol. 2, p. 170, p. 46, fig. 1, 1811.

Pseudopimelodus zungaro RIBEIRO, Rev. Mus. Paulista, vol. 10, p. 728, 1918 (Río Cabriale, Venezuela).

The following nine examples of this fish were taken by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121283, 8 specimens, 153 to 264 mm., from the Río San Juan at the bridge south of Mene Grande, tributary Río Motatán, March 20.

U.S.N.M. No. 121284, a specimen, 242 mm., from the Río Negro below mouth Río Yasa, March 2.

Genus PSEUDOPIMELODUS Bleeker

Pseudopimelodus BLEEKER, Ichthyologiae Archipelagi Indici Prodromus, vol. 1, p. 196, 207, 1858 (sp.); Nederl. Tijdschr. Dierk., vol. 1, p. 101, 1863. (Type, *Pimelodus raninus* Cuvier and Valenciennes.) (Ref. copied.)

The relationships and validity of certain genera and species of South American catfishes allied to *Pseudopimelodus* are not well defined and need careful study. There are not sufficient specimens available at present to enable me to work out the limits of the genera or species under question, except to point out that *Zungaro* Bleeker differs from the related genera, *Pseudopimelodus* and *Microglanis*, in having the lower jaw a little longer than the upper, the predorsal plate slender, meeting and fitting into a notch of the supraoccipital process, and the anterior margin of the pectoral spine smooth. In defining the genus *Pseudopimelodus* Eigenmann and Allen (Fishes of western South America, pp. 90-91, 1942) describe the "intermaxillary teeth without angle projecting backward." Eigenmann (Mem. Carnegie Mus., vol. 5, p. 155, 1912) in defining the genus *Microglanis* distinguishes it from *Pseudopimelodus* by "premaxillary patches of teeth without backward projecting angles." He says further that the members of this genus are "small Pimelodines, reaching a maximum length of 110 mm." Doubt is cast on the validity of this genus after studying a large series of a related form from the Maracaibo Basin. The premaxillary band of teeth in this series is angular in the small ones 40 to 50 mm. in length, and in the large ones this angle projects more posteriorly as described for *Pseudopimelodus*. In a small paratype of *Microglanis poecilus* the outer or lateral ends of the premaxillary band of teeth are more rounded and the predorsal plate does not meet the supraoccipital process; neither does it in the specimens from the Maracaibo Basin.

Eigenmann describes the predorsal plate of *Pseudopimelodus raninus* (*op. cit.*, 154) as "nearly touching the occipital process," and so it does in a small specimen before me from the Río Meta in Colombia, but the premaxillary band of teeth has the lateral ends rounded. Unfortunately no specimen of *Pseudopimelodus raninus* is now available to me for study, and thus I am unable to determine with certainty that my specimens should be referred to *Pseudopimelodus*.

Eigenmann (*op. cit.*, pp. 152, 153) describes two new species of *Pseudopimelodus* from British Guiana. Certain features of *Pseudopimelodus albomarginatus* Eigenmann (*op. cit.*, p. 153) indicate that this species is based on the young. I draw my conclusions from the large series of specimens of the related form from the Maracaibo Basin, because in this form the caudal fin changes with age from a deeply cleft, longer, rounder upper caudal lobe than lower, in the young, to then a concave caudal fin, later to a truncate one, and finally, in those 100 mm. to 184 mm., it is rounded or almost rounded. Thus *P. albomarginatus* agrees with the young from the Maracaibo Basin in regard to the caudal fin, and in addition it has the juvenile color pattern, which changes to the adult color pattern at about 100 mm. of length. *Pseudopimelodus villosus* Eigenmann (*op. cit.*, p. 152), holotype 148 mm. in length, shows the rounded caudal fin and the spotted color pattern found on the adults of a similar form from the Maracaibo Basin. I would conclude that *villosus* and *albomarginatus* are the same species if Eigenmann did not separate them in his key (*op. cit.*, p. 151) by the predorsal plate meeting the occipital process for *albomarginatus*. Also, he distinguishes *villosus* from *albomarginatus* by no humeral spine in the former. Again, the humeral spine is reduced in length with increase in size in the form from Maracaibo Basin.

Although the status of these two species is questioned, as well as the validity of the genus *Microglanis*, it is clear that the form in the Maracaibo Basin differs sufficiently from those in British Guiana to be recognized as a new subspecies, which I describe below.

KEY TO THE SUBSPECIES OF PSEUDOPIMELODUS VILLOSUS REPORTED FROM VENEZUELA

- 1a. Maxillary barbels reaching gill openings in largest specimens and much past gill openings in those 150 mm. and shorter; if white blotch is present on basal posterior half of dorsal fin it does not occur on more than last three interradial membranes except very rarely as a small speck on fourth, but usually much reduced in size on third from last; least depth of caudal peduncle 2.7 to 3.1 in the head; snout to dorsal spine base 2.4 to 2.6, head 2.8 to 3.1, depth 4.8 to 5.2, in the standard length; eye $3\frac{1}{2}$ to $5\frac{1}{2}$ in snout, 4 to 6 in interorbital space. — ***Pseudopimelodus villosus butcheri***, new subspecies
- 1b. Maxillary barbels not quite reaching gill openings; white blotch on basal half of posterior side of dorsal fin occurring on last four interradial membranes and not reduced in size on any of them; least depth of caudal peduncle 2.9 to $3\frac{1}{2}$ in head; snout to dorsal spine base $2\frac{1}{4}$ to $2\frac{2}{3}$, head $2\frac{2}{3}$ to 3.2, depth $4\frac{2}{3}$ to 5.3, in standard length; eye 3 to 4 in snout and 5 in interorbital space.

Pseudopimelodus villosus villosus Eigenmann

PSEUDOPIMELODUS VILLOSUS BUTCHERI, new subspecies

PLATE 1, B

Holotype.—U.S.N.M. No. 121270, a specimen 107 mm. in standard length, collected by Leonard P. Schultz, March 17 and 20, 1942, in the Río San Juan near bridge south of Mene Grande, tributary to Río Motatán, Maracaibo Basin.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121273, 58 specimens, 29.5 to 172 mm., collected along with the holotype and bearing the same data; U.S.N.M. No. 121280, 2 examples, 34 and 184 mm., March 24, 1942, from the Río Motatán, 8 km. below Motatán; U.S.N.M. No. 121272, 2 specimens, 39.5 and 44 mm., March 17, 1942, from the Río Motatán, at bridge 22 km. north of Motatán; U.S.N.M. No. 121271, 25 specimens, 29.5 to 69 mm., March 20, 1942, from the Río San Pedro near bridge south of Mene Grande, tributary to Motatán system; U.S.N.M. No. 121278, 1 specimen, 27.5 mm., March 24, 1942, from the Río Jimelles, 12 km. east of Motatán, tributary to Río Motatán; U.S.N.M. No. 121276, 11 examples, 35 to 60 mm., March 21, 1942, from the Río Machango, 20 km. above bridge south of Lagunillas, Maracaibo Basin; U.S.N.M. No. 121277, 1 specimen, 45 mm., March 6, 1942, from the Río Palmar at the bridge 70 km. southwest of Maracaibo; U.S.N.M. No. 121275, 1 specimen, 38 mm., February 21, 1942, from the Río Palmar near Totuma, about 100 km. southwest of Maracaibo; U.S.N.M. No. 121274, 6 examples, 16 to 52 mm., February 24, 1942, from the Río Socuy, 3 km. above its mouth, Maracaibo Basin; U.S.N.M. No. 121279, 5 specimens, April 1, 1942, from the Río Táchira, 7 km. north of San Antonio, Catatumbo system.

Description.—Based on holotype and paratypes listed above. Measurements, expressed in hundredths of the standard length, are recorded below, first for the holotype, then for two paratypes in parentheses, respectively. Standard length (in mm.) 107 (45.5; 184).

Length of head to end of operculum 33.6 (36.2; 33.3); greatest depth of body 22.0 (20.9; 21.7); length of snout 12.2 (12.5; 12.5); diameter of eye 3.36 (3.73; 2.83); width of fleshy interorbital space 12.3 (11.4; 15.5); distance between rims of anterior and posterior nostrils 4.20 (4.18; 4.62); distance from eye to rim of posterior nostril 2.80 (2.42; 3.21); width of premaxillary band of teeth 2.24 (2.42; 2.39); width across outer angles of maxillaries 2.15 (2.20; 2.45); width across base of pectorals 29.2 (29.7; 29.6); length of maxillary barbels 30.4 (34.1; 28.8); length of anterior mental barbels 9.53 (9.44; 10.7); length of posterior mental barbels 19.6 (15.6; 16.8); least depth of caudal peduncle 13.5 (13.0; 12.8); length of caudal peduncle 14.5 (16.0; 16.5); total length of adipose fin 18.2 (22.0; 15.2); length of base of adipose fin 12.6 (15.8; 11.7); length of base of anal fin 13.1 (14.3; 12.8); dis-

tance from snout to dorsal origin 42.1 (41.8; 41.6); snout to anal origin 72.5 (75.8; 74.5); snout to adipose origin 76.0 (71.4; 75.5); snout to pelvic insertion 52.8 (53.8; 55.4); snout to pectoral insertion 30.8 (31.9; 30.8); snout to anal origin 59.8 (62.6; 63.4); length of dorsal spine 10.8 (11.9; 7.50); length of pectoral spine 15.4 (16.5; 13.2); longest branched ray of pelvics 15.9 (17.8; 14.9); longest branched ray of pectorals 19.1 (18.7; 16.1); longest branched ray of dorsal 18.2 (19.8; 18.5); longest branched ray of anal 15.9 (16.5; 15.5); longest ray of upper lobe of caudal fin 25.2 (28.6; 20.1); longest ray of lower lobe of caudal fin 24.3 (25.5; 19.4).

The following counts were made, respectively: Dorsal rays I, 6 (I, 6; I, 6); anal iv, 8 (v, 8; iv, 7); pelvic i, 5—i, 5 (i, 5—i, 5; i, 5—i, 5); pectoral I, 6—I, 6 (I, 6—I, 6; I, 6—I, 6); branched rays of caudal 12 (13; 13); gill rakers on first arch—(3+7; 3+6). For additional counts see table 1.

TABLE 1.—Counts made on species of *Zungaro* and *Pseudopimelodus* from the Maracaibo Basin

Species	Number of fin rays								Number of branched caudal fin rays			Number of gill rakers on first gill arch								
	Dorsal	Anal					Pelvic	Pectoral		12	13	14	Above angle			Below angle				
		I, 6	iv, 7	iv, 8	v, 6	v, 7		v, 8	i, 5				I, 6	I, 7	1	2	3	3	4	5	6	7	8
<i>Zungaro zungaro</i>	4	-----	4	4	---	4	1	8	-----	4	2	1	-----	2	2	-----	-----	-----	-----	
<i>Pseudopimelodus villosus butcheri</i> ..	4	2	4	---	3	1	6	7	---	2	2	-----	2	6	-----	-----	-----	2	5	1

Head depressed, its width across base of pectorals about 1.1 to 1.2 in its length; body compressed at caudal peduncle; adipose fin with a short base; anal base short, about equal to snout; origin of adipose fin over origin of anal fin or a trifle in front of the latter; insertion of pelvics under posterior end of dorsal fin base; margin of eye not free, the eye small, 3½ to 5 times in interorbital space; gill membranes extend far forward, attached to isthmus without a free fold; nostrils wide apart, the anterior one tubular, near front of snout, the posterior nostril funnel-shaped with a minute point or barblet on the anterior edge of the membranous rim; teeth villiform, in a wide band on dentaries and premaxillaries; at the lateral ends of the premaxillary band is a posteriorly projecting arm on adults, but only angular to rounded in the young; no teeth on vomer or palatines; the predorsal plate does not meet the supraoccipital process; dorsal surface of head fleshy, the bones covered with thick skin; gill rakers short, pointed, two to three above and six to eight below the angle of first gill arch; both jaws equal, mouth terminal, gape wide; pectoral spine about 2 to 2½ in the head, with long teeth on front and rear margins, those on front margin antrorse distally, and on inner margin retrorse; dorsal spine

short, 3 to 3½ in the head, smooth on all sides and about two-thirds the length of the branched rays of the dorsal fin; posterior margins of pelvic fins rounded, of the pectoral truncate or a little rounded, the fleshy tip of the pectoral spine reaching beyond the longest branched ray; adipose fin with short base, the tip of adipose extending beyond base and free; the caudal fin changes remarkably with age, in specimens 20 to 40 or 50 mm. in standard length, the upper lobe longest and separated from the lower lobe by short rays, the caudal fin being deeply emarginate; but in a little larger specimen the caudal fin has rounded upper and lower lobes with the middle rays shorter, the fin being a little concave; in the largest specimens and some about 80 mm. and longer the caudal fin being evenly rounded; anal fin rounded; maxillary barbel reaching past head but not quite to opposite dorsal origin; posterior mental barbel reaching a little past the pectoral insertion; anterior mental barbel short, reaching a very little past a vertical line through rear margin of eye; pelvics not quite reaching to anal origin, and pectorals reaching about three-fourths the way to pelvic insertion; the larger specimens as well as some of the smaller ones are profusely covered all over the dorsal and lateral surfaces of the head with minute papillae called "hair-like filaments" by Eigenmann for *villosus*.

Color.—In large adults the upper parts are blackish to dark brown, ventral surfaces brownish mottled, and sides and dorsal surfaces sometimes dark spotted, almost obscured; the large specimens, when preserved, have a thick coat of mucus covering the color pattern; specimens 50 to 60 mm. in standard length have the following color pattern, which remains more or less apparent in even a few of the largest specimens: A pale bar across occiput; margins of gill membranes pale; usually a pale spot at origin of dorsal and another at origin of adipose fins; a pale bar on middle of length of side of body just behind base of caudal fin and extending directly upward and sometimes more or less confluent with a small white spot in middle to base of posterior rays of dorsal fin; another pale blotch on side under adipose fin; sometimes basal part of posterior anal rays with pale blotch; a small white blotch on both upper and lower edges of caudal peduncle; outer margins of all the fins white, remainder black or mottled with black and white; the caudal fin is variable, usually with a wide white margin posteriorly, then spotted or mottled with black and white, or it may be all white as in the specimens from the Río Táchira and one from the Motatán system; in some of the larger specimens just inside the wide pale band the caudal fin may have a wide blackish band somewhat broken by white spots. The above color pattern becomes obscured in the largest specimens, and its place is taken by a spotted or mottled pattern; the white margins to the fins remain distinct at all sizes.

Remarks.—This new subspecies is very closely related to Eigenmann's *Pseudopimelodus albomarginatus* and *P. v. villosus*, differing from the former in having the predorsal plate not meeting the supra-occipital process. From *P. v. villosus* it differs in having longer barbels, as indicated in the key on page 198, and a reduction of the white central blotch on the dorsal fin to not more than the last three interradial membranes instead of four in *villosus*. The caudal fin in *villosus* appears to become rounded at a greater length than this new form in the Maracaibo Basin.

Named *butcheri* in honor of Walter W. Butcher, geologist, Lago Petroleum Corporation, who aided me in collecting fishes near Rosario, western side of Lago Maracaibo.

PSEUDOPIMELODUS VILLOSUS VILLOSUS Eigenmann

Pseudopimelodus villosus EIGENMANN, Mem. Carnegie Mus., vol. 5, p. 153, pl. 10, fig. 1, 1912 (Potaro Landing; Kumaka, Demerara; Wismar).

?*Pseudopimelodus albomarginatus* EIGENMANN, *ibid.*, p. 153, pl. 11, fig. 1 (Tukeit and Waratuk, British Guiana).

?*Pimelodus (Pseudopimelodus) raninus* PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 470 (Apure River, Venezuela).

Genus PIMELODUS Lacepède

Pimelodus LACEPÈDE, Histoire naturelle des poissons, vol. 5, 1803 (polygeneric).—
CUVIER, Règne animal, vol. 2, p. 203, 1817 (restricted to species having only a single band of teeth in upper jaw). (Type, *P. maculatus* Lacepède = *clarias*.) (Ref. copied.)

KEY TO THE SPECIES OF PIMELODUS REPORTED FROM VENEZUELA

- 1a. Dorsal spine contained 6 to $6\frac{1}{2}$ times in standard length; teeth along nearly entire front margin of pectoral spine; total length of adipose fin contained 0.7 to 0.8 time in dorsal spine and 0.6 in pectoral spine; a large black blotch in dorsal fin; a light streak from dorsal spine to above pelvics, thence to middle of caudal fin rays, another above it; snout broad, depressed.
Pimelodus ornatus Kner
- 1b. Dorsal spine length contained fewer than 5 times in standard length; no ornate spot in dorsal fin.
- 2a. Length of adipose fin contained 5 to $6\frac{1}{4}$ times in standard length; anal rays v, 8 to v, 10, usually v, 9; pectoral with I, 8 to I, 10, usually I, 9 or I, 10.
- 3a. Length of adipose fin contained 6 to $6\frac{3}{4}$ times in standard length, 1.3 to 1.8 in dorsal spine, 1.2 to 1.6 in pectoral spine; height of adipose fin 2.1 to 2.8 in its total length; width of head a little greater than length of adipose; greatest depth of body 3.5 to 4 in standard length; dorsal spine 3.4 to 4.2 in length of body; sides with black blotches more or less separated by about two pale streaks, the one along the lateral line always distinct. . . . *Pimelodus clarias coprophagus*, new subspecies
- 3b. Length of adipose fin 5 times in standard length, 0.8 to 1.1 in dorsal spine and equal to length of pectoral spine; height of adipose fin $3\frac{1}{2}$ to $3\frac{3}{4}$ in its length; width of head 1.2 to 1.4 in length of adipose fin; greatest depth of body 5 to $5\frac{1}{2}$ in standard length; dorsal spine 4.1 to 4.5 times in length of body; color usually plain grayish above, lighter below. . . . *Pimelodus clarias clarias* (Bloch)

U.S.N.M. No. 121145, Río de Los Pajaros, 3 km. above Lago Maracaibo, April 30, 1942, 6 specimens, 123 to 158 mm.

U.S.N.M. No. 121159, Lago Maracaibo at Yacht Club, Maracaibo, March 5, 1942, 2 specimens, 123 and 148 mm.

U.S.N.M. No. 121158, Lago Maracaibo, 1 km. off Pueblo Viejo, April 7-9, 1942, 2 specimens, 230 to 239 mm.

U.S.N.M. No. 121147, Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21, 1942, 25 specimens, 117 to 154 mm.

U.S.N.M. No. 121157, Río Palmar at bridge 70 km. southwest of Maracaibo, March 6, 1942, 5 specimens, 110 to 159 mm.

U.S.N.M. No. 121152, Ciénaga del Guanavana about 10 km. north of Sinamaica, March 11, 1942, 1 specimen, 195 mm.

U.S.N.M. 121156, Río Socuy, 3 km. above its mouth, Maracaibo Basin, February 24, 1942, 15 specimens, 125 to 218 mm.

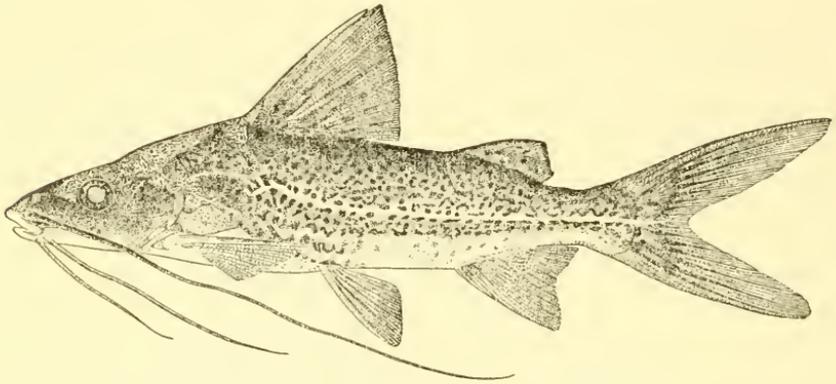


FIGURE 2.—*Pimelodus clarias coprophagus*, new subspecies: Holotype (U.S.N.M. No. 121150), 163 mm. in standard length.

U.S.N.M. No. 121148, Río Apón, about 35 km. south of Rosario, Maracaibo Basin, February 26, 1942, 31 specimens, 118 to 192 mm.

U.S.N.M. No. 121155, Río Negro below mouth of Río Yasa, March 2, 1942, 7 specimens, 118 to 195 mm.

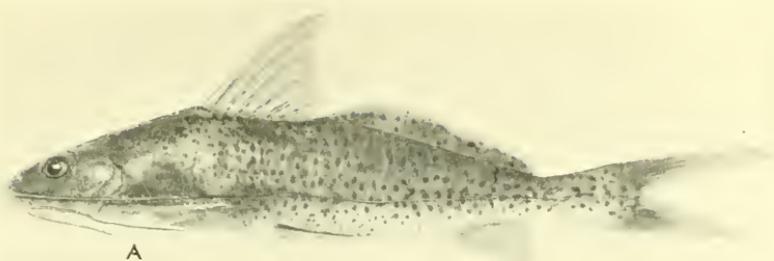
U.S.N.M. No. 121149, caño half a mile west of Sinamaica, March 11, 1942, 5 specimens, 162 to 176 mm.

U.S.N.M. No. 121151, Río Motatán at bridge 22 km. north of Motatán, March 17, 1942, 11 specimens, 117 to 167 mm.

U.S.N.M. No. 121146, Río Motatán 8 km. below Motatán, March 24, 1942, 1 specimen, 128 mm.

Description.—Certain features on the holotype and two paratypes were carefully measured, and the resulting data, expressed in hundredths of the standard length, are recorded in table 3. The following counts were made on the holotype and paratypes, respectively: Dorsal rays I, 6; I, 6; I, 6; anal v, 9; v, 9; v, 9; pectoral I, 9; I, 9; I, 9; pelvic i, 5; i, 5; i, 5; branched rays of caudal fin 15; 15; 14; number of gill rakers on first gill arch --; 9+24; 8+23. Additional counts in table 2.

Upper surface of head bony, the supraoccipital process with broad base tapering to a rounded point posteriorly, touching but not fused with the predorsal plate; eye with free margin; premaxillary band of



A



B

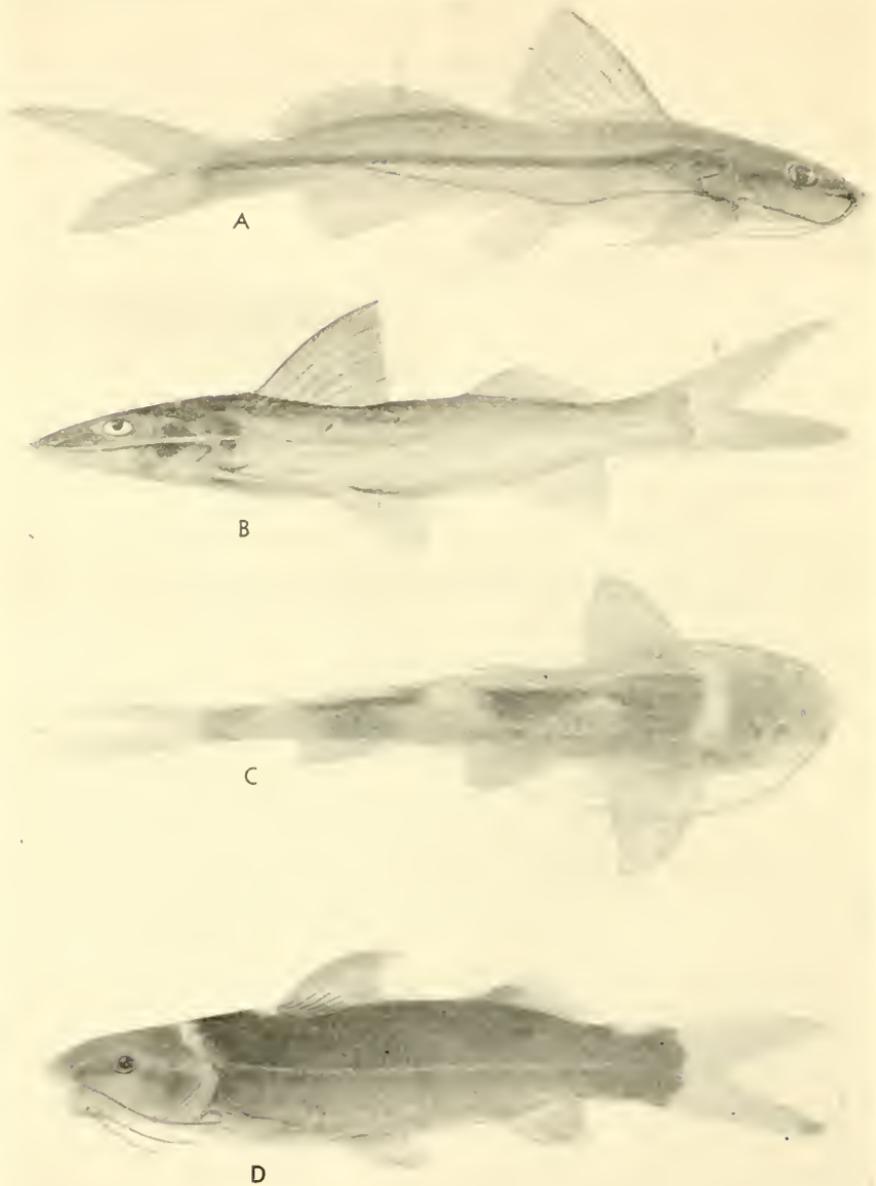


C



D

A, *Sovichthys abueto*, new genus and species: Holotype (U.S.N.M. No. 121183), 215 mm. in standard length; B, *Pseudopimelodus villosus butcheri*, new subspecies: Holotype (U.S.N.M. No. 121270), 107 mm.; C, *Pimelodus grosskopfii navarroii*, new subspecies: Holotype (U.S.N.M. No. 121174), 252 mm.; D, *Pimelodella linami*, new species: Holotype (U.S.N.M. No. 121132), 75.2 mm. Retouched photographs.



A, *Pimelodella chagresi odynea*, new subspecies: Holotype (U.S.N.M. No. 121133), 89 mm. in standard length; B, *Megalonema platycephalum psammium*, new subspecies: Holotype (U.S.N.M. No. 121175), 133.5 mm.; C, *Cetopsorhamdia shermani*, new species: Holotype (U.S.N.M. No. 121216), 30.7 mm.; D, *C. picklei*, new species: Holotype (U.S.N.M. No. 121217), 88 mm. Retouched photographs.

teeth broad with lateral end rounded; no teeth on vomer or palatines; snout projecting beyond lower lip the width of the upper lip; maxillary barbels reaching to anal fin or to caudal peduncle; outer mental barbels reaching almost to insertion of the pelvics and inner mental barbels extending a little past insertion of pectorals; the bases of the outer mental barbels are a little behind those of the anterior mental barbels; pectoral spine with numerous sharp-pointed retrorse teeth along its posterior margin and tiny numerous antrorse teeth along the basal half of the anterior margin of the pectoral spine in the half-grown, but in those specimens 200 mm. in standard length the front of the spine is rough only; posterior margin of dorsal spine with numerous retrorse teeth, anterior margin without teeth; length of gill rakers about $\frac{1}{2}$ eye; posterior margin of dorsal fin a little concave; rear margin of adipose truncate to a trifle concave; posterior margin of anal concave, usually the first branched ray longest; first branched ray of pectoral longest, the rear margin of this fin a little concave; caudal deeply forked, usually the upper lobe is longest; in the almost perfectly preserved specimens the head is profusely supplied with very minute papillae; head is depressed forward, but the supraoccipital process has a rounded keel; caudal peduncle a little compressed; total length of adipose fin less than length of snout and eye; dorsal spine $1\frac{1}{4}$ in distance from snout to dorsal origin; adipose fin shorter than distance from rear base of dorsal to adipose origin; pectoral spine not quite reaching to pelvic insertion, and dorsal spine not reaching adipose origin; gill membranes extend far forward, free from the isthmus.

Color.—Color pattern variable but always with black spots or blotches more or less separated by pale streaks along sides. The holotype has the profusely spotted color phase, in which the spots are round to elongate and more or less joined, giving a mottled pattern but with a very distinct pale streak along the lateral line; predorsal plate with black sides, this black color extending a short distance down on the skin below the plate; adipose fin faintly spotted, but often plain grayish, with its basal half a little yellowish; dorsal fin pigmented but usually with hyaline areas on the membranes a third of the way out, followed behind and below by intensification of the black pigment. Another color phase, probably the commonest, consists of a wide pale streak along the lateral line above and below, which is a row more or less of black blotches or an irregularly blackish band; below this blackish broken band another wide pale streak and then a series of blackish pigment areas occurs; sometimes the black blotches or black streak above the pale lateral band is set off by a pale streak from the blackish blotches on upper part of the back; dorsal surface of head usually not spotted, but sometimes blackish color bars more or less meet at middle

base of supraoccipital process; belly usually silvery, but occasionally a few diffuse spots occur anteriorly; peritoneum pale.

Named *coprophagus* in reference to its feeding habits.

Remarks.—This new subspecies is so distinct from *P. clarias clarias* of the Magdalena River system that it might have been best to give it the rank of a full species. The relationships of *P. clarias clarias* and other populations close to *clarias* ranging southward from the Maracaibo Basin need careful study, for they appear to differ somewhat from the Magdalena form, that in the Maracaibo Basin, and also *P. clarias punctatus* from Panama. *P. clarias clarias* has a plain coloration without spots or streaks, *P. clarias punctatus* is spotted when young but plain in color when older, while *P. clarias coprophagus* is profusely spotted with pale streaks at all sizes and ages. This new subspecies differs from all other species with a similar color pattern in its very short and high adipose fin, the height usually continued about 2.5 times in its total length. In the key other differences are given that aid in its separation from species reported in Colombia or Venezuela.

In Lago Maracaibo *P. clarias coprophagus* is one of the commonest species and is taken some distance up the rivers. Around the docks in the oilfields and along the waterfront at Maracaibo it is a scavenger, eating any refuse that it can get. Off Lagunillas in Lago Maracaibo I saw it swimming in large schools at the surface just under the film of oil that covers the water in that part of the lake. Often it sweeps its long blackish maxillary barbels forward and backward under this oil film, and on a few occasions I have seen individuals swallow large globules of thick petroleum more or less settling in the water. Because of its feeding habits around the oilfields it is thoroughly despised.

PIMELODUS CLARIAS CLARIAS (Bloch)

Silurus clarias BLOCH, Naturgeschichte der ausländischen Fische, pl. 35, figs. 1-2, 1785 [= *S. clarias* Linnaeus in part; not *S. clarias* Hasselquist, which is *Synodontis clarias* from the Nile (ref. copied)].

Pimelodus clarias (Bloch) STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 39, p. 15, 1878 (Magdalena River) (I have selected this locality as representing the type locality on which to base comparison); vol. 41, p. 158, 1879 (Ciudad Bolívar; Río Mamoni at Chepo).

Pimelodus maculatus PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 470 (Cala-bozo, Venezuela).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Apure River, Venezuela).

?*Pseudariodes pantherinus* LÜTKEN, Vid. Medd. Naturh. Foren. Kjøbenhavn, pts. 12-16, p. 192, 1874 (Caracas, Venezuela). (One of Lütken's specimens, probably a cotype, is in the United States National Museum, No. 44970, and it greatly resembles my specimens of *Pimelodus clarias coprophagus* from the Maracaibo Basin except in certain color characteristics. Lütken's types of *pantherinus* need careful comparison with the Maracaibo form. Perhaps they were not taken at Caracas.)

PIMELODUS GROSSKOPFII NAVARROI, new subspecies

PLATE 1, C

Holotype.—U.S.N.M. No. 121174, a specimen, 252 mm. in standard length, taken in the Río Palmar at the bridge 70 km. southwest of Maracaibo by Leonard P. Schultz, March 6, 1942.

Paratypes.—U.S.N.M. No. 121172, 17 specimens, 61 to 191 mm., collected by Leonard P. Schultz in the Río Socuy 3 km. above mouth, north of Maracaibo, February 24, 1942; U.S.N.M. No. 121173, 4 specimens, 76 to 147 mm., collected by Leonard P. Schultz in the Río Negro below mouth of Río Yasa, March 2, 1942; U.S.N.M. No.

TABLE 3.—Measurements (in hundredths of the standard length) for species of *Pimelodus*

Character	<i>clarias clarias</i>		<i>clarias coprophagus</i>			<i>grosskopfii navarroii</i>	
	U.S.N.M. No. 116456, Magdalena system		Río Socuy, paratype	Río Apón, paratype	Río Agua Caliente, holotype	Río Palmar, holotype	Río Socuy, paratype
Standard length (in mm.)	103	103.7	122.6 ⁵ / ₄	121.6	163	252	150.5
Head to end of supraoccipital process	34.4	35.0	36.0	36.7	36.3	31.0	33.3
Head to end of operculum	28.6	28.2	29.3	29.5	29.5	24.8	25.8
Width of head at base of pelvis	16.7	17.5	18.8	18.0	19.5	18.8	18.5
Greatest depth of body	20.9	20.8	22.3	21.8	24.2	19.4	19.9
Length of snout	11.6	12.0	12.7	12.5	13.1	11.5	12.3
Diameter of eye	6.80	5.98	6.20	6.25	5.52	4.09	4.98
Distance from eye to posterior nostril	5.24	5.30	6.69	6.25	6.75	6.00	5.38
Distance between anterior and posterior nostrils	3.49	3.57	3.75	3.78	3.50	2.90	3.39
Width of fleshy interorbital space	9.80	9.84	10.3	10.4	10.7	9.13	8.30
Postorbital length of head	10.0	11.6	11.3	12.2	11.4	9.72	10.6
Total length of adipose fin	18.9	20.7	17.9	16.9	15.6	22.5	22.2
Height of adipose fin	6.80	6.75	6.60	6.08	5.21	5.76	6.04
Least depth of caudal peduncle	9.22	8.97	9.46	8.64	9.32	8.02	8.63
Length of caudal peduncle	19.4	19.8	20.1	17.1	16.6	18.7	18.7
Length of dorsal spine	21.8	22.3	25.7	28.0	27.0	22.2	26.0
Length of pectoral spine	19.7	19.9	23.7	24.5	23.3	18.8	20.6
Length of longest ray of pelvis	17.3	16.6	18.3	17.0	18.1	14.8	17.3
Length of longest ray of anal	16.9	17.0	17.5	16.0	17.8	14.3	15.9
Length of upper caudal lobe	33.5	35.2	37.2	35.6	34.4	22.2	33.3
Length of lower caudal lobe	29.6	30.0	34.0	30.4	31.4	22.4	.....
Length of shortest middle caudal rays	9.22	9.16	9.14	8.64	8.96	6.75	8.63
Distance from snout to dorsal origin	38.4	39.2	41.9	42.0	41.5	35.6	39.2
Distance from snout to anal origin	69.9	69.1	72.7	70.7	72.1	72.0	71.7
Distance from snout to adipose origin	68.9	67.2	69.1	70.5	72.0	64.8	65.5
Distance from snout to pelvic insertion	48.0	47.6	50.4	49.8	51.8	46.6	48.1
Distance from snout to pectoral insertion	26.2	25.8	25.8	25.2	26.4	22.9	23.7
Distance from snout to anus	53.0	54.2	56.8	56.1	57.0	55.4	55.7
Anus to anal origin	17.5	15.6	15.9	14.6	14.5	16.5	14.7
Length of maxillary barbel	109	93.6	89.5	92.6	84.7	78.2	100.0
Length of outer mental barbel	44.6	36.2	37.5	45.2	44.8	41.7	35.9
Length of inner mental barbel	24.7	23.1	24.1	26.7	27.6	22.2	21.6
Width of base of supraoccipital process	6.31	6.27	7.01	6.99	7.05	6.35	6.17
Length of supraoccipital process	10.6	10.1	10.6	11.2	11.3	9.84	10.7

101614, a 173-mm. specimen collected by Nicéforo María in the Río Pamplonita, near Cucuta, Colombia (Catatumbo system).

Description.—Measurements of the holotype and one paratype were carefully made, and the data, expressed in hundredths of the standard length, are recorded in table 3.

The following counts were made: Dorsal rays I, 6; I, 6; anal v, 8; v, 8; pectoral I, 10 and I, 11; pelvic i, 5; i, 5; caudal with branched rays —; 15. Additional counts are recorded in table 2.

Upper surface of head depressed; the supraoccipital process elevated along the midline and touching the predorsal plate; eye with a free margin; premaxillary band of teeth broad with rounded corners laterally; no teeth on vomer or palatines; snout projecting beyond lower jaw a distance a little greater than width of lower lip; maxillary barbel extends anywhere from rear of anal fin base to middle of length of caudal fin; outer mental barbel reaching a little beyond the base of pelvics and inner mental barbel to middle of pectorals; bases of outer mental barbels a trifle behind base of inner mental barbels; anterior edge of pectoral and dorsal spines smooth or nearly so; posterior sides of pectoral spine strongly toothed, that of dorsal weakly serrated or only rough with age; gill rakers $\frac{1}{2}$ diameter of eye; rear margins of dorsal, anal, pectoral, and pelvic fins a little concave; caudal fin deeply forked; minute papillae on head; body compressed posteriorly; total length of adipose fin a little shorter than length of head and longer than distance from base of dorsal to adipose origin by the depth of the caudal peduncle; dorsal spine $1\frac{1}{4}$ in distance from tip of snout to dorsal origin, pectoral spine reaching three-fourths the way to pelvic insertion; dorsal spine not quite reaching adipose origin; upper caudal lobe a little longer than lower lobe.

Color.—Black spots occur everywhere on upper surface, even on top of the head and adipose and dorsal fins in the type; paired fins and anal with their bases yellowish; underside of body whitish; caudal fin plain; peritoneum pale. In specimens up to 190 mm. the color pattern consists of black spots more or less separated by pale streaks, one extending from predorsal plate obliquely downward to lateral line, thence to caudal fin base, and one along middle of upper sides; often the top of head and all fins are plain in color, and in the smallest specimens before me the black spots disappear or fade out posteriorly.

Named *navarroi* in honor of Rafael Navarro, of Maracaibo, who acted as my assistant in collecting many of the fishes herein reported upon from the Maracaibo Basin.

Remarks.—This new subspecies, *grosskopfi navarroi*, may be separated from *grosskopfi grosskopfi* of the Magdalena system by the shorter adipose fin. Other differences are indicated in the key and in the tables.

Genus *PIMELODELLA* Eigenmann and Eigenmann

Pimelodella EIGENMANN and EIGENMANN, Proc. California Acad. Sci., ser. 2, vol. 1, p. 131, 1888. (Type, *Pimelodus cristatus* Müller and Troschel.)

It is with considerable regret that I must add new names to this already complicated group of species, but since it has been impossible to obtain the loan of needed comparative material, I have felt it necessary to describe the Maracaibo forms as new and hope their relationships can be worked out more correctly when the genus is again carefully revised.

Brachyrhamdia imitator Myers, Bull. Mus. Comp. Zool., vol. 68, No. 3, pp. 123-124, 1927, a new genus and species, described without a figure, based on a single specimen 50 mm. in length, is not distinguishable from *Pimelodella* in the published account, and Dr. Chapman, of the California Academy of Sciences, informs me that the type cannot be found. I therefore quote the description:

"BRACHYRHAMDIA, gen. nov.

"βραχῦς, short, and *Rhamdia*, a genus of Pimelodidae.

"Genotype.—*Brachyrhamdia imitator* Myers.

"Pimelodinae. Allied to *Pimelodella*.

"Body rather compact; somewhat compressed and deep. Occipital process forming a bridge with the dorsal plate. Dorsal and pectoral spines pungent those of the latter with thorns along the basal half of the posterior edge. Humeral process spine-like. Fontanel not continued behind eyes, without a bridge. Eyes with free orbital rims. Barbels normal. Caudal deeply forked. Head entirely covered with skin.

"BRACHYRHAMDIA IMITATOR, sp. nov.

"Head $3\frac{1}{2}$ in body-length. Depth $3\frac{1}{2}$. Eye $3\frac{1}{4}$ in head, circular. Dorsal I, 6. Anal 9.

"Body in general shape like *Corydoras*, the head deep and the skull arched. Maxillary barbel lying in a groove below eye, long, reaching tip of anal rays. Outer mental barbel nearly reaching tip of pectoral spine. Inner mental barbel shorter. Premaxillary teeth in a band, without backward projecting angles. Pectoral spines very slightly longer than dorsal spine, the latter smooth, the former with eight strong thorns along the basal half of the posterior margin. Dorsal origin $1\frac{1}{2}$ times as far from caudal base as from snout-tip. Pelvics inserted on vertical of next to last dorsal ray. Adipose fin high, the length of its base slightly less than length of dorsal spine.

"Dull brownish yellow, light on belly. Posterior sides finely mottled. A black masque-like zone from occiput down over eyes and across cheek. Another wide black zone from dorsal origin to humeral process, this running up and involving the spine and first ray of dorsal.

"Type.—17,695 I.U. 50 mm. Venezuela: Caño de Quiribana, near Caicara. May, 1925. Carl Ternetz.

"Taken with, and very similar in color and form to *Corydoras melanistius* Regan."

Unfortunately not enough information is given for *B. imitator* Myers to enable me to include it in the keys prepared for this report.

KEY TO THE SPECIES OF PIMELODELLA REPORTED FROM VENEZUELA

- 1a. Upper caudal lobe shorter than lower; length of adipose fin 2.8 in standard length; eye 1.2 in distance from rear base of dorsal to origin of adipose fin; eye 1.25 in interorbital; maxillary barbel extending to end of adipose fin; outer mental barbel nearly to pelvics; inner mental barbel just beyond insertion of pelvics; first ray of dorsal not quite so long as head; a dark stripe from snout to caudal fin base; dorsal fin hyaline at base, dusky distally (Río Tapa Tapa).....*Pimelodella tapatapae* Eigenmann
- 1b. Upper caudal lobe longer than the lower.
- 2a. First ray of dorsal fin prolonged into a filament about twice as long as other rays of dorsal and one-third longer than head; head contained in upper caudal lobe $1\frac{3}{4}$ times; length of adipose fin 3.2 in standard length; maxillary barbel reaching to tips of pelvics; outer mental barbel reaching to middle of length of pectorals; inner mental barbels reaching to insertion of pectorals; eye contained 2.8 in distance between base of dorsal and origin of anal fin; eye 1.3 in interorbital; anus closer to base of caudal than tip of snout by a distance equal to $\frac{3}{4}$ of snout; dorsal fin hyaline in basal third, pale dusky distally; a black stripe from snout to base of caudal.....*Pimelodella linami*, new species
- 2b. First ray of dorsal fin not extending beyond other rays of that fin, and about same length as head.
- 3a. Maxillary barbel extending to base of caudal fin or farther; upper lobe of caudal fin 2.5 in standard length; length of adipose fin less than 3 times in length....*Pimelodella gracilis* (Cuvier and Valenciennes)
- 3b. Maxillary barbel not extending beyond tip of anal fin.
- 4a. Basal portion of dorsal fin hyaline, with middle part blackish, fading distally; length of adipose fin contained 3 to 3.25 in standard length.
Pimelodella metae Eigenmann
- 4b. Dorsal fin with dark pigment just in front of each ray on interradiation membrane, anterior half of this membrane hyaline; length of adipose fin contained 2.8 to 3.2 times in standard length.
- 5a. Maxillary barbels reaching anywhere from middle of anal base to a trifle beyond tips of anal fin; outer mental barbel extending to opposite tips of pectorals, and inner a little past base of pectorals; dorsal and pectoral spines almost equal in length, rarely is pectoral longer.....*Pimelodella chagresi odynea*, new subspecies
- 5b. Maxillary barbels reaching almost to anal origin, sometimes only to tips of pelvics; outer mental barbels extending almost to middle of length of pectorals, and inner mental barbels reaching only two-thirds way to base of pelvics; pectoral spine a little longer than dorsal spine, rarely equal.

Pimelodella chagresi chagresi (Steindachner)

PIMELODELLA TAPATAPAE Eigenmann

Pimelodella tapatapae EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 5, 1920 (mouth of Río Tapa Tapa, Valencia Basin).

PIMELODELLA LINAMI, new species

PLATE 1, D

Holotype.—U.S.N.M. No. 121132, the only known specimen, 75.2 mm. in standard length, collected by Leonard P. Schultz, March 31, 1942, in the Río Torbes, 1 km. above Táriba, Venezuela, Orinoco system.

Description.—Body naked; two pairs of mental barbels, the outer reaching to middle of length of pectorals, the inner barely to the insertion of the pectorals; one pair of maxillary barbels that reach almost to anal origin; nostrils widely separated, the anterior pair tubular; mouth subterminal, the snout projecting a little beyond lower lip; gill membranes extending far forward, free from the isthmus except where they join it; supraoccipital process extending backward a distance equal to postorbital length of head almost reaching the predorsal plate but not joining it; orbital rim free from the eye; pectoral spine with 9 or 10 teeth on posterior side, the distal third without teeth; anterior side of pectoral spine with a few low serrations on distal third; anus closer to base of caudal than tip of snout by a distance equal to diameter of eye; first ray (spine) of dorsal elongated with a filamentous tip, the soft portion of ray extending twice the length of the spine beyond tip of the spine; upper lobe of the caudal fin elongate, $2\frac{1}{2}$ in standard length and almost twice length of head; a wide band of villiform teeth on premaxillaries and at front of dentaries; no teeth on palatines or vomer; adipose fin about 3 in the standard length; eye 1.8 in snout, 1.2 in interorbital, and 4.4 in head; head 4.2 in standard length; depth $5\frac{1}{4}$ in length.

Detailed measurements of the holotype are presented in table 4.

Dorsal rays I, 6; anal v, 8; pectoral I, 9; pelvics i, 5; caudal with 15 branched rays.

Color.—Grayish above, with a black lateral streak from snout to base of caudal peduncle; back a little more heavily pigmented than upper sides.

Remarks.—This new species differs from all other species of *Pimelodella* except *P. griffini* Eigenmann in having the first ray of the dorsal fin filamentous and extending beyond the spine and all branched rays. The adipose fin of *griffini* is less developed, its total length contained 3.5 to 4.5 times in the standard length instead of but 3 times in *linami*; also the barbels are longer in *linami* than in *griffini*, the maxillary reaching almost to anal origin, the outer mental to middle of pectorals and inner mental almost to insertion of pectorals instead of the maxillary barbel to middle of pelvics, the outer mental barbel a little beyond base of pectorals and the inner mental not to insertion of pectorals in *griffini*.

Named *linami* in honor of Henry E. Linam, of Caracas, general manager of the Standard Oil Co. of Venezuela, who extended the formal invitation for me to stay at their camps and study the fishes of the Maracaibo Basin.

PIMELODELLA GRACILIS (Cuvier and Valenciennes)

Pimelodus gracilis CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 15, p. 181, 1840 (Buenos Ayres, Paranáat Corrientes).

- Pimelodella gracilis* EIGENMANN, Mem. Carnegie Mus., vol. 7, No. 4, p. 238, 1917 (La Plata Basin; Uruguay Basin; ? Amazon; ? Orinoco).—EIGENMANN and ALLEN, Fishes of western South America, p. 102, 1942 (Orinoco).
- Pimelodus (Pseudorhamdia) gracilis* STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 41, p. 157, 1879 (Ciudad Bolívar).

TABLE 4.—Measurements (in hundredths of the standard length) for species of *Pimelodella*

Characters	linami (holo- type)	chagresi chagresi				chagresi odynea			
		Río Chama system		U.S.N.M. No. 78256 Upper Trinidad, Panama	Río Tá- chira (para- type)	Río Motatán system			
						Para- type	Para- type	Holo- type	
Standard length (in mm.)	75.2	84	83.1	86.0	102.5	75.3	92	82.5	89
Length of head to tip of supraoccipital	28.2	28.0	28.9	30.5	29.7	28.7	28.4	28.3	28.2
Length of head to end of operculum	24.1	23.2	24.4	25.0	23.9	22.6	23.9	22.0	22.4
Greatest depth at origin of dorsal	18.0	18.7	19.3	17.6	18.5	19.9	18.6	17.7	17.0
Width of head at base of pectorals	16.0	17.4	18.1	17.4	—	17.4	18.5	16.4	16.4
Length of snout	9.84	10.0	10.8	9.88	9.27	9.56	10.1	8.60	9.10
Diameter of eye	5.58	4.88	4.45	6.16	5.56	5.71	4.90	5.58	5.06
Least width of fleshy interorbital space	6.78	6.90	7.22	5.93	5.95	5.98	7.06	6.54	6.86
Postorbital length of head	10.0	10.1	10.6	10.0	9.37	8.76	10.0	9.45	8.76
Length of maxillary barbel	62.5	65.0	61.4	61.6	63.4	81.6	75.0	93.3	96.5
Length of inner mental barbel	14.0	14.6	15.6	10.5	14.1	14.6	17.9	20.0	16.2
Length of outer mental barbel	25.9	25.6	25.9	21.5	23.9	26.5	28.9	32.7	36.0
Total length of adipose fin	31.0	32.4	30.8	31.1	33.2	32.5	32.1	31.5	34.8
Greatest height of adipose fin	4.65	5.60	4.94	5.23	4.68	5.18	6.20	6.54	4.94
Least depth of caudal peduncle	10.0	8.45	8.19	8.14	8.30	8.63	8.80	7.88	7.75
Length of caudal peduncle	20.6	19.6	20.8	19.5	21.0	22.4	21.7	21.3	20.9
Distance between anterior and posterior nostrils	3.99	2.98	3.73	3.72	3.61	3.32	3.80	3.15	3.37
Distance from eye to posterior nostril	3.19	3.69	3.73	3.49	3.61	3.32	3.80	3.27	3.48
Distance from snout to origin of dorsal	32.7	33.3	34.4	35.5	33.7	33.3	32.6	32.7	33.2
Distance from snout to origin of anal	69.2	69.2	67.6	67.1	66.9	65.0	66.5	67.8	68.6
Distance from snout to insertion of pelvics	47.5	45.8	44.6	47.2	47.1	46.6	46.2	44.8	44.4
Distance from snout to insertion of pectorals	24.1	20.4	21.2	23.3	22.5	21.4	21.7	21.3	19.8
Distance from snout to center of anus	54.0	52.0	51.8	54.2	54.6	51.3	52.6	50.5	52.7
Anus to anal origin	15.6	15.5	16.5	12.8	13.7	12.6	13.6	16.6	15.8
Length of longest ray of anal fin	12.6	11.8	13.2	12.0	12.5	12.6	12.5	13.3	12.6
Length of first ray of dorsal fin	38.7	18.2	19.1	21.5	19.5	20.0	19.6	20.0	21.7
Length of longest ray of upper caudal lobe	39.9	31.1	28.9	29.8	28.3	35.8	—	36.4	33.2
Length of longest ray of pelvic fin	13.7	15.0	13.8	13.4	14.8	14.5	14.1	16.4	14.7
Length of longest ray of lower caudal lobe	26.6	22.1	20.1	23.3	23.9	25.4	23.8	26.0	23.8
Length of dorsal spine	14.0	13.1	13.2	15.3	16.1	13.9	14.1	20.0	15.5
Length of pectoral spine	14.5	15.0	14.4	17.1	18.1	15.1	14.9	19.4	15.8

PIMELODELLA METAE Eigenmann

- Pimelodella metae* EIGENMANN, Mem. Carnegie Mus., vol. 7, No. 4, p. 244, pl. 31, fig. 2, 1917 (Quebrada Cramalote and Río Negro, near Villavicencia; Barrigona, Río Meta; all Colombia); Indiana Univ. Studies, vol. 7, No. 44, p. 5, 1920 (Maracay, Río Bue, and Río Castaño, all Valencia Basin, Venezuela).—PEARSE, Univ. Wisconsin Studies, No. 1, p. 22, 1920 (mouth Río Bue).—EIGENMANN, Mem. Carnegie Mus., vol. 9, No. 1, p. 222, 1922 (Lake Valencia Basin).
- ?*Pimelodella buckleyi* RIBEIRO, Rev. Mus. Paulista, vol. 10, p. 731, 1918 (Río Cabriale, Venezuela).

PIMELODELLA CHAGRESI ODYNEA, new subspecies

PLATE 2, A

Holotype.—U.S.N.M. No. 121133, a specimen, 89 mm. in standard length, collected by Leonard P. Schultz, March 17 and 20, 1942, in the Río San Juan at the bridge south of Mene Grande, Motatán system, Maracaibo Basin.

Paratypes.—U.S.N.M. No. 121141, 26 specimens, 49 to 92 mm., collected along with the holotype and bearing the same data. Other paratypes as follows (collected by L. P. Schultz unless otherwise indicated):

U.S.N.M. No. 121140, Río Motatán, 4 km. above Motatán, March 25, 1942, 88 specimens, 29 to 90 mm. (several females have their abdomens enlarged with eggs).

U.S.N.M. No. 121134, Río Motatán at bridge 22 km. north of Motatán, March 17, 1942, 50 specimens, 44 to 80 mm.

U.S.N.M. No. 121136, Río Motatán, 8 km. below Motatán, March 24, 1942, 103 specimens, 23.5 to 71 mm.

U.S.N.M. No. 121143, Río Jimelles, 12 km. east of Motatán, Motatán system, March 24, 1942, 8 specimens, 26.5 to 57.5 mm.

U.S.N.M. No. 121137, Río San Pedro at bridge, Motatán system, March 20, 1942, 3 specimens, 70 to 77 mm.

U.S.N.M. No. 121138, Río Machango, at bridge south of Lagunillas, Maracaibo Basin, March 16, 1942, 3 specimens, 51 to 80.5 mm.

U.S.N.M. No. 121144, Río Machango, 20 km. above the bridge south of Lagunillas, March 21, 1942, 3 specimens, 26.5 to 77.5 mm.

U.S.N.M. 121142, Río Socuy, 3 km. above its mouth, Maracaibo Basin, February 24, 1942, 18 specimens, 33.5 to 90 mm.

U.S.N.M. No. 82618, Sierra de Perija, obtained by Theodoor de Booy, mountains north of Maracaibo, 1 specimen, 42.5 mm.

U.S.N.M. No. 121135, Río Apón, about 35 km. south of Rosario, Maracaibo Basin, February 26, 1942, 2 specimens, 52 and 61 mm.

U.S.N.M. No. 121213, Río Negro below mouth of Río Yasa, Maracaibo Basin, March 2, 1942, 22 specimens, 30.5 to 69.5 mm.

U.S.N.M. No. 101610, Río Pamplonita, near Cucuta, Santander del Norte, Catatumbo system, Maracaibo Basin, Colombia, collected by Nicéforo María, 1 specimen, 84.5 mm.

U.S.N.M. No. 121252, Cucuta, Colombia, collected by Nicéforo María, 1 specimen, 100 mm.

U.S.N.M. No. 121139, Río Táchira, 7 km. north of San Antonio, Catatumbo system, April 1, 1942, 1 specimen, 75.3 mm.

Description.—Body naked, gill membranes extending far forward on isthmus; two pairs of nostrils, widely separated, the anterior pair tubular; a wide band of villiform teeth on premaxillaries and a narrower band on dentaries; posterior edge of pectoral spine with 9 to 12 teeth, the distal third smooth; the distal third of the anterior edge of pectoral spine with shallow serrations; maxillary pair of barbels reaching to caudal peduncle, sometimes only to end of anal fin; outer mental barbel reaching to opposite tips of pectorals, and inner mental barbel reaching a little past base of pectorals; eye 1.8 or 1.9 in snout,

and 1.1 to 1.3 in interorbital; pectoral and dorsal spines almost equal in length; supraoccipital process about as long as the snout; adipose fin elongate, its total length contained from 2.8 to 3.2 in the standard length, and origin of adipose $2\frac{3}{4}$ eye diameters behind base of dorsal fin; head about $4\frac{1}{2}$ in the standard length and depth 5 to 6 times; anus almost equidistant from tip of snout and base of caudal fin; first dorsal ray not longer than branched rays of that fin; intestine with a few convolutions.

Detailed measurements were made on the holotype and a few paratypes, and these data are recorded in table 4.

Color.—Grayish, with a black lateral streak from snout to base of caudal fin, fading on middle rays of that fin; a blackish streak along each side of dorsal fin extending to head; dorsal fin with pigment in front of each ray on interradiation membrane, the anterior two-thirds of membrane hyaline; anterior tubular nostril blackish; peritoneum silvery.

Fin-ray counts are recorded in table 5, but the holotype has the following: Dorsal I, 6; anal v, 8; pectoral I, 8–I, 8; pelvic i, 5; branched rays in caudal fin 15.

Remarks.—This new subspecies differs from *P. chagresi chagresi* (Steindachner) by having longer barbels, as indicated in the key.

Named *odynea* in reference to the severe pain caused by these little catfishes when my fingers were pricked by their pectoral spines.

PIMELODELLA CHAGRESI CHAGRESI (Steindachner)

Pimelodus (*Pseudorhamdia*) *chagresi* STEINDACHNER, Sitzb. Akad. Wiss. Wien, vol. 74, p. 34, 1876 (Río Chagres and its tributary, near Obispo).

U.S.N.M. No. 121130, 14 specimens, 26 to 83 mm., collected by Leonard P. Schultz in the Río Gonzáles at La Gonzáles, Río Chama system, Maracaibo Basin, Estado de Mérida, March 29, 1942.

U.S.N.M. No. 121131, 32 specimens, 48 to 82 mm., collected by Leonard P. Schultz in the Río Chama at Estanques, Estado de Mérida, April 3, 1942.

TABLE 5.—*Fin-ray counts for certain species of Pimelodella from the Maracaibo Basin, Venezuela*

Species	Dorsal	Anal		Pectoral		Pelvic
	I, 6	v, 7	v, 8	I, 8	I, 9	i, 5
<i>linami</i>	1	.....	1	.....	1	1
<i>chagresi odynea</i>	10	2	8	6	7	4
<i>chagresi chagresi</i>	10	3	6	.....	8	3

Genus PINIRAMPUS Bleeker

Pinirampus BLEEKER, Ichthyologiae Archipelagi Indici Prodrumus, vol. 1, p. 198, 1858. (Type, *Pimelodus pinirampu* Agassiz.)

PINIRAMPUS PIRINAMPU (Agassiz)

- Pimelodus pirinampu* AGASSIZ, in Spix, *Selecta genera et species piscium . . .*
Brasiliam . . ., p. 20, pl. 8, 1829 (ref. copied).
- Pirinampus pirinampus* EIGENMANN and EIGENMANN, *Occ. Pap. California Acad. Sci.*, vol. 1, p. 104, 1890 (Venezuela).—RIBEIRO, *Arch. Mus. Nac. Rio de Janeiro*, vol. 16, No. 4, p. 304, 1911 (Venezuela).
- ? *Pimelodus barbancho* HUMBOLDT, *Recueil d'observations de zoologie . . .*, vol. 2, p. 172, 1811 (Venezuela). (Ref. copied.)

Genus MEGALONEMA Eigenmann

Megalonema EIGENMANN, *Rep. Princeton Univ. Exped. Patagonia*, vol. 3, p. 383; 1910 (*nomen nudum*); *Mem. Carnegie Mus.*, vol. 5, p. 150, fig. 31, pl. 10; fig. 2, 1912. (Type, *Megalonema platycephalum* Eigenmann.)

Since *Megalonema punctatum* Meek and Hildebrand and *M. robustum* Meek and Hildebrand have been referred to *Pimelodus clarias punctatus* by these authors, there remain three other species in the genus: *Megalonema platycephalum* Eigenmann, *M. xanthum* Eigenmann, and *M. rhabdostigma* Fowler (*Proc. Acad. Nat. Sci. Philadelphia*, 1914, p. 256, fig. 10, from Rupununi River).

Although I have not seen the type of the last-named species, Fowler's figure 10 of *rhabdostigma* does not appear to belong to the genus *Megalonema* for the following reasons: (1) He says "eyelids free without adipose development," while the true members of this genus have free eyelids and the eyes have adipose eyelids strongly developed dorsally; (2) dorsal and pectorals with definite spines, but in *Megalonema* the first ray is articulated; (3) "occipital process and articulating predorsal buckler, besides exposure of shoulder-girdle over pectoral origin"; in *Megalonema* the supraoccipital process does not nearly reach the predorsal plate, there is no exposure of shoulder-girdle over the pectoral base, and there is no backward extension of the coracoids above or behind base of pectorals; (4) Fowler says "P. I, 9," while in *Megalonema* the various species have I, 12 to I, 14 rays in the pectoral fin; (5) the color pattern, shape, and all characters described by Fowler cause me to conclude that his *Megalonema rhabdostigma* should be referred to the genus *Pimelodus*, and it no doubt will be proved to be a synonym of *Pimelodus ornatus* Kner.

KEY TO THE SPECIES OF MEGALONEMA

- 1a. Total length of adipose fin contained about $2\frac{1}{2}$ times in standard length; first ray of dorsal fin two-thirds length of adipose fin; anal rays v, 8 to 10, usually 9 or 10 branched rays; pectoral I, 13 or I, 14; gill rakers 4 or 5+14 or 15; depth $4\frac{3}{4}$ to 5; first dorsal ray reaches $\frac{1}{4}$ along adipose fin; maxillary barbel reaching to caudal fin base or nearly there.

*Megalonema xanthum*³ Eigenmann

³ This species was reported from Girardot and Apulo, Colombia, Magdalena system, by Eigenmann. *Indiana Univ. Bull.*, vol. 10, No. 8, pp. 16-17, 1913.

- 1b. Total length of adipose fin contained about $4\frac{1}{2}$ to 5 times in standard length; first dorsal ray longer than length of adipose fin; caudal fin base with a pair of hidden or embedded dark spots, persistent at all sizes.
- 2a. Lower lobe of caudal fin with a darkish oblong blotch, below which ventral margin of caudal fin is distinctly pale or whitish; upper sides and back above the lateral line grayish or brownish, below which the sides are pale, distinctly set off from darker pigment above, pale sides extending about an eye diameter above black lateral line; distance from base of dorsal to origin of adipose fin a little greater than snout and eye; anal rays v, 8 to 10, usually 9 branched rays; pectoral rays I, 13 or I, 14; gill rakers 2 or 3+10 or 11.

Megalonema platycephalum psammium, new subspecies

- 2b. Pigment of lower lobe of caudal fin not restricted to a large blotch set off ventrally by a white ventral margin on lower caudal lobe; pigment on back and sides extends below lateral line anteriorly and along it posteriorly, no pale area above lateral line; distance from base of dorsal to origin of adipose equal to snout and eye.

Megalonema platycephalum platycephalum ⁴ Eigenmann

MEGALONEMA PLATYCEPHALUM PSAMMIUM, new subspecies

PLATE 2, B

Holotype.—U.S.N.M. No. 121175, a specimen 133.5 mm. in standard length, taken by Leonard P. Schultz in the Río Palmar at the bridge, 70 km. southwest of Maracaibo, March 6, 1942.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121178, 15 specimens, 74 to 105 mm., taken along with the holotype and bearing the same data; U.S.N.M. No. 121177, 46 examples, 35 to 152 mm., Río Socuy, 3 km. above mouth, February 24, 1942; U.S.N.M. No. 121176, 14 specimens, 64.5 to 102 mm., Río Apón, about 35 km. south of Rosario, Maracaibo Basin, February 26, 1942. The specimens were taken mostly over sandy bottoms.

Description.—The holotype and one paratype were carefully measured, and data for these, expressed in hundredths of the standard length, are recorded below, respectively. Standard length (in mm.) 133.5 and 107.

Length of head to end of supraoccipital 28.5 (29.4); length of head to end of gill cover 28.8 (29.0); greatest depth of body at dorsal origin 15.0 (16.1); width of head at base of pectorals 16.2 (16.3); length of snout 12.7 (13.1); diameter of eye 4.42 (4.86); width of fleshy interorbital space 7.34 (6.73); width of bony interorbital space 5.02 (4.67); distance from margin of eye to posterior nostril 5.77 (5.89); distance from anterior to posterior nostril 4.64 (4.65); postorbital length of head 12.1 (11.7); total length of adipose fin 22.8 (21.1); height of adipose 5.62 (6.54); least depth of caudal peduncle 8.32 (7.85); length of caudal peduncle or distance from rear of anal base to midbase of caudal fin 18.0 (18.2); length of first ray of dorsal 23.2 (24.8); length

⁴ This species is known from Tumatumari, British Guiana, in the original description by Eigenmann, Mem. Carnegie Mus., vol. 5, p. 150, fig. 31, pl. 10, fig. 2, 1912.

of first ray of pectoral 20.4 (19.0); length of longest pelvic ray 15.9 (16.7); length of longest anal ray 15.0 (15.1); length of longest ray of upper caudal lobe 30.3 (30.0); length of longest ray of lower caudal lobe 24.7 (27.1); shortest midcaudal ray 9.36 (9.82); distance from tip of snout to dorsal origin 36.7 (36.9); snout to anal origin 72.6 (71.5); snout to adipose origin 66.1 (66.4); snout to pelvic insertion 47.2 (45.8); snout to pectoral insertion 26.2 (25.8); snout to anus 53.5 (51.4); anus to anal origin 19.6 (19.2); length of maxillary barbel 73.4 (79.4); length of outer mental barbel 29.6 (32.7); length of inner mental barbel 14.6 (16.8); distance across ends of premaxillary band of teeth 9.36 (9.35); diameter of bony orbit 5.69 (5.98).

The following counts were made: Dorsal i, 6 (i, 6); anal v, 9 (v, 10); pectoral i, 13 (i, 13); pelvic i, 5 (i, 5); branched rays in caudal fin 15 (15); gill rakers — (3 + 10). In addition the following counts were made: Anal v, 8 in one fish, v, 9 in nine specimens; pectoral i, 14 in six examples, and i, 13 in four; gill rakers 2 + 10 in one fish, 2 + 11 in another, 3 + 11 in two, and 3 + 10 in five specimens.

Dorsal surface of head depressed anteriorly; ventral contour nearly straight, the lower surface flattish so that the upper lip is on same plane as lower jaw, the snout projecting a distance equal to diameter of eye; supraoccipital process with a narrow base and projecting backward a distance about equal to eye and not meeting the predorsal plate; premaxillary band of villiform teeth wide, teeth depressible; band of villiform teeth at front of dentaries; no teeth on vomer or palatines; interorbital space slightly concave or flattish; gill rakers not quite so long as pupil; adipose fin high, its height about 3.8 to 4 in its length; space between base of dorsal and adipose origin a little greater than length of snout and eye; adipose fin base twice length of anal fin base; adipose fin contained $4\frac{1}{2}$ to $4\frac{3}{4}$ in standard length; posterior margins of dorsal, anal, and pectorals a little concave; pelvics rounded; caudal fin deeply forked, the upper lobe a little longer than lower; length of caudal peduncle 1.2 in adipose fin length; frontal fontanel extends to opposite rear margin of eye, this fontanel bordered by two small cartilaginous ridges that converge forward and then expand at front of snout; nasal cavities bordered by a black cartilaginous rod at sides and anteriorly; occipital fontanel minute; center of eye in middle of head; first ray of dorsal and of pectoral simple, articulated, and not spinous, these rays a little longer or equal to the first branched ray; barbels somewhat flattened anteriorly, the maxillary one in young reaching to caudal fin but in larger specimens only to end of adipose fin; outer mental barbels with base farther back than inner mental barbels, and reaching in young to pelvic insertion but only to pectoral insertion in those about 150 mm. in standard length; inner mental barbels reach to or almost to pectoral insertion; gill membranes extend forward and are free from the isthmus.

Color.—Grayish to light brownish above, white below, the color abruptly paler about an eye diameter above the blackish lateral line; two embedded black spots near base of each lobe of the caudal fin; black spots, more or less embedded, between bases of each ray of dorsal fin; lower lobe of caudal fin darker, the ventral margin distinctly pale and contrasting with the blackish pigment; under the eye a dark band, with the cheek below abruptly white; peritoneum white.

Remarks.—This new subspecies differs from other forms referred to the genus *Megalonema* as indicated in the key on page 215. The most distinct difference is in the color along its side, the pale area extending above the lateral line, while in *platycephalum* the darker pigment is continuous to below the lateral line.

Named *psammium* in reference to its occurrence over sandy areas of rivers.

Genus CETOPSORHAMDIA Eigenmann and Fisher

Cetopsorhamdia EIGENMANN and FISHER, in Eigenmann, Ann. Carnegie Mus., vol. 10, p. 83, 1916. (Type, *Cetopsorhamdia nasus* Eigenmann and Fisher.)

Eigenmann described the genus *Chasmocranus* (genotype: *C. longior* Eigenmann) and referred another species, *C. brevior*, to it. An examination of a paratype, U.S.N.M. No. 66133, indicates that *Chasmocranus* has a depressed head and backward-projecting angles at the outer ends of the premaxillary band of teeth, as described by Eigenmann. Gosline (Stanford Ichth. Bull., vol. 2, No. 3, p. 88, 1941) recognizes the genus and refers to it the following species: *C. truncatorostris* Borodin, 1927, and *C. quadrizonatus* Pearson, 1937. Perhaps these species, along with those referred to the genera *Imparfinis* and *Pariolius* by Gosline (*loc. cit.*), need careful reexamination, as certain of these species do not have their heads depressed so much as is indicated in Gosline's key in contrast to the "head conical" for *Cetopsorhamdia*.

The forms described as new below have the outer ends of the premaxillary band of teeth rounded.

KEY TO THE SPECIES OF CETOPSORHAMDIA

- 1a. Total length of adipose fin contained in standard length less than 4 times, and head in standard length about 4.6 to 4.8 times.
- 2a. Total length of adipose fin 0.7 times in distance from dorsal origin to adipose origin and 2.9 in standard length; no pale bars on back or sides, color plain darkish; distance from pelvic insertion to anal origin 2.1 in snout to pelvic insertion; length of shortest midcaudal fin rays in total length of adipose fin 3.1, in longest caudal fin ray 2.2, and 2.5 in distance from dorsal origin to adipose origin (Magdalena Basin near Honda).

Cetopsorhamdia boquillae Eigenmann ⁵

⁵ *Cetopsorhamdia boquillae* Eigenmann, Mem. Carnegie Mus., vol. 10, No. 1, p. 37, pl. 1, fig. 3, 1922 (Boquilla).

- 2b. Total length of adipose fin 0.8 to 0.9 in dorsal origin to adipose origin and $3\frac{1}{4}$ in standard length. Six pale bars across back and somewhat on sides, first between upper end of gill openings, second at origin of dorsal, next rear base of dorsal, fourth origin of adipose, another under middle of adipose and last across caudal peduncle; these pale bars separated by blackish; distance from pelvic insertion to anal origin 1.5 in snout to pelvic insertion; length of shortest midcaudal fin rays in total length of adipose fin 1.9, in longest caudal fin ray 1.4, and 1.9 in distance from dorsal origin to adipose origin.---*Cetopsorhamdia rosae* (Eigenmann) ⁶
- 2c. Total length of adipose fin 1.2 in dorsal origin to adipose origin and 3.7 in standard length; color nearly uniform, with traces of paler bars on back anteriorly; distance from pelvic insertion to anal origin 1.6 in snout to pelvic insertion; length of shortest midcaudal fin rays 3 times in total length of adipose fin, 2.2 in longest caudal fin ray, and 3.4 in distance from dorsal origin to adipose origin.---*Cetopsorhamdia mirini* (Haseman) ⁷
- 1b. Total length of adipose fin contained more than 4 times in standard length and about 1.4 to 2.0 times in distance from dorsal origin to adipose origin.
- 3a. Greatest height of adipose fin contained 2 to 3.8 times in its total length.
- 4a. Three or four distinct pale bars across back and on sides, first between upper end of gill openings, second represented as a white spot at base of first rays of dorsal connecting with a palish area below, third from between dorsal and adipose, last across caudal peduncle (only a single blackish bar under adipose); greatest depth of adipose 2.2 in its total length; length of shortest midcaudal fin rays 1.6 in total length of adipose, 2.5 in longest ray of caudal fin, and 2.3 in distance from dorsal origin to adipose origin; distance between pelvic insertion and anal origin 2.1 in snout to pelvic insertion; total length of adipose fin 4.8 in standard length and 1.4 in distance from dorsal origin to adipose origin; head 3.6, and width of head across base of pelvics 5, in standard length; anal origin a very little in advance of adipose origin, almost under it.-----*Cetopsorhamdia shermani*, new species
- 4b. Color not as in 4a; no wide pale color bars between dorsals or on caudal peduncle; color plain blackish posteriorly; anal origin directly under adipose origin or a very little behind it.
- 5a. Distance from pelvic insertion to anal origin 1.3 to 2.0 times in snout to pelvic insertion.
- 6a. Distance from pelvic insertion to anal origin 1.4 in snout to pelvic insertion; total length of adipose fin 4.5 or 4.6 in standard length, and 1.5 in distance from dorsal origin to adipose origin; width of head across pectoral bases $5\frac{1}{2}$, head 5.2, depth about $5\frac{3}{4}$ in standard length; height of adipose about 3.7 in its length; length of shortest midcaudal fin rays $2\frac{1}{2}$ in total length of adipose, 3.1 in dorsal origin to adipose origin and 2.5 in longest (upper lobe) rays of caudal fin; a dark blotch or bar on back just behind head, one at origin of dorsal, third at rear base of dorsal, fourth between base of dorsal and adipose origin, the spaces between these a little paler but not white bars; caudal fin blackish, not white and sharply contrasting with blackish caudal base.

Cetopsorhamdia hasemani (Steindachner) ⁸

⁶ *Chasmocranus rosae* Eigenmann, Mem. Carnegie Mus., vol. 9, No. 1, p. 220, pl. 1, fig. 4, 1922 (Río Negro, Villavicencio, Colombia). Gosline (*op. cit.*, p. 88) refers this species to *Parolius* Cope. I cannot agree that its head is noticeably depressed.

⁷ *Imparfinis mirini* Haseman, Ann. Carnegie Mus., vol. 7, p. 318, pl. 47, 1911. Gosline (*op. cit.*, p. 88) refers this species to *Cetopsorhamdia* also.

⁸ *Imparfinis hasemani* Steindachner, Denkschr. Akad. Wiss. Wien, vol. 93, p. 59, figs. 1-3, 1917 (Río Surumú at Serra do Mello; Río Branco at Bem Querer; Río Tapajos at Santarem).

- 6b. Distance from pelvic insertion to anal origin 1.6 to 1.9 times in snout to pelvic insertion; total length of adipose fin 5.4 to $6\frac{1}{4}$ times in standard length and 1.6 to 2.0 in distance from dorsal origin to adipose origin.
- 7a. Shortest midcaudal fin rays in total length of adipose fin 2, in dorsal origin to adipose origin about 3.4, and in longest rays of caudal fin about 3 times; head $4\frac{1}{2}$, depth 5 in standard length; color plain blackish without pale caudal fin sharply contrasting with black caudal base; a white spot at origin of dorsal fin.
- Cetopsorhamdia insidiosa** (Steindachner)
- 7b. Shortest midcaudal fin ray 1.5 to 1.7 in total length of adipose fin, 3.0 to 3.2 in dorsal origin to adipose origin, and 2.7 to 2.9 in longest (lower lobe) rays of caudal fin; head 3.8 to 4.0 and width across pectoral bases 5 to 5.5 in standard length; caudal fin white, sharply contrasting with blackish caudal base; a narrow pale bar over occiput connecting across upper ends of gill openings; a white spot at origin of dorsal fin; a short narrow white area along middorsal line of caudal peduncle just in front of bases of upper caudal rays; midventral line of caudal peduncle white----- **Cetopsorhamdia picklei**, new species
- 5b. Distance from pelvic insertion to anal origin 3 times in snout to pelvic insertion; length of shortest midcaudal fin rays into longest rays of lower lobe of caudal fin 3.2 times; head 4 to 4.3 times in standard length; everywhere darkish in color dorsally; a dark band at base of caudal and a light band about width of eye extending between upper margins of gill openings across base of occipital; a pale spot at dorsal origin.

Cetopsorhamdia nasus Eigenmann and Fisher⁹

- 3b. Greatest height of adipose fin 5 to 7 times in its total length; origin of adipose fin nearly over middle of anal fin base; anal origin to midbase of caudal fin contained $1\frac{1}{4}$ times in snout to anal origin; total length of adipose fin 4.2 to 4.3, and head 4, width of head across base of pectorals about 5, all in standard length; a pale bar between upper ends of gill openings across occiput; a wide, somewhat obscure, pale bar between dorsals and another across caudal peduncle; base of caudal fin black; sometimes a pale spot on half-grown at origin of adipose fin; no pale spot at origin of dorsal fin; no black color extending up on basal part of caudal fin rays; length of shortest midcaudal fin rays, 1.7 in total length of adipose fin, 2.0 in longest ray of caudal fin, and 2.7 in distance from dorsal origin to adipose origin.

Cetopsorhamdia orinoco, new species

CETOPSORHAMDIA SHERMANI, new species

PLATE 2, C

Holotype.—U.S.N.M. No. 121216, the only known specimen, 30.7 mm. in standard length, collected by Leonard P. Schultz, Guillermo Zuloaga, Roger Sherman, and William Phelps, Jr., May 12, 1942, in the Río Guárico and tributaries between San Sebastián and San Casimiro (Orinoco system), Estado de Aragua, Venezuela.

Description.—Detailed measurements are expressed in hundredths of the standard length:

⁹ *Cetopsorhamdia nasus* Eigenmann and Fisher, Ann. Carnegie Mus., vol. 10, p. 83, 1916 (Honda).

Length of head to end of operculum 28.7; width of head across base of pectorals 19.9; greatest depth of body 19.9; length of snout 12.1; diameter of eye 4.56; distance from eye to rim of posterior nostril 2.28; distance between anterior and posterior nostrils 4.89; width of interorbital space 9.45; postorbital length of head 14.3; total length of adipose fin 22.2; greatest height of adipose fin 7.50; least depth of caudal peduncle 10.4; length of caudal peduncle from base of anal to midbase of caudal fin 22.2; length of first ray of dorsal fin 27.4; length of first ray of pectoral 22.8; longest branched ray of pelvic fin 17.9; longest branched ray of anal fin 18.9; length of longest ray of upper lobe of caudal fin 32.2; longest ray of lower lobe of caudal fin 31.9; length of shortest rays of caudal fin 12.7; distance from snout to dorsal origin 40.0; snout to anal origin 67.1; snout to adipose origin 68.4; snout to pelvic insertion 45.6; snout to pectoral insertion 23.1; dorsal origin to adipose origin 31.3; anus to anal origin 10.1; length of maxillary barbel 46.9; length of outer mental barbel 22.8; length of inner mental barbel 13.4; length of base of anal 13.0.

TABLE 6.—Counts made on seven species of *Cetopsorhamdia*

Species	Number of fin rays											Number of gill rakers on first arch																		
	Dorsal		Anal			Pectoral				Pelvic	Above angle			Below angle						Total										
	i, 6	iv, 7	iv, 8	v, 7	i, 8	i, 9	i, 10	i, 11	i, 5	1	2	3	6	7	8	9	10	11	12	7	8	9	10	11	12	13	14	15		
<i>orinoco</i>	5			5		4	6		5	4			2	2						2	2									
<i>shermani</i>	1	1				2			2																					
<i>picklei</i>	9	6	3			1	11		4	1	2	12			4	5	1	1	1							1	5	3	1	1
<i>nasus</i>	1	1							1	1																				
<i>boguillae</i>	1		1			1	1		1																					
<i>rosae</i>	1	1	1						1																					
<i>brevior</i>	1	1							1																					

The following counts were made: Dorsal rays i, 6; anal iv, 7; pectoral i, 8-i, 8; pelvic i, 5-i, 5; branched rays of caudal fin 15.

First rays of pectoral and dorsal not spines but segmented rays; margin of eyes not free; gill membranes extending far forward, free from isthmus, not joined to each other; a pair of maxillary barbels in a groove to below eye and extending to opposite tips of pectorals; two pair of mental barbels, the outer pair reaching a little behind base of pectorals, the inner pair not quite reaching to opposite pectoral insertion; origin of anal a trifle in advance or under origin of adipose fin; pelvics inserted under fourth branched ray dorsal fin; caudal fin deeply forked, lobes about equal; nasal openings far apart, the posterior ones near eyes, funnel-shaped, the anterior nasal openings directly in front of the posterior ones and tubular; snout projecting, lower jaw

shorter, included, so that mouth is subterminal; teeth villiform in a narrow band on premaxillaries and dentaries; no teeth on vomer or palatines.

Body compressed posteriorly, head depressed anteriorly, profile rounded; distance from anal origin to midbase of caudal fin $1\frac{1}{2}$ in snout to pelvic insertion; snout to dorsal about $1\frac{1}{2}$, head $3\frac{1}{2}$, depth 5, width of head at pectoral base 5, all in standard length; first ray of dorsal longest, extending past next branched ray, margin of this fin concave; first branched ray of anal longest, rear margin a little concave; first ray of pectoral a trifle longer than first branched ray, rear margin truncate; first branched ray of pelvics longest, rear margins truncate.

Color.—A pale color bar extending from base of pectorals past upper ends of gill openings across occiput, the blackish opercle extending into this band, but the thin membranes around operculum white; a white spot below base of first three dorsal fin rays, but not in front of fin; base of dorsal and back below dorsal blackish, then a pale hour-glass-shaped area, with an elongate blackish blotch along lateral line, then paler below; a wide pale bar between dorsals extending to in front of anal; another wide pale band across caudal peduncle; base of caudal fin blackish, sharply contrasting with pale caudal fin; all fins pale except base of adipose and base of dorsal; anal base with some black pigment cells; dorsal surface of head blackish; tip of snout white; mental barbels white; basal half of maxillary barbels pigmented.

Remarks.—This new species differs in color from all other species referred to the genus *Cetopsorhamdia* and may be separated from them by the key on pages 218–220.

Named *shermani* in honor of Roger Sherman, of the Standard Oil Co. of Venezuela, who helped me in many ways while I was in Venezuela.

CETOPSORHAMDIA PICKLEI, new species

PLATE 2, D

Holotype.—U.S.N.M. No. 121217, a specimen 88 mm. in standard length, collected by Leonard P. Schultz, March 25, 1942, in the Río Motatán, 4 km. above Motatán, Maracaibo Basin.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121218, 37 specimens, 45 to 118 mm., taken along with the holotype and bearing the same data; U.S.N.M. No. 121222, 29 examples, 46 to 96 mm., March 24, 1942, from the Río Jimelles, 12 km. east of Motatán, Motatán system; U.S.N.M. No. 121220, 7 specimens, 53 to 95.5 mm., March 24, 1942, from the Río Motatán, 8 km. below Motatán; U.S.N.M. No. 121219, 24 specimens, 37 to 75.5 mm., March 17 and 20, 1942, from the Río San Juan near bridge south of Mene Grande, Motatán system; U.S.N.M. No. 121221, 17 examples, 37.5 to 70.5

mm., February 21, 1942, from the Río Palmar near Totuma, about 100 km. southwest of Maracaibo.

The largest specimens are females, their abdomens swollen with eggs.

Description.—Based on the holotype and paratypes listed above. Detailed measurements of the holotype and two paratypes, expressed in hundredths of the standard length, are recorded below, first for the holotype, then for the two paratypes in parentheses, respectively. Standard length (in mm.) 88 (39.7; 118).

Length of the head to end of operculum 25.7 (28.5; 23.7); width of head across base of pectorals 19.0 (16.9; 18.6); greatest depth 21.7 (16.6; 25.4); snout 10.5 (11.3; 9.58); diameter of eye 4.43 (5.04; 3.98); distance from eye to posterior nostril 2.16 (2.77; 2.20); distance between anterior and posterior nostrils 4.54 (5.29; 3.90); width of fleshy interorbital space 6.59 (6.80; 6.02); postorbital length of head 12.4 (13.8; 11.7); total length of adipose fin 19.3 (16.4; 19.9); greatest height of adipose fin 6.14 (5.80; 5.59); least depth of caudal peduncle 13.3 (11.6; 13.7); length of caudal peduncle from rear base of anal to midbase of caudal fin 21.0 (21.2; 22.4); length of first (simple) ray of dorsal fin 22.7 (23.2; 21.1); length of first or upper pectoral ray 17.8 (18.9; 14.7); longest pelvic ray 16.8 (16.9; 15.9); longest anal ray 18.2 (16.4; 15.3); length of longest ray of upper lobe of caudal fin 30.1 (33.2; 26.3); length of longest ray of lower lobe of caudal fin 30.9 (33.2; 27.1); length of shortest middle ray of caudal fin 11.4 (11.3; 11.0); distance from tip of snout to dorsal origin 36.5 (41.6; 36.2); snout to anal origin 70.9 (70.5; 69.5); snout to adipose origin 70.8 (69.5; 68.3); snout to pelvic insertion 48.8 (47.4; 47.4); snout to pectoral insertion 24.1 (27.2; 21.7); distance from dorsal origin to adipose origin 33.5 (27.7; 33.9); anus to anal origin 12.5 (13.8; 12.7); length of maxillary barbel 30.9 (32.2; 25.8); length of outer mental barbel 15.3 (18.9; 14.5); length of inner mental barbel 8.52 (12.1; 8.48); length of base of anal fin 12.5 (12.3; 13.1).

The following counts were made, respectively; Dorsal rays i, 6 (i, 6; i, 6); anal iv, 8 (iv, 7; iv, 8); pectoral i, 9-i, 9 (i, 9; i, 9); pelvic i, 5-i, 5 (i, 5; i, 5); branched rays in caudal fin 15 (15; 15).

Head a little depressed; body compressed posteriorly; gill membranes extending far forward, free from the isthmus; teeth villiform in a band on premaxillaries and on dentary, no posteriorly projecting toothed areas laterally; margins of eyes not free; a pair of maxillary barbels, in a groove to under eye, these barbels reaching to opposite middle of pectorals; two pairs of mental barbels, their bases nearly in a straight line; the outer mental barbel reaches to pectoral base and the inner one two-thirds the way to pectoral base; nasal openings far apart, the posterior nostril near eye and funnel-shaped, the anterior nostril near front of snout tubular; mouth subterminal,

the snout projecting; no teeth on vomer or palatines; pelvic insertion under the fifth branched ray of the dorsal; anal origin under the adipose origin; the adipose fin is short and high, its height about $2\frac{1}{2}$ to 3 times in its total length, and the latter $5\frac{1}{8}$ to $6\frac{1}{4}$ times in the standard length; the first rays of dorsal and pectorals are soft, not spinous; the first dorsal ray is about as long as the first branched ray, the rear margin of this fin slightly concave; last simple ray of anal about as long as first branched ray, rear margin of anal truncate; posterior margins of paired fins rounded; first ray of pectoral four-fifths as long as first branched ray; pectoral fins reaching two-thirds the way to the pelvics, the latter three-fourths the way to the anal origin; anus closer to snout than caudal fin base by length of snout and eye; lobes of caudal fin equal, this fin deeply forked; a membrane occurs along margin of shoulder girdle becoming free toward pectoral base but ending before reaching that far.

Color.—General color blackish above, paler below; a white bar or saddle across occipital, extending down to base of pectorals; a white spot at origin of dorsal fin but no white spot at origin of adipose; middorsal line of caudal peduncle with a white oblong spot just in front of base of upper rays of caudal fin; caudal fin yellowish, sharply contrasting with its black basal portion; paired fins pale; anal fin pale with some dark pigment basally; base of dorsal fin black, pale distally; anterior base of adipose dark, pale distally; underside of snout white, blackish dorsally; maxillary barbel pigmented dorsally, pale ventrally; mental barbels whitish; when alive, this species was blackish above, tinged with orange-yellowish ventrally, abruptly so below groove behind base of maxillary barbel; pale saddle across occipital yellow, as is spot at origin of dorsal; all median fins tinged with orange-yellow color; posterior margin of caudal fin with a wide, slightly darkish band; anterior rays of anal orange-yellow as is mid-ventral area of caudal peduncle; peritoneum dusky laterally.

Remarks.—This new species can be separated from all others in the genus *Cetopsorhamdia* by the key on page 218. It is most closely related to *nasus*, of the Magdalena system, but differs in a more robust body, depth 4.8 to 5.2 instead of over 6 times in *nasus*. Eigenmann gives i, 11 pectoral rays for *nasus*, but *picklei* has i, 9; the lower caudal lobe of *nasus* is much longer than the upper lobe, while in this new species they are equal; the length of the adipose fin in *picklei* equals the space between rear of dorsal and adipose origin, but in *nasus* the adipose is contained $1\frac{1}{4}$ times; other differences occur, and some are given in the key.

Named *picklei* for Chesley B. Pickle, of the Lago Petroleum Corporation, who aided me in the collection of fishes at the southern end of Lago Maracaibo.

CETOPSORHAMDIA ORINOCO, new species

PLATE 3, A

Holotype.—U.S.N.M. No. 121214, a specimen 53.5 mm. in standard length, collected by Leonard P. Schultz, March 31, 1942, in the Río Torbes, 1 km. above Táriba, Orinoco system, Venezuela.

Paratypes.—U.S.N.M. No. 121215, 4 specimens, 32.5 to 51.5 mm., taken along with the holotype and bearing the same data.

Description.—Based on the holotype and paratypes listed above. Detailed measurements of the holotype and a paratype, expressed in hundredths of the standard length, are recorded below, respectively. Standard length (in mm.) 53.5 and 33.7.

Length of head to end of operculum 25.4 and 29.1; width of head across base of pectorals 20.6 and 20.8; greatest depth 14.2 and 14.8; length of snout 10.7 and 11.6; diameter of eye 3.74 and 3.26; distance from eye to posterior nostril 2.42 and 2.38; distance between anterior and posterior nostrils 3.92 and 3.86; width of interorbital space 6.72 and 8.01; postorbital length of head 12.5 and 15.1; total length of adipose fin 22.6 and 24.3; height (greatest) of adipose fin 3.92 and 4.75; least depth of caudal peduncle 8.60 and 9.20; length of caudal peduncle from anal base to midbase of caudal fin 23.6 and 24.0; length of first ray of dorsal fin 18.5 and 22.6; length of first ray of pectoral fin 17.9 and 23.1; longest ray of pelvic fin 14.6 and 18.4; longest branched ray of anal fin 14.6 and 16.3; longest ray of upper lobe of caudal fin 21.9 and 24.6; longest ray of lower lobe of caudal fin 24.9 and 27.3; length of shortest midcaudal fin rays 12.3 and 15.7; distance from tip of snout to dorsal origin 37.9 and 40.0; snout to anal origin 67.3 and 68.0; snout to adipose origin 70.4 and 70.0; snout to pelvic insertion 44.5 and 45.1; snout to pectoral insertion 23.7 and 26.7; dorsal origin to adipose origin 34.2 and 30.9; anus to anal origin 14.0 and 13.7; length of maxillary barbel 28.6 and 37.1; length of outer mental barbel 15.1 and 20.5; length of inner mental barbel 11.6 and 13.4; length of anal base 13.1 and 13.7.

Head depressed anteriorly, body compressed posteriorly; snout bluntly rounded, projecting beyond the subterminal mouth; villiform teeth in a band on premaxillaries and on dentaries, without posteriorly projecting angles laterally; no teeth on vomer or palatines; nostrils wide apart, the posterior one funnel-shaped near eye, the anterior one near front of snout; a pair of maxillary barbels, lying in a groove to under eye and extending to opposite four-fifths the length of pectoral fin; two pairs of mental barbels, their bases almost in a straight line, the outer pair reaching almost to rear of base of pectoral fin and the inner pair about four-fifths the way to opposite pectoral insertion, eye without a free margin; a thin membrane along margin of shoulder girdle under gill cover; caudal fin deeply concave or forked, but the

lobes are not pointed and only partially rounded, of equal length; first dorsal ray soft, equal in length to first branched ray, margin of dorsal fin truncate; simple rays of anal fin graduated, the first branched soft ray longest, margin of this fin truncate; paired fins with rounded posterior margins; first ray of pectoral not spinous, about equal in length to first branched ray; the adipose fin is long but somewhat high, its total length about 4 times in the standard length, and much longer than the space from rear base of dorsal to adipose origin; pelvics inserted under second branched ray of dorsal; anal origin about an eye diameter in advance of a vertical line through adipose origin; anus a trifle closer to caudal fin base than tip of snout.

Color.—General color blackish above, paler below, with the pale caudal fin sharply contrasting with the black base of caudal fin; a pale bar, sometimes obscure, across occipital and down to upper end of gill openings; origin of dorsal and the area just in front blackish, sometimes behind this a small, paler blotch, then at rear base of dorsal the pigment is more intensive; body below dorsal fin base paler except a blackish diffuse oblong blotch along lateral line; a wide pale bar between dorsal across body to in front of anal, another on caudal peduncle, these pale bar pigments somewhat obscure in larger specimens; the black bar from base of caudal fin to anal is obvious; on the smaller specimens a small pale spot occurs at origin of adipose, absent on larger specimens; paired fins pale, dorsal and anal pale; snout pale; front of chin and lower jaw pigmented.

Remarks.—This new species differs from the other members of the genus *Cetopsorhamdia* with elongate adipose fins in color, and it is the only one of the species having the anal fin origin so far in advance of the adipose origin.

Named *orinoco* for the river system in which it was collected.

Genus NANNORHAMDIA Regan

Nannorhamdia REGAN, Ann. Mag. Nat. Hist., ser. 8, vol. 12, p. 467, 1913. (Type, *Nannorhamdia spurrelli* Regan.)

The state of preservation determines to a large extent whether the rim of the orbit is free from the eye dorsally. If the eye bulges even a little, the dorsal edge of the rim does not appear free; only in well-preserved specimens the dorsal rim of the orbit is distinctly free and then not strongly. The first ray of the dorsal fin is definitely not a pungent spine. The segmentation of this ray can be seen occurring nearly to its base. The pectoral spine is not a pungent spine, but if the soft-rayed portion is broken off at the proper place a more or less sharp-pointed spine can be felt and seen. The posterior half of the first pectoral ray or spine is segmented nearly to its base. There are usually seven gill rakers on the lower half of the first gill arch. The number of fin rays varies according to the data recorded in table 7. The caudal fin usually has 15 branched rays.

TABLE 7.—*Fin-ray counts in specimens of Nannorhamdia nemacheir*

Locality	Dorsal rays		Anal rays				Pectoral rays		
	i, 5	i, 6	iv, 6	iv, 7	iv, 8	v, 7	I, 8	I, 9	I, 10
Río Palmar.....		8	3	4		1		8	
Ríos Motatán and Machango.....	1	12	1	10	1		1	6	3

NANNORHAMDIA NEMACHEIR Eigenmann and Fisher

Nannorhamdia nemacheir EIGENMANN and FISHER, in Eigenmann, Ann. Carnegie Mus., vol. 10, p. 83, 1916 (Girardot, Colombia).

The following specimens of this catfish were collected in the Maracaibo Basin, Venezuela, by Leonard P. Schultz during 1942:

U.S.N.M. No. 121171, Río Machango, 20 km. above the bridge south of Lagunillas, March 21, 15 specimens, 36 to 53.5 mm.

U.S.N.M. No. 121166, Río Machango, at bridge south of Lagunillas, March 16, 112 specimens, 24 to 45 mm.

U.S.N.M. No. 121163, Río Motatán, at bridge 22 km. north of Motatán, March 17, 43 specimens, 32.5 to 63.8 mm.

U.S.N.M. No. 121160, Río Motatán, 4 km. above Motatán, March 25, 12 specimens, 49.5 to 74 mm.

U.S.N.M. No. 121169, Río Jimelles, 12 km. east of Motatán, Motatán system, March 24, 3 specimens, 54 to 64 mm.

U.S.N.M. No. 121167, Río San Juan, at and above bridge south of Mene Grande, Motatán system, March 17 and 20, 33 specimens, 32.5 to 69 mm.

U.S.N.M. No. 121164, Río Motatán, 8 km. below Motatán, March 24, 13 specimens, 35 to 64.5 mm.

U.S.N.M. No. 121170, Río San Pedro, at bridge south of Mene Grande, Motatán system, March 20, 12 specimens, 37 to 61.7 mm.

U.S.N.M. No. 121161, Río Apón, about 35 km. south of Rosario, February 26, 8 specimens, 38 to 48.5 mm.

U.S.N.M. No. 121165, Río Palmar, at bridge 70 km. southwest of Maracaibo, March 6, 3 specimens, 50.5 to 55 mm.

U.S.N.M. No. 121162, Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21, 118 specimens, 36.5 to 72.5 mm.

U.S.N.M. No. 121168, Río San Juan, 12 km. south of Rosario, Estado de Zulia, February 26, 10 specimens, 28.5 to 39 mm.

The specimens listed above do not agree exactly with Eigenmann's descriptions of *N. nemacheir*, but since none are available for direct comparison from the Río Magdalena, I hesitate to name the Maracaibo specimens as a new subspecies.

SORUBIMINAE, new subfamily

The pinelodid catfishes herein grouped under the subfamily Sorubiminae have certain characters in common, as follows: Broad heads much depressed anteriorly, with patches or bands of villiform teeth in the roof of the mouth on vomer or on palatines or on both, and with

wide bands on the dentary and premaxillary; eye with free margin, and nostrils widely separated nearer front of snout than eye; inner edge of operculum with one or two folds or "pouches"; gill rakers stiff. The similarity in the above-mentioned characters has influenced me to separate them as a subfamily, although its limits are ill defined, and doubt must be cast on such grouping.

Only those genera and species so far found in Venezuela are listed below, but other genera were included in the key on pages 187-189 in order to indicate relationships among the various genera and to record those genera that may belong to the Sorubiminae.

Genus HEMISORUBIM Bleeker

Hemisorubim BLEEKER, Nederl. Tijdschr. Dierk., vol. 1, p. 97, 1863. (Type, *Platystoma platyrhynchus* Cuvier and Valenciennes.)

HEMISORUBIM PLATYRHYNCHOS (Cuvier and Valenciennes)

DORMILÓN

Platystoma platyrhynchus CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 15, p. 27, 1840.

Hemisorubim platyrhynchus PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 470 (Calabozo, Venezuela).

Genus SORUBIM Agassiz

Sorubim AGASSIZ, in SPIX, Selecta genera et species piscium . . . Brasiliam . . . , p. 24, 1829. (Type, *Silurus lima* Bloch.)

SORUBIM LIMA (Bloch)

PALETA

FIGURE 3, h

Silurus lima BLOCH, in Schneider, Systema ichthyologiae, p. 384, 1801.

Sorubim lima PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 469 (Calabozo, Venezuela).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Apure River, Venezuela).

Genus SORUBIMICHTHYS Bleeker

Sorubimichthys BLEEKER, Nederl. Tijdschr. Dierk., vol. 1, p. 98, 1863. (Type, *Platystoma spatula* Agassiz.)

SORUBIMICHTHYS PLANICEPS (Agassiz)

Platystoma planiceps AGASSIZ, in Spix, Selecta genera et species piscium . . . Brasiliam . . . , p. 25, 1829 (ref. copied).—PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 469 (Calabozo, Venezuela).—ERNST, Estudios sobre la flora y fauna de Venezuela, p. 282, 1877 (creeks near Caracas).

Sorubimichthys planiceps EIGENMANN and ALLEN, Fishes of western South America, p. 115, 1942 (Amazon and Orinoco).

PERRUNICHTHYS, new genus

This new genus of pimelodid catfish, with a greatly depressed head anteriorly, differs from all other genera of the subfamily Sorubiminae in its very small patches of villiform teeth on palatines and vomer, the latter with their long axis running transversely. The two palatine patches are widely separated from the vomerine patches, all teeth uniform. The premaxillary band of teeth does not have posteriorly projecting angles laterally, but the ends are rounded. In the adult

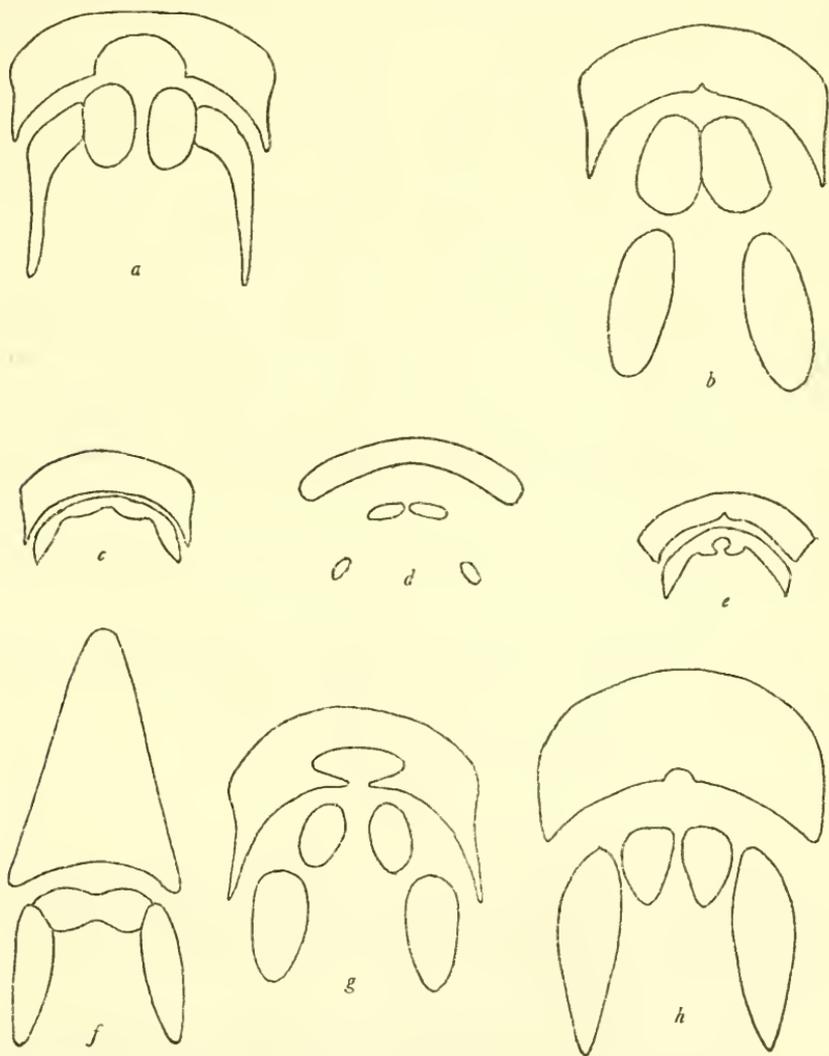


FIGURE 3.—Sketches of the toothed areas in roof of mouth of various species of South American Pimelodidae: a, *Pseudoplatystoma fasciatum*; b, *Duopalatinus emarginatus*; c, *Paulicea lütkeni* (after Ribeiro); d, *Perrunichthys perruno*; e, *Brachyplatystoma vaillanti* (after Ribeiro); f, *Platystomatichthys sturio*; g, *Platysilurus malarmo*; h, *Sorubim lima*.

the vomerine patches meet in the midline, but in the type they are a little separated; dentary with a band of villiform teeth. The width of the head is contained about $1\frac{1}{2}$ to $1\frac{1}{4}$ in length of head to end of opercle, while the width of the head across the angles of the mouth is contained 1.7 in head length and about $1\frac{1}{3}$ in width of head; interorbital space a little concave, the eye contained about $3\frac{1}{4}$ in the interorbital space; eyes with a free margin; nostrils closer to end of snout than eye, and widely separated, the anterior nostril tubular, the posterior one covered with a flap; gill membranes extend forward, free from isthmus, with the usual narrow free fold in front of which is a pouch; a sharp-pointed, acutely triangular, spiny projection, a little longer than eye, extending backward from shoulder girdle above axil of pectoral fin; dorsal spine pungent, with a flexible produced tip extending beyond branched rays a distance nearly equal to eye; pectoral spine heavy, broad, with antrorse spines anteriorly and strong retrorse spines along its posterior margins; gill rakers stiff, about 4 or 5+11; the maxillary barbel is heavy, gradually tapering to a fine filament and ending opposite caudal fin, shorter in the large paratype; adipose fin very long, twice length of anal fin base, $1\frac{1}{4}$ in length of head, and 3.9 in standard length; caudal peduncle rounded; caudal fin deeply forked; air bladder large. Mental barbels remote from tip of chin; eyes superior, not visible from below; supraoccipital process longer than its base and meeting the predorsal plate; below the lateral line are groups of fingerlike canals branching from the lateral line and ending in pores.

This new genus may be distinguished from related genera by the key on pages 187-189.

Genotype.—*Perrunichthys perruno*, new species.

Named *Perrunichthys* after the common name of this species, called *bagre perruno* by the people of the Maracaibo Basin.

PERRUNICHTHYS PERRUNO, new species

PERRUNO

FIGURE 3, d; PLATE 3, B

Holotype.—U.S.N.M. No. 121189, a specimen 270 mm. in standard length, taken in the Río Negro below the mouth of the Río Yasa, about 75 km. south of Rosario, west side of Lago Maracaibo, by Leonard P. Schultz, March 2, 1942.

Paratype.—U.S.N.M. No. 121200, a large specimen 620 mm. in standard length, taken along with the holotype and bearing the same data. In addition, a larger specimen was collected, but one of the men cut it in pieces with his machete and ruined it; thus it was not preserved. The top of head of the paratype also was cut deeply by a machete.

Description.—Based on the holotype and paratype. Detailed measurements of the two type specimens, in hundredths of the standard length, are given below, first for the holotype, followed by the paratype in parentheses. Standard length (in mm.) 270 (620).

Length of head to tip of supraoccipital process 34.6 (—); length of head to end of opercle 31.1 (29.4); greatest depth of body 17.6 (23.9); greatest width of head at base of pectorals 25.4 (26.9); length of snout 15.0 (14.8); diameter of eye 4.14 (3.23); width of fleshy interorbital space 12.8 (13.9); length of maxillary barbel 115 (82); length of outer mental barbel 50.4 (33.0); length of inner mental barbel 27.8 (21.0); total length of adipose fin 25.5 (24.7); length of base of anal fin 10.0 (12.3); height of adipose fin 5.36 (5.32); least depth of caudal peduncle 7.40 (7.90); length of caudal peduncle 18.9 (19.0); distance from anterior to posterior nasal opening 3.44 (2.90); distance from eye to posterior nasal opening 7.10 (7.58); snout to origin of dorsal fin 37.6 (—); snout to origin of anal 71.0 (68.0); snout to adipose 63.3 (66.0); snout to pelvic insertion 49.6 (—); snout to pectoral insertion 26.3 (—); anus to anal origin 10.7 (12.3); snout to anus 61.4 (—); length of dorsal spine 21.1 (14.5); length of dorsal spine and its prolonged fleshy tip 26.7 (21.8); length of longest ray of anal (first or second branched ray) 14.4 (13.4); length of longest (first branched) ray of pelvic fins 16.6 (14.8); length of pectoral spine 21.8 (19.0); length of longest ray of upper lobe of caudal fin 28.9 (25.3); length of longest ray of lower lobe of caudal fin 26.3 (—); length of shortest midcaudal ray 13.0 (11.3); postorbital length of head 14.0 (13.1); width of head across angle of mouth 18.5 (18.1); distance from tip of chin to base of inner mental barbel 5.00 (5.00); tip of chin to base of outer mental barbel 8.51 (7.90).

The following counts were made: Dorsal rays I, 8 (I, 7); anal v, 7 (v, 7); pectoral I, 10—I, 11 (I, 11—I, 11); pelvic i, 5 (i, 5); branched caudal fin rays 15 (15); number of gill rakers on first gill arch 5+11.

In addition to the characters given in the generic diagnosis, others are mentioned below. The greatest depth is about $5\frac{1}{2}$, head $3\frac{1}{4}$, in standard length; eye $3\frac{1}{2}$ in snout, $7\frac{1}{4}$ to 9 in head; bases of inner mental barbels only a trifle in front of bases of outer mental barbels, the latter reaching to base of pelvics or a little beyond; inner mental barbels reaching a little past pectoral bases in the holotype; posterior margins of dorsal and anal fins a little rounded, pectoral almost truncate and pelvics a little rounded to truncate; adipose fin high, its depth $4\frac{1}{2}$ in its length, the distance from adipose origin to rear base of dorsal about $1\frac{1}{2}$ height of adipose or $\frac{3}{4}$ interorbital space. All teeth villiform, and similar in mouth. Underside of head flat, nearly all in same plane.

Color.—Plain dark brownish above, pale below; somewhat mottled with pale brown; all median fins with large roundish, dark blotches,

giving these fins a mottled appearance; paired fins blackish; maxillary barbel blackish to dark brown basally, barred with brown distally; outer mental barbel barred with brownish; inner mental barbel pale; just inside band of teeth on lower jaw is a darkish band.

Remarks.—This new species differs from all other pimelodid catfishes in the shape, size, and arrangement of the villiform patches of teeth in the roof of the mouth, as well as in color pattern, length and shape of barbels, and concave interorbital space, among other differences.

Named *perruno* after the common name of this species in the Maracaibo Basin.

Genus BRACHYPLATYSTOMA Bleeker

Brachyplatystoma BLEEKER, Nederl. Tijdschr. Dierk., vol. 1, p. 97, 1863. (Type, *Platystoma vaillanti* Cuvier and Valenciennes.)

BRACHYPLATYSTOMA VAILLANTI (Cuvier and Valenciennes)

FIGURE 3, e

Platystoma vaillanti CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 15, p. 21, pl. 423, 1840 (Cayenne and Surinam).—PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 469 (Calabozo).

Genus PSEUDOPLATYSTOMA Bleeker

Pseudoplatystoma BLEEKER, Nederl. Tijdschr. Dierk., vol. 1, p. 97, 1863. (Type, *Silurus fasciatus* Linnaeus).

PSEUDOPLATYSTOMA FASCIATUM (Linnaeus)

BAGRE RAYADO

FIGURE 3, a

Silurus fasciatus LINNAEUS, Systema naturae, ed. 12, vol. 1, p. 505, 1766.

Pseudoplatystoma fasciatum EIGENMANN and ALLEN, Fishes of western South America, p. 108, 1942 (La Plata northward to the Magdalena, Orinoco, and Guiana).—RÖHL, Fauna descriptiva de Venezuela, p. 375, 1942 (Río Apure at Bolívar).

Platystoma fasciatum PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 469 (Calabozo, Venezuela).

Genus PLATYSILURUS Haseman

Platysilurus HASEMAN, Ann. Carnegie Mus., vol. 7, p. 320, pl. 52, 1911. (Type, *Platysilurus barbatus* Haseman.)

This genus of pimelodid catfishes was not adequately described by Haseman. The following description is based entirely on the species found in the Maracaibo Basin:

Head greatly depressed; wide bands of villiform teeth on premaxillaries, vomer, palatines, and dentary. The arrangement of the teeth in roof of mouth is illustrated in figure 3, *g*. A broad, depressed snout, projecting a little beyond the lower jaw; nostrils widely separated, far forward on snout; eye superior; extremely long maxillary barbels, ossified as far back as opposite end of dorsal fin, then becoming flexible, band-shaped to opposite caudal fin base, thence tapering to a fine, hairlike filament opposite rear of caudal fin and continued beyond tips of rays of caudal fin; outer pair of mental barbels not quite so long as length of snout; inner or anterior pair of mental barbels about half length of outer or posterior ones; supraoccipital moderately broad, meeting the predorsal plate; a wide fontanel beginning on snout continues in middorsal line to behind eye where it becomes a narrow groove in the supraoccipital process; center of eye a little closer to tip of supraoccipital process than to tip of snout, and the width of the interorbital space closer to posterior end of gill cover than to tip of snout; interorbital space a little concave; pectoral spines strong, wide, with weak antrorse teeth on anterior margin and strong retrorse teeth on posterior margin, this spine as long as snout and eye together; dorsal spine strong, smooth anteriorly, but toothed along its posterior margin; gill membranes extending forward, free from the isthmus; a pouch in front of isthmus between bases of mental barbels; a large dermal fold on inside of gill cover; gill rakers bony, about 5 + 14; air bladder large, extending as far back as opposite pelvic girdle; snout projecting beyond tip of lower jaw; width of head at base of pectorals one-half distance from tip of snout to rear of supraoccipital process, or equal to distance from tip of snout to center of eye; base of adipose fin longer than anal fin base; caudal peduncle slender, caudal fin deeply forked; upper lobe with the upper ray produced, more or less filamentous; contour of ventral surface from pelvics to tip of snout flat, mostly in same plane.

KEY TO THE SPECIES OF PLATYSILURUS

- 1a. Total length of adipose fin 2.1 in snout to dorsal origin; anal origin barely behind a vertical line through adipose origin; pelvic insertion under bases of third to fourth dorsal soft rays and equal distance between tip of snout and midbase of caudal fin rays; head $3\frac{1}{2}$ in standard length; shortest midcaudal fin rays 2 times in eye to dorsal origin. *Platysilurus barbatus* Haseman
- 1b. Total length of adipose fin 2.3 to 2.7 in snout to dorsal origin; anal origin distinctly behind a vertical line through adipose origin; pelvic insertion under bases of 5 to 6 soft rays of dorsal and equal distance between base of maxillary barbel and midbase of caudal fin; head about 3 in standard length; shortest midcaudal fin ray about 3 times in distance from rear of eye to dorsal origin. *Platysilurus malarmo*, new species

PLATYSILURUS MALARMO, new species

MALARMO

FIGURE 3, *g*; PLATE 3, C

Holotype.—U. S. N. M. No. 121179, a specimen 316 mm. in standard length, collected by Leonard P. Schultz on May 2, 1942, in Lago Maracaibo, near the mouth of the Río Concho.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121182, 4 specimens, 276 to 328 mm., Río Socuy, 3 km. above mouth, February 24, 1942; U.S.N.M. No. 121201, a specimen 560 mm., same data; U.S.N.M. No. 121180, 4 specimens, 223 to 323 mm., Río Negro below mouth of Río Yasa, March 2, 1942; U.S.N.M. No. 121181, 4 specimens, 288 to 350 mm., Río Apón, about 35 km. south of Rosario, Maracaibo Basin, February 26, 1942. All these specimens came from deep pools over sandy to muddy bottoms.

Description.—Based on the holotype and paratypes listed. Measurements for these, expressed in hundredths of the standard length, first for the holotype, then for the paratype in parentheses, respectively, are given below. Standard length (in mm.) 316 (223).

Length of head from tip of snout to tip of supraoccipital process 38.9 (38.3); length of head to end of operculum 34.5 (34.1); greatest depth 18.7 (15.5); width of head at base of pectorals 20.0 (19.3); length of snout 19.3 (19.5); postorbital length of head (to end of operculum) 12.2 (11.9); width of snout through corners (rictus) of mouth 12.7 (12.6); diameter of eye 3.16 (3.95); width of fleshy interorbital space 7.55 (7.62); length of maxillary barbel 194.5 (to where filament begins 161); length of outer mental barbel 22.0 (16.8); length of inner mental barbel 12.3 (10.3); total length of adipose fin 17.5 (17.8); greatest height of adipose fin 5.44 (7.18); length of base of anal fin 9.82 (10.5); least depth of caudal peduncle 5.85 (4.93); length of caudal peduncle 16.2 (16.2); distance from anterior to posterior nostril 4.55 (5.16); distance from eye to posterior nostril 13.0 (12.4); tip of chin to base of inner or anterior mental barbel 12.7 (12.6); tip of chin to outer or posterior mental barbel 13.0 (11.4); snout to origin of dorsal fin 43.1 (42.6); snout to origin of anal 76.6 (74.9); snout to origin of adipose fin 71.2 (69.5); snout to insertion of pelvics 55.4 (52.0); snout to insertion of pectorals 33.4 (29.7); anus to anal origin 17.1 (17.1); snout to anus 60.1 (57.8); length of dorsal spine 17.6 (—); length of pectoral spine 21.7 (23.6); length of longest ray of pelvics 15.2 (12.7); length of longest ray of anal 13.8 (12.6); length of longest ray of upper lobe of caudal fin 51.2 (38.6 with tip broken off); length of longest ray of lower lobe of caudal fin 39.5 (—); length of shortest midcaudal fin ray 10.3 (7.2).

The following counts were made: Dorsal I,6 (I,6); anal vi, 9 (vi,9); pectoral I,10 (I,9); pelvic i,5 (i,5); branched rays of caudal fin 15 (16); number of gill rakers on first gill arch — (5+12).

The caudal peduncle is slender, rounded; origin of anal a little behind that of adipose origin; pelvies inserted about under the fourth branched ray of the dorsal; the supraoccipital process is a little divided in the midline posteriorly, so that the predorsal plate projects a little into the supraoccipital process; a fontanel begins on snout and extends backward through interorbital space almost to base of supraoccipital process; eyes superior-lateral in position, not showing from below, about 2 to 2.2 in interorbital space, and 4.8 to 5.3 in the snout; postorbital length of head about $\frac{1}{10}$ length of snout; width of snout at corners of mouth $\frac{3}{4}$ width of head at base of pelvies; total length of adipose fin 5 to $6\frac{1}{2}$ times in standard length; height of adipose fin about $2\frac{1}{2}$ in its total length; adipose fin length a little shorter than snout but much longer than base of anal fin; pectoral spine almost as long as snout and eye; the filamentous end of the maxillary barbel, if unbroken, is as long as or longer than the ossified part of this barbel, the ossified part reaching to opposite rear of dorsal fin; other characters described under the genus.

Color.—Grayish to blackish or brownish above, paler on lower sides, white ventrally; the most consistent and prominent color mark is a large black spot at base of upper lobe of caudal fin; sides of body with an irregular row of large black blotches more or less along lateral line anteriorly, but above it on caudal peduncle; in the holotype the black spots are less prominent than on all the other paratypes, but it was selected because it was a more perfect specimen otherwise; sometimes smaller black spots are scattered on back, as well as on dorsal, adipose, and sometimes on basal parts of caudal fin; anal and paired fins white; lower half of lower lobe of caudal fin blackish, the upper part of this lobe white; upper lobe pale grayish, the long upper simple ray dark grayish; peritoneum pale.

Remarks.—This new species differs from all other pimelodid catfishes in the extremely long barbels in combination with the color pattern and arrangement of the broad villiform patches of teeth widely separated from each other and from *P. barbatus* as indicated in the key on page 233.

Named *malarmo* (bony-cheek) after the common name of this species as given to me by the Venezuelans who went along with me on the trip to the Río Negro in the territory of the hostile Motilone Indians.

Family CALLOPHYSIDAE

Genus CALLOPHYSUS Müller and Troschel

Callophysus MÜLLER and TROSCHER, Horae ichthyologicae, pt. 3, p. 1, 1849.
(Type, *Pimelodus macropterus* Lichtenstein.) (Ref. copied.)

CALLOPHYSUS MACROPTERUS (Lichtenstein)

ZAMURITO

Pimclodus macropterus LICHTENSTEIN, Wiedemann's Zool. Mag., vol. 1, pt. 3, p. 59, 1819 (Brazil).

Callophysus macropterus PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 470 (Apure River, Venezuela).

Family AUCHENIPTERIDAE

KEY TO THE GENERA OF AUCHENIPTERIDAE REPORTED FROM VENEZUELA

- 1a. Anal base long, of 16 to 40 branched rays; pectoral spine pungent, pectoral rays usually I, 7; postcleithral process a triangular, broad-based, spiny projection.
- 2a. Teeth villiform in a band on premaxillaries and on dentaries, no teeth on palatines.
- 3a. Pelvic rays i, 5; caudal fin truncate or a little concave; anterior or outer margin of pectoral spine serrated distally, the teeth antrorse; bases of anterior pair of mental barbels far in advance of bases of posterior ones; lower jaw a little longer than upper jaw.—*Trachycorystes* Bleeker
- 3b. Pelvic rays i, 7; caudal fin forked; anterior margin of pectoral spine smooth, not serrated; bases of anterior pair of mental barbels in front of bases of posterior ones.....*Pseudauchenipterus* Bleeker
- 2b. Upper jaw sharp-edged, with a single series of teeth along edge, lower jaw with about 2 series of teeth in front, a single series on side; pectoral spine with spines on anterior and posterior sides; caudal fin forked; adipose fin short; dorsal and pectoral spine pungent.—*Entomocorus* Eigenmann
- 1b. Anal base short, of about 7 to 11 rays; adipose fin base shorter than anal fin base; pelvic rays i, 5 and pectoral about i, 5; postcleithral process a narrow-based spiny projection; dorsal surface of head covered by a wide bony plate with lateral wings opposite dorsal origin, this plate formed by expanded supraoccipital process fused with dorsal plate; caudal fin forked.
Centromochlus Kner

Genus TRACHYCORYSTES Bleeker

Trachycorystes BLEEKER, Act. Soc. Sci. Ind.-Med., vol. 4, p. 200, 1857-58. (Type, *Trachycorystes typus* Bleeker.)

KEY TO THE SPECIES OF TRACHYCORYSTES REPORTED FROM VENEZUELA

- 1a. Least depth of caudal peduncle 2.2 to 2.7 in length of anal base and 1.6 to 2.0 in pectoral spine; caudal fin slightly concave; anal rays iii, 23 to iii, 25.
Trachycorystes insignis peloichthys, new subspecies
- 1b. Least depth of caudal peduncle 1.5 to 1.9 in length of anal base and 1.2 to 1.4 in pectoral spine; caudal fin truncate or a trifle rounded; anal rays iii, 24 in a specimen from British Guiana.....*Trachycorystes galeatus* (Linnaeus)

TRACHYCORYSTES INSIGNIS PELOICHTHYS, new subspecies

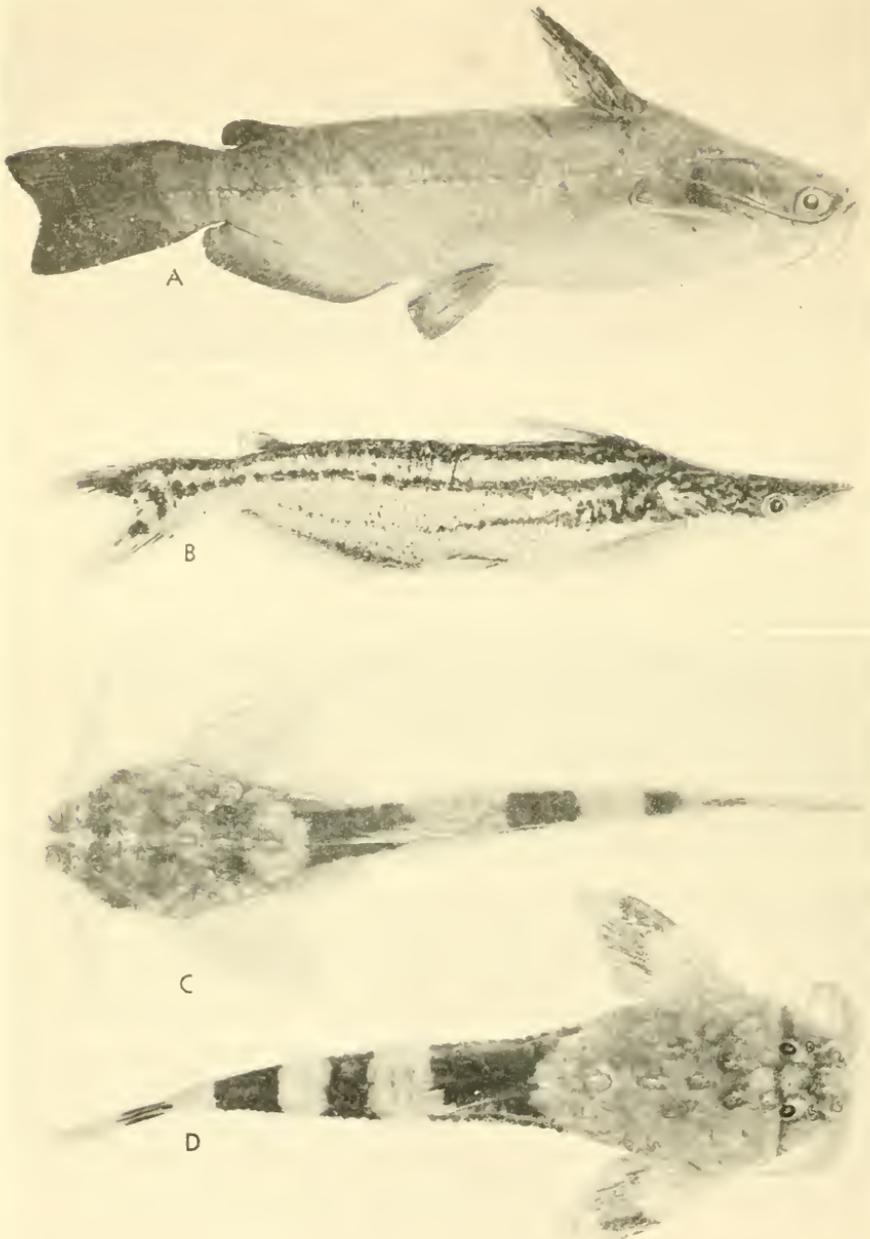
PLATE 4, A

Holotype.—U.S.N.M. No. 121281, a specimen 160 mm. in standard length, collected by Leonard P. Schultz, May 1, 1942, in the Río Agua Caliente, 2 to 3 km. above Lago Maracaibo, Venezuela.

Paratypes.—U.S.N.M. No. 121282, 4 specimens, 133 to 160 mm. in



A, *Cetopsorhamdia orinoco*, new species: Holotype (U.S.N.M. No. 121214), 53.5 mm. in standard length; B, *Perrunichthys perruno*, new genus and species: Holotype (U.S.N.M. No. 121189), 270 mm.; C, *Platysilurus malarino*, new species: Holotype (U.S.N.M. No. 121179), 316 mm. A and B, retouched photographs; C, drawing.



A, *Trachycorystes insignis peloichthys*, new subspecies: Holotype (U.S.N.M. No. 121281), 160 mm. in standard length; B, *Ageneiosus freiei*, new species: Holotype (U.S.N.M. No. 121260), 207 mm.; C, *Hoplomyzon atrizona petroleus*, new subspecies: Holotype (U.S.N.M. No. 121070), 25.3 mm.; D, *Dupouyichthys sapito*, new genus and species: Holotype (U.S.N.M. No. 121072), 23 mm. Retouched photographs.

standard length, taken along with the holotype and bearing the same data. These types were taken in about 18 feet of water, the bottom very muddy and with much vegetable debris.

Description.—Based on the holotype and four paratypes. Detailed measurements were made on the holotype and two paratypes, and these data are recorded in table 8.

The following counts were made, respectively, for holotype, then paratypes: Dorsal rays I, 6; I, 6; I, 6; I, 6; anal iii, 25; iii, 25; iii, 24; iii, 25; iii, 23; pectoral I, 7-1, 7; I, 8; I, 7-I, 7; I, 7-I, 7; I, 7-I, 7; pelvic i, 5; i, 5; i, 5; i, 5; i, 5; branched caudal rays on three paratypes counted were 15; a paratype had 2+7 gill rakers on first gill arch.

TABLE 8.—*Measurements, expressed in hundredths of the standard length, for two subspecies of Trachycorystes insignis*

Characters	<i>peloichthys</i>			<i>insignis</i>
	Holotype (♀)	Paratypes (♀)	Paratype (♂)	U.S.N.M. No. 79233 (from El Banco, Colombia) (♀)
Standard length (in mm.)	160	161	140	162.5
Length of head to end of operculum	27.3	29.2	27.1	27.7
Greatest depth	26.3	25.5	26.1	26.5
Length of snout	10.2	9.63	10.7	9.53
Diameter of eye	5.32	6.33	4.71	4.92
Interorbital width	17.4	17.0	18.2	16.6
Anterior to posterior nostrils	4.69	4.66	4.36	4.61
Distance from eye to anterior nostril	5.63	4.97	6.07	5.66
Width of mouth across its outer angles	15.6	17.4	15.7	14.6
Width of head across base of pectorals	23.4	25.5	25.1	23.4
Length of maxillary barbel	33.5	35.4	40.7	34.5
Length of anterior mental barbel	12.1	12.7	11.9	9.84
Length of posterior mental barbel	20.4	22.1	23.9	18.5
Least depth of caudal peduncle	10.6	11.8	10.7	11.4
Length of caudal peduncle	11.8	11.0	9.43	11.7
Total length of adipose fin	11.9		12.7	10.5
Length of base of a lipose fin	6.88	6.20	5.72	5.54
Length of base of anal fin	26.3	27.3	28.6	25.8
Snout to dorsal origin	31.9	32.2	32.0	31.4
Snout to anal origin	65.6	63.5	64.3	63.8
Snout to adipose origin	81.0	79.5	78.0	79.4
Snout to pelvic insertion	51.6	50.9	50.2	51.0
Snout to pectoral insertion	21.9	24.2	23.9	22.5
Snout to anus	63.5	61.5	60.7	62.1
Length of dorsal spine	21.6		32.9	25.6
Length of pectoral spine	21.1	22.0	21.4	24.6
Longest branched ray of pelvics	13.3	14.0	16.4	13.8
Longest branched ray of pectorals	18.8	20.7	18.6	21.2
Longest branched ray of dorsal	20.7	17.9	24.0	21.8
Longest branched ray of anal	10.3	10.9	12.1	8.61
Longest ray of upper lobe of caudal fin	21.1	25.5	24.0	23.7
Longest ray of lower lobe of caudal fin	21.3	22.7	23.4	22.6
Distance from tip of gill cover to tip of postcleithral process above upper base of pectoral fins	7.56	7.76	7.96	9.54

Head much depressed anteriorly, body compressed; snout bluntly rounded, the lower jaw a little projecting; eyes lateral, visible from below as well as from above; gill membranes joined to sides of head, the gill opening not extending beyond base of pectoral fin; margin of eye not free; teeth villiform, in a narrow band on premaxillaries and on dentary, no teeth on vomer or palatines; pectoral spine strong, the anterior or outer margin with antrorse teeth, and much stronger retrorse ones on inner surface; dorsal spine strong, not serrated, in males this spine longer, bent, and crooked; nostrils wide apart, the anterior pair tubular at front of snout; maxillary barbel in a groove below eye, not extending quite to tip of pectoral spine, this barbel with a bony base in males; two pairs of mental barbels, the anterior pair shortest, their bases near front of lower jaw and reaching a little past a line between rear margins of eye, the posterior pair about opposite front of eye and reaching to behind pectoral base; adipose fin base short and fin short; anal base as long as head; least depth of caudal peduncle about 3 times in snout to dorsal origin, 1.6 to 2.0 in pectoral spine, and 2.2 to 2.7 in anal fin base; length of postcleithral process behind head 2.3 to 3.1 in length of pectoral spine, 3.5 to 4.5 in snout to dorsal origin, and 1.5 to 1.7 in least depth of caudal peduncle; head 3.4 to 3.7 and depth 3.7 to 4.0 in standard length; caudal fin a little concave; eye 3.7 to 3.9 in interorbital space; rear margins of dorsal and of pectorals truncate, other fins rounded; dorsal and pectoral spines about equal in length, except in males the dorsal spine elongated and crooked; supraoccipital process broad, reaching base of dorsal fin and giving off nine pairs of wings that reach a little below front of dorsal fin base; frontal fontanel narrow, between orbits; anus near anal origin; pelvics reach to anal origin, pectoral reaches two-thirds the way to pelvic base; first anal rays of male longer than other rays of this fin.

Color.—Blackish above with golden-brown reflections showing on upper sides and back when alive, this golden-brown fading when specimens were preserved and remaining as pale areas, giving an obscure mottled effect; belly paler, white in most of the specimens, although the black pigment occurs on front of lower jaw and under side of head in irregular patches; all fins blackish, the caudal a little mottled; peritoneum pale.

Remarks.—This new subspecies differs from *Trachycorystes insignis insignis* in having a shorter postcleithral process, the length of this behind the operculum being 2.3 to 3.1 in length of pectoral spine, 3.5 to 4.5 in snout to dorsal origin and 1.5 to 1.7 in least depth of caudal peduncle instead of 2.1 to 2.5 in the pectoral spine, 2.8 to 3.2 in snout to dorsal origin, and 1.0 to 1.3 in least depth of the caudal peduncle. The dorsal and pectoral spines in females are little longer in *insignis* than in *peloichthys*.

Named *peleichthys* in reference to its living in very muddy bottoms with much vegetable debris.

TRACHYCORYSTES GALEATUS (Linnaeus)

Silurus galeatus LINNAEUS, Systema naturae, ed. 12, vol. 1, p. 503, 1766 (based on Seba, Locupletissimi rerum naturalium thesauri . . ., vol. 3, pl. 29, fig. 7, 1761). (Ref. copied.)

Auchenipterus galeatus PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 470 (Calabozo, Venezuela).

Auchenipterus maculosus PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Apure River, Venezuela).

Trachycorystes galeatus EIGENMANN and ALLEN, Fishes of western South America, p. 119, pl. 5, fig. 1, 1942 (Orinoco).

Genus PSEUDAUCHENIPTERUS Bleeker

Pseudauchenipterus BLEEKER, Nederl. Tijdschr. Dierk., vol. 1, p. 88, 1863. (Type, *Silurus nodosus* Bloch.)

PSEUDAUCHENIPTERUS NODOSUS (Bloch)

Silurus nodosus BLOCH, Naturgeschichte der ausländischen Fische, vol. 8, p. 35, pl. 368, 1794.

Pseudauchenipterus guppyi FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 433, 1911 (Pedernales, Venezuela).

Pseudauchenipterus nigrolineatus FOWLER, *ibid.*, p. 434, fig. 5 (Pedernales, Venezuela).

P. guppyi Regan, and *P. nodosus* as figured by Eigenmann (Mem. Carnegie Mus., vol. 5, pl. 20, fig. 2, 1912), are the same species as described by Fowler as *P. nigrolineatus* (*op. cit.*, fig. 5). Although *guppyi* and *nigrolineatus* are the same species, it is possible that they differ from *nodosus*, but they cannot be separated until a large series of color variations is studied.

Genus ENTOMOCORUS Eigenmann

Entomocorus EIGENMANN, Ann. Carnegie Mus., vol. 11, p. 403, 1917. (Type, *Entomocorus benjamini* Eigenmann.)

ENTOMOCORUS BENJAMINI Eigenmann

Entomocorus benjamini EIGENMANN, Ann. Carnegie Mus., vol. 11, p. 403, fig. 3, pl. 41, 1917 (San Joaquin; Río Santa Rita).—MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 97, 1942 (Laguna El Guacimo, 3 km. west of San Fernando de Apure, Venezuela).

Genus CENTROMOCHLUS Kner

Centromochlus KNER, Sitzb. Akad. Wiss. Wien, vol. 26, p. 430, 1858. (Type, *Centromochlus megalops* Kner.) (Ref. copied.)

KEY TO THE SPECIES OF CENTROMOCHLUS REPORTED FROM VENEZUELA

- 1a. Insertion of pelvic fins closer to tip of snout than to midcaudal base; anal rays 9 or 10; chocolate-brown above, pale below, sides and caudal with oval light spots.....**Centromochlus aulopygius** Kner
- 1b. Insertion of pelvic fins closer to midcaudal base than to snout tip; anal rays 7; no oval light spots.....**Centromochlus heckelii** (Filippi)

CENTROMOCHLUS AUOPYGIUS Kner

Centromochlus auopygius KNER, Sitzb. Akad. Wiss. Wien, vol. 26, p. 432, pl. 8, figs. 25, 1858 (Río Guapore).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Apure River, Venezuela).

CENTROMOCHLUS HECKELII (Filippi)

Auchenipterus heckelii FILIPPI, Guer. Rev. et Mag. Zool., 1853, p. 166 (ref. copied).

Centromochlus heckelii PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Apure River, Venezuela).

Family AGENEIOSIDAE

Genus AGENEIOSUS Lacepède

Ageneiosus LACEPÈDE, Histoire naturelle des poissons, vol. 5, p. 132, 1803. (Type, *Ageneiosus armatus* Lacepède.)

KEY TO THE SPECIES OF AGENEIOSUS REPORTED FROM VENEZUELA

- 1a. Caudal fin forked; pectoral spines pungent.
- 2a. No wide black band along middle of sides continuous to base of caudal fin and no trace of another black band below this one; anal base without pigment or with just a trace; greatest depth at dorsal origin 1.6 to 1.75 in the head; center of eye to tip of snout greater than distance from center of eye to rear of head by the distance between anterior and posterior nostrils; pectoral rays usually I, 11 or I, 12; anal rays iv, 32 to iv, 35.
Ageneiosus caucanus Steindachner
- 2b. A wide black lateral band, sometimes broken into more or less continuous black blotches posteriorly, continuing to base of caudal fin; another band below this anteriorly, fading into a series of small spots over anal base and not reaching caudal fin; all black bands separated by wide pale bands, the one above black lateral band enclosing a large black blotch each side in front of dorsal fin; anal base heavily pigmented; greatest depth at dorsal origin 2.0 to 2.3 times in head; center of eye to tip of snout equal to distance or greater than distance from center of eye to rear of head by not over 0.4 distance between nostrils; pectorals usually I, 13.....*Ageneiosus freiei*, new species
- 1b. Caudal fin emarginate; pectoral rays not pungent; width of head about 1½ in its length; steel-blue above, pale below; dorsal spotted; caudal with pale margin.....*Ageneiosus brevifilis* Cuvier and Valenciennes

AGENEIOSUS CAUCANUS Steindachner

Ageneiosus caucanus STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 42, p. 61, pl. 6, figs. 1, 1a, 1879 (Río Cauca).

Ageneiosus paradalis LÜTKEN, Vid. Medd. Naturh. Foren. Kjøbenhavn, pts. 12-16, p. 190, 1874 (Caracas, Venezuela). (Probably this is some other species, but since its identity is not clear from the description by Lütken it is best to leave it with *caucanus* where other authors have referred it.)

AGENEIOSUS FREIEL, new species

DONCELLA

PLATE 4, B

Ageneiosus caucanus MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 97, 1942 (river 10 km. south of Lagumillas, tributary to Lago Maracaibo, Venezuela).

Holotype.—U.S.N.M. No. 121260, a specimen 207 mm. in standard length, collected by Leonard P. Schultz, May 1, 1942, in the Río Agua Caliente, 2 to 3 km. above Lago Maracaibo.

Paratypes.—U.S.N.M. No. 121261, 2 examples, 215 and 228 mm., collected along with the holotype and bearing the same data; U.S.N.M. No. 121262, 2 specimens, 203 and 370 mm., collected by Leonard P. Schultz, March 2, 1942, in the Río Negro below the mouth of the Río Yasa, west side of Lago Maracaibo, Venezuela.

Description.—Based on the holotype and paratypes listed above. Detailed measurements were made on the holotype and two paratypes, and these data are recorded in table 9. Certain counts were made and these have been recorded in table 10. In one specimen of *freiei* the pectoral fin on one side had the count of I, 11, but the last ray was much larger than usual and perhaps an injury had removed the last rays, although it looked normal otherwise. The holotype has the following fin-ray counts: Dorsal rays I, 6; anal iv, 33; pectoral I, 13—I, 13; pelvic i, 6; branched caudal fin rays 15. The number of gill rakers is 3+10.

The body is compressed, but the front of the head, especially the snout, is greatly depressed, flat, and thin; the snout projects beyond the lower jaw; the eyes are lateral and can be seen equally from above or below; the width of the head across outer angle of maxillaries is about equal to the width across base of pectorals; the profile just in front of dorsal fin is steep; the supraoccipital process meets the bony predorsal plate; the nostrils are widely separated, the posterior one is twice the distance between the anterior and posterior ones from the eye, anterior nostril near front of snout; teeth villiform, in a wide band on premaxillaries, and a narrower band on dentaries; gill membranes joined to the isthmus; adipose fin small, with a narrow base; dorsal spine pungent, as is pectoral spine; anal fin long, its base almost as long as the head; depth at origin of dorsal about $5\frac{1}{2}$ to $6\frac{1}{4}$ in the standard length, and 2 to $2\frac{1}{2}$ in the head; width across angles of mouth 1.6 to 1.95 in the head; head 2.6 to 3 in standard length; maxillary barbel not reaching past rictus of mouth; gill rakers short, stiff, few in number; margin of eyes not free; caudal fin deeply concave, forked, lobes almost equal, the upper a little more pointed and a trifle longer; rear margin of pectoral fin truncate; posterior margin of pelvics truncate to a little concave; first branched rays of anal longest.

TABLE 9.—Measurements, in hundredths of the standard length, for two species of *Agegneiosus*.

Characters	<i>freiei</i>			<i>caucanus</i>
	U.S.N.M. No. 121260	U.S.N.M. No. 121261	U.S.N.M. No. 121262	U.S.N.M. No. 78254
Standard length (in mm.).....	207	215	370	204
Length of head to end of operculum.....	33.6	35.7	32.3	29.4
Greatest depth of body.....	19.3	18.6	16.7	17.4
Length of snout.....	15.9	16.7	16.5	14.5
Diameter of eye.....	4.83	4.05	3.11	4.76
Width of interorbital space.....	14.4	16.0	16.9	13.4
Distance between anterior and posterior nostrils.....	3.67	3.68	3.40	3.68
Distance from eye to anterior nostril.....	10.2	11.2	10.8	9.85
Width (greatest) of premaxillary band of teeth.....	3.29	3.35	2.97	2.55
Width of mouth across outer corners of upper jaw.....	16.5	16.7	18.9	15.7
Width of head at base of pectorals.....	18.8	18.7	19.9	17.9
Length of maxillary barbel.....	4.54	3.05	5.86	3.73
Least depth of caudal peduncle.....	7.49	6.51	6.49	6.86
Length of caudal peduncle.....	10.8	9.77	12.0	12.1
Total length of adipose fin.....	8.50	6.70	7.43	7.45
Length of anal fin base.....	27.8	29.7	29.6	29.1
Snout to dorsal origin.....	35.1	36.3	34.7	32.5
Snout to anal origin.....	63.3	62.8	60.8	62.2
Snout to adipose origin.....	82.2	81.7	81.9	80.9
Snout to pelvic insertion.....	52.6	51.6	49.8	47.6
Snout to pectoral insertion.....	30.7	32.1	29.2	28.7
Snout to anus.....	61.1	60.5	59.4	57.0
Length of dorsal spine.....	16.4	-----	10.5	17.9
Length of pectoral spine.....	14.5	12.9	13.5	14.7
Longest branched ray of pelvic fin.....	13.0	12.3	10.1	13.0
Longest branched ray of pectoral fin.....	14.3	14.5	13.3	14.0
Longest branched ray of dorsal fin.....	18.0	17.4	15.7	17.6
Longest branched ray of anal fin.....	10.6	9.07	8.38	11.0
Longest ray of upper lobe of caudal fin.....	22.0	21.1	14.6	20.7
Longest ray of lower lobe of caudal fin.....	21.5	19.0	14.5	19.4

TABLE 10.—Counts made on three species of *Agegneiosus*.

Species	Number of fin rays										Number of gill rakers on first arch										
	Dor- sal	Anal					Pectoral					Above angle		Below angle			Total				
		I, 6	iv, 32	iv, 33	iv, 34	iv, 35	I, 11	I, 12	I, 13	I, 14	i, 15	3	4	10	11	12	13	13	14	15	16	17
<i>freiei</i>	5	1	2	2	-----	?1	-----	8	1	-----	2	1	1	-----	1	1	1	-----	1	-----	1
<i>caucanus</i>	6	1	4	4	1	3	8	-----	-----	-----	3	3	1	3	2	-----	1	2	2	1	-----
<i>brevifilis</i>	2	2	-----	-----	-----	-----	-----	-----	-----	4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Color.—Dark above, paler below, with a pale band beginning around a large black blotch back of head and a little in front and below dorsal origin, continuing to base of caudal fin, where it may be interrupted by a more or less broken band at base of caudal fin rays; a wide black band beginning near upper end of gill opening continues along upper midsides to midbase of caudal fin, this band posteriorly sometimes

composed of more or less joined black blotches; another black band beginning near upper base of pectoral fin, sometimes connected to the black band above by branching black bars, continues posteriorly and curves gently below middle of sides, then fades out over base of anal fin; sometimes the pale areas on sides are finely spotted; dorsal surface of head mottled; a pale middorsal streak along the back behind dorsal fin; the black band at each side of this pale streak meets in front of dorsal origin; upper surfaces of paired fins pigmented; dorsal and anal fins speckled; the caudal fin is variable in color, usually a black blotch occurs in middle of basal part of caudal rays surrounded by pale, then enclosed dorsally and posteriorly by wide areas of black pigment and sometimes anteriorly and ventrally too; in the largest specimen the color of the caudal fin is reduced to the midbasal black blotch and a large black blotch near middle of each lobe of the caudal fin with other black blotches of various sizes distally and basally; underside of head and belly white except a narrow line of pigment under and around lower margin of orbit.

Remarks.—This new species is most closely related to *Ageneiosus caucanus* and differs from it and all other species of *Ageneiosus* in its color pattern. It has two black bands on sides below the one along the back instead of but one or two very incomplete ones on *caucanus*. In addition, *freiei* has I, 13 or I, 14 (usually I, 13) pectoral fin rays instead of I, 11 or I, 12 (usually I, 12) in *caucanus* (counts made on specimens from the Río Tuysa, Panama). No specimen was available from the type locality, Río Cauca, but since Eigenmann, as well as Meek and Hildebrand, has identified the Panama specimens as the same as those in the Río Cauca, my separation is based on examination of numerous Panama specimens, and figures published by Steindachner on specimens from the Río Cauca of Colombia.

Named *freiei* in honor of Dr. Alvin J. Freie, division geologist of the Lago Petroleum Corporation, Venezuela, who helped me in many ways to collect fishes in the Maracaibo Basin.

AGENEIOSUS BREVIFILIS Cuvier and Valenciennes

LAULÁO

Ageneiosus brevifilis CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 15, p. 242, 1840 (Cayenne).

Hypophthalmus dawall RÖHL, Fauna descriptiva de Venezuela, p. 385, 1942 (Apure and Orinoco; market of Ciudad Bolívar).

Family BUNOCEPHALIDAE

KEY TO THE GENERA AND SPECIES OF BUNOCEPHALIDAE FROM THE MARACAIBO BASIN

- 1a. Three plates between anus and origin of anal fin, these plates appearing to be fused in midventral line and the one in front of anal fin having lateral wings; no papillae or barbel on upper lip or around corners of mouth; 4 black color bars meeting in midventral line; a narrow black band across

head through eyes; 6 barbels, 4 mental and 2 maxillary; dorsal i, 4 or i, 5; anal ii, 5 or ii, 6; platelets in lateral line 33 to 39. (Fig. 4, b.)

Dupouyichthys sapito, new genus and species

1b. Five or six plates between anus and origin of anal fin; a barbel at each corner of gape of mouth near base of maxillary barbel; dorsal i, 6; anal usually iii, 4; 4 short papillae on upper lip; 4 mental and 2 maxillary barbels; no black streak across eyes; platelets in lateral line 50.

2a. Four black saddles dorsally, the last one on base of caudal fin rays and next to last at posterior end of caudal peduncle, separated by a narrow pale interspace; black area of dorsal fin with concave dorsal margin and the black is restricted to basal part of fin. (Fig. 4, a.)

Hoplomyzon atrizona petroleus, new subspecies

2b. Three black saddles dorsally, the last one extending on basal portion of caudal fin rays; black blotch on dorsal fin with convex dorsal or distal margin and occupying anterior two-thirds of fin. (Fig. 4, a.)

Hoplomyzon atrizona atrizona Myers

DUPOUYICHTHYS, new genus

This new bunocephalid catfish genus from the Motatán system, Maracaibo Basin, is related to *Hoplomyzon* Myers. It differs in having but three plates in front of the anal origin instead of five or six, in lacking a barbel at front corners of mouth, and the absence of four papillae on the upper lip; in addition, the fleshy tips of the spiny pelvic fin rays are exerted.

This genus has a depressed head and hexagonally shaped body posteriorly, the under surface on the same general plane; a bony protuberance at rear of supraoccipital, followed by two or more between this one and origin of dorsal; a line passing through insertion of pelvics is about a third closer to origin of dorsal than to insertion of the pectoral fin; greatest depth of body at origin of dorsal and greatest width of body at bases of pectoral fins; body armed by a dorsal and a ventral series of plates and a series of tiny platelets along the lateral line; these plates are essentially the same as in *H. atrizona*; skin everywhere finely papillate; upper lip without the four papillae found in the other related species; lower lip thin, not papillate; nostrils widely separated, the anterior one tubular; anus a trifle closer to tip of snout than end of depressed anal fin and about a snout's length in front of the origin of the anal fin; snout broadly rounded, with a median depression; interorbital a little concave, the supraorbital rims elevated anteriorly; six barbels, two pairs of mental barbels and a maxillary pair, the latter connecting with the side of the head in front of the orbits by a membrane; maxillary barbels extend to front of base of coracoid process; pectoral spine armed on its inner side with five or six spines; pelvic spine with exerted tip, the first soft ray about a third longer than the spine; a membrane connects the tip of the last soft dorsal ray with the back; but the membrane connecting the last ray of anal with the body does not extend quite to the tip of the

last anal ray; gill openings small, inferior, a little in front of base of pectorals; eyes small, their rear margin about equidistant between the tip of snout and end of supraoccipital knob; caudal fin truncate, the first branched ray of lower lobe longest.

Genotype.—*Dupouyichthys sapito*, new species.

Named *Dupouyichthys* in honor of my friend Dr. Walter Dupouy, director of the Musco de Ciencias Naturales, Caracas, Venezuela.

DUPOUYICHTHYS SAPITO, new species

SAPITO

PLATE 4, D; FIGURE 4, b

Holotype.—U.S.N.M. No. 121072, a specimen 23 mm. in standard length, collected by Leonard P. Schultz, March 17, 1942, in the Río Motatán, at the bridge 22 km. north of Motatán.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121073, 3 specimens, 21 to 22.7 mm. in standard length, taken along with the holotype and bearing the same data; U.S.N.M. No. 121074, 3 specimens, 18 to 18.5 mm., from the Río San Juan about 12 km. south of Rosario, Maracaibo Basin, February 26, 1942; U.S.N.M. No. 121122, 1 specimen, 18.5 mm., from the Río Negro, below mouth of Río Yasa, Maracaibo Basin, March 2, 1942.

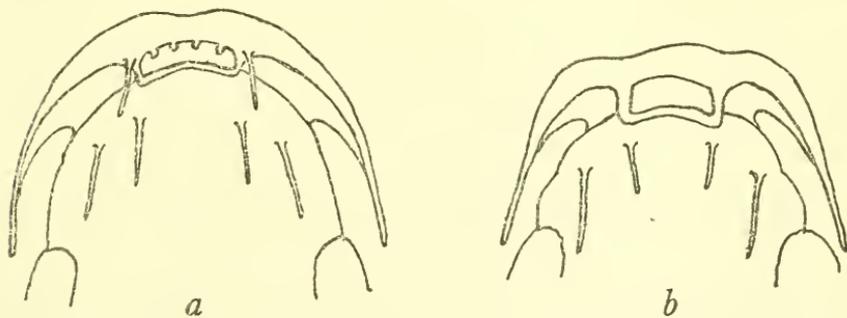


FIGURE 4.—Sketches of the underside of the head of two Bunocephalidae: a, *Hoplomyzon atrizona atrizona* Myers and *H. a. petroleus*, new subspecies; b, *Dupouyichthys sapito*, new genus and species.

Description.—Based on the holotype and 7 paratypes listed above. Detailed measurements were made on the holotype and one paratype and recorded in hundredths of the standard length, respectively. Standard length (in mm.) 23 and 20.7; total length 27.4 and 26 mm.

Length of head from tip of snout to posterior tip of supraoccipital 30.9 and 31.4; width of head at coracoids 30.0 and 33.3; greatest depth of body 17.4 and 18.4; postorbital length of head 16.1 and 17.4; length of snout 13.5 and 15.0; diameter of eye 2.61 and 2.90; width of fleshy

interorbital space 7.82 and 8.21; width of gape of mouth 9.13 and 9.66; longest (outer) mental barbel 11.3 and 11.1; length of maxillary barbel measured from its anterior base to its tip 22.2 and 20.3; distance between anterior nostrils 5.15 and 5.80; anus to anal origin 11.7 and 13.5; tip of snout to anus 4.09 and 5.84; length of base of dorsal fin from bony origin to end of membranous base 24.8 and 24.6; length of first ray of dorsal fin 20.9 and 22.2; length of last ray of dorsal fin 13.5 and 12.5; length of first ray of anal fin 23.9 and 19.3; length of pectoral spine to its fleshy tip 28.2 and 32.4; length of pelvic spine to its fleshy tip 16.5 and 18.4; length of upper ray of caudal fin 18.3 and 19.3; length of lower simple ray of caudal fin 21.9 and 25.1; length of (longest) branched ray of caudal fin 21.7 and 22.9; length of depressed anal fin 28.3 and 28.5; length of caudal peduncle or distance from base of last anal ray to midbase of caudal fin rays 32.1 and 33.3; least depth of caudal peduncle 3.91 and 4.75; distance from eye to origin of dorsal fin 45.6 and 47.3; distance from eye to origin of anal fin 52.2 and 57.0; distance from eye to insertion of pelvic fins 36.1 and 38.2.

The following counts were made, respectively: Dorsal rays i, 4; i, 4; i, 5; i, 5; i, 4; i, 4; i, 4; i, 4; anal rays ii, 5; ii, 5; ii, 6; ii, 5; ii, 5; ii, 5; ii, 5; ii, 5; pelvics always i, 5 and pectorals always I, 6; number of caudal fin rays i+7+i; i+7+i; i+7+i; i+8+i; i+7+i; i+7+i; i+7+i; number of platelets along the lateral line 37; 39; 34; 38; 35; 35; 33; number of plates in the dorsal series from origin of dorsal to base of caudal fin 21; 21; 21; 20; 21; 22; 23; number of plates in the ventral series from anus to base of caudal fin 21; 20; 20; 21; 21; 21; 21; plates behind base of last anal ray to base of caudal 12; 11; 11; 11; 12; 13; 13; plates in front of origin of anal fin always 3; number of spines on inner edge of pectoral spine 5; 5; 5; 6; 6; 6; 6.

Color.—The color pattern consists of four wide black bars, the first through middle of dorsal fin across body, meeting its fellow around the anal origin, thus basally from the first to third dorsal rays the color is white, with a wide white margin posteriorly on the dorsal fin; the second bar is at rear of anal fin but does not extend on that fin; third across caudal peduncle and the fourth across second quarter of the caudal fin; conspicuous black bar near middle front of pectoral fin; basal third of soft rays of pelvics black, the spiny ray pale; a narrow black line across top of head through eyes to base of outer mental barbel; anal fin pale.

Remarks.—This new species differs from *Hoplomyzon atrizona petroleus* and *Hoplomyzon atrizona atrizona* in lacking barbels near front corner of mouth, and in having four black color bars and a black line across top of head. The three plates in front of the anal fin separate it from both species.

Named *sapito* after the common name of this species in the Maracaibo Basin.

Genus HOPLOMYZON Myers

Hoplomyzon MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 94, 1942. (Type, *Hoplomyzon atrizona* Myers.)

It was with more than usual interest that I examined, late in 1942, the description of the new genus *Hoplomyzon*, especially after I had described two new genera in my manuscript in preparation on the Venezuelan catfishes. One of these, *Dupouichthys*, I still believe is valid, but the other one, after careful study, I consider to be the same as *Hoplomyzon*, but that could not be determined from the description. Since my two specimens from the Río Motatán of the Maracaibo Basin resembled *H. atrizona* in so many details, I suspected at once that Dr. Myers in his necessary haste to prepare the paper for publication may have overlooked the barbel at each corner of the mouth. The artist who drew one of the paratypes did not include that pair of barbels either.

At my request, Miss Margaret Storey, in the absence of Dr. Myers in Brazil, kindly lent a paratype, Stanford University No. 36495, of *Hoplomyzon atrizona*, and, upon examination, the barbels were seen to be as obvious as those on my specimens from the Río Motatán, Maracaibo Basin. This paratype, however, differed slightly in color from my specimens, so again I wrote to Miss Storey to see if the type could be examined. She asked William Gosline to examine the type, and he replied to me as follows:

“I have reexamined the type of ‘the species that Myers described as *Hoplomyzon atrizona*,’ and am enclosing a rough sketch of the mouth parts. The only additional barbel I can find is at the point indicated.”

His sketch of *H. atrizona* confirmed my suspicion that a barbel at the front corners of the mouth should have been drawn and described, as the pair was present, as shown in figure 4, *a*.

The generic description follows: Head depressed, under surface of the body forming a plane surface, body quadrangularly shaped anteriorly and hexagonally shaped in cross section posteriorly; greatest depth at origin of dorsal fin, greatest width at pectoral fin insertion; body armed by a dorsal series of paired bony plates beginning near origin of dorsal fin and a similar series of paired plates along the ventral side beginning behind anus; along the lateral line at each pore is a tiny platelet; behind the anal and dorsal fins the plates are close together and probably fused; all plates are covered with a thin skin; skin everywhere rugose, especially on the head; vent equidistant between rear edge of basal membrane of anal fin and tip of snout; a vertical line through insertion of pelvics about equidistant between such a line through insertion of pectorals and origin of dorsal fin; anal origin under base of next to last ray of dorsal; anus about twice the

width of the interorbital space in front of the anal fin origin; eight barbels as follows: two pairs of mental barbels, the outer pair longest; a pair of large maxillary barbels, with a membrane that connects with the side of the head opposite the eye, the maxillary barbels reaching a little past the middle of the coracoid process; a pair of barbels near outer front corners of the mouth at base of maxillary barbels on ventral surface of snout; snout broadly rounded anteriorly, with a median indentation; upper lip composed of four large papillae; lower lip thin, without papillae, the small gill opening just in front of base of pectoral fin on lower surface of body; upper surface of head with a lump at rear tip of supraoccipital, behind which are two more elongated ridges, then the origin of the dorsal; orbital rims slightly elevated, the interorbital space otherwise flattish; eyes very small, the posterior margin of orbit a little closer to tip of snout than to rear tip of supraoccipital; mouth opening equal to interorbital space; two pairs of nostrils widely separated, the anterior ones tubular; caudal fin truncate, the first outer branched ray of lower lobe longest, the upper simple ray shortest; pectoral spine with six long spines on its inner edge, pectoral spine with a fleshy tip; pelvic spine about two-thirds the length of the first branched ray; dorsal fin connected with body by a membrane to tip of last ray; anal similarly connected by a membrane to the body but not quite to the tip of the last anal ray.

HOPLOMYZON ATRIZONA PETROLEUS, new subspecies

PLATE 4, C; FIGURE 4, a

Holotype.—U.S.N.M. No. 121070, a specimen 25.3 mm. in standard length, collected by Leonard P. Schultz, March 25, 1942, in the Río Motatán, 4 km. above Motatán, Maracaibo Basin, Venezuela.

Paratype.—U.S.N.M. No. 121071, a specimen 24.7 mm. in standard length, taken along with the holotype and bearing the same date.

Description.—Based on holotype and paratype. Detailed measurements of these, expressed in hundredths of the standard length, are recorded, respectively. Standard length (in mm.) 25.3; 24.7; total length 30.9 and 29.5 mm.

Length of head from tip of snout to posterior tip of supraoccipital 26.5 and 27.1; width of head at coracoids 26.9 and 26.7; greatest depth of body 12.0 and 12.1; postorbital length of head 14.6 and 14.2; length of snout 11.1 and 10.1; diameter of eye 1.98 and 2.02; width of fleshy interorbital space 7.90 and 7.29; width of gape of mouth 7.90 and 7.70; longest (outer) mental barbel 7.90 and 6.48; length of maxillary barbel measured from its anterior base to its tip 20.5 and 19.4; length of barbel at front corner of upper lip 4.74 and 4.86; distance between anterior nostrils 5.14 and —; anus to anal origin 14.2 and 15.4; tip of snout to anus 36.3 and 35.6; length of base of dorsal fin from bony

origin to end of membranous base 30.4 and 32.5; length of first ray of dorsal fin 17.8 and 16.6; length of last ray of dorsal fin 12.6 and 13.0; length of first ray of anal fin 15.4 and 14.2; length of pectoral spine to its fleshy tip 26.1 and 27.1; length of pelvic spine to its fleshy tip 13.0 and 14.2; length of upper ray of caudal fin 18.2 and 16.2; length of lower simple ray of caudal fin 18.6 and 22.3; length of lower (longest) branched ray of caudal fin 22.9 and —; length of depressed anal fin 27.3 and 28.3; length of caudal peduncle, or distance from base of last anal ray to midbase of caudal fin rays 34.0 and 34.4; least depth of caudal peduncle 3.95 and 4.04; distance from eye to origin of dorsal 39.5 and 38.5; distance from eye to origin of anal 51.8 and 47.4; distance from eye to insertion of pelvics 30.4 and 28.3.

The following counts were made, respectively: Dorsal rays i,6 and i,6; anal iii,4; and iii,4; pelvic i,5 and i,5; pectoral I,6 and I,6; number of caudal fin rays $i+7+i$ and $i+7+i$; number of platelets along the lateral line 50 and 50; dorsal series of plates from origin of dorsal to base of caudal fin 23 and 23; ventral series of plates from anus to base of caudal fin 23 and 23; plates behind the base of last anal ray 12 and 11; plates in front of origin of anal fin 5 and 6; number of spines on inner edge of the pectoral spine 6 and 6.

Color.—The general color pattern consists of four black saddles across back and on sides, the first from under base of dorsal fin rays down to and including the lateral line and below it a little posteriorly, this bar extending only on the base of the dorsal fin except anteriorly where it reaches halfway out the first ray; the second is just behind the end of basal membrane of dorsal fin; third at smallest part of caudal peduncle and last across the basal fifth of the caudal fin rays; the ventral bony plates are pigmented, more so under the region of the dorsal saddles; the area around the tubular anterior nostrils is blackish; undersides pale, dorsal surface of head brownish.

Remarks.—This new subspecies differs in color from *Hoplomyzon a. atrizona* Myers and *Dupouyichthys sapito*, as indicated in the key.

Named *petroleus* in honor of the Lago Petroleum Corporation of Venezuela, the company that aided me so much in traveling around the Maracaibo Basin of Venezuela and in whose camps I stayed.

HOPLOMYZON ATRIZONA ATRIZONA Myers

Hoplomyzon atrizona MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 95, fig. 3, 1942 (brook tributary to Río Zulia, Estacion Táchira, 60 km. north of San Cristobal, Venezuela).

The following counts were made on a paratype: Dorsal i,6; anal iii,4; pelvic i,5-i,5; pectoral I,6-I,6; caudal fin rays $i+7+i$; plates in lateral line 50; plates on dorsal side 23; plates on ventral side 23; spines on inner edge of pectoral spine 6; plates behind base last anal ray 11; plates in front of anal origin 5.

Family CETOPSIDAE

The genera and species centering around *Cetopsis* Agassiz have caused me some trouble in attempting to learn their limits, and their nomenclature has not been clarified by Eigenmann in his various papers. Bleeker divided the genus *Cetopsis* into three parts (Versl. Akad. Amsterdam, vol. 14, p. 403, 1862) and added the fourth genus (*Paracetopsis*) in his Atlas ichthyologique. . . , vol. 2, p. 16, 1862. He retained *Cetopsis* Agassiz and designated *Cetopsis coecutiens* Agassiz as its type, defining the genus somewhat as follows: Teeth simple, on premaxillary triserial, on dentary and vomer uniserial; branchial opening a small slit before base of pectoral fin; pelvic fins not united; eye small; B. 10; A. 21.

Hemicetopsis Bleeker (*op. cit.*, pp. 403 and 16) was defined as having teeth simple, on premaxillaries, dentaries, and vomer uniserial; pelvics not united; eye inconspicuous; A. 29. Bleeker designated as type "*Hemicetopsis candira* = *Cetopsis candira* Ag."

Pseudocetopsis Bleeker (*op. cit.*, pp. 403 and 16) was defined as having teeth on premaxillaries and dentaries many-rowed, vomer uniserial; gill opening about as long above as below base of pectoral fin; pelvic fins united; eye conspicuous; dorsal and pectorals with a produced filament, A. 22. Bleeker designated as type "*Pseudocetopsis gobioides* = *Cetopsis gobioides* Kner."

Paracetopsis Guichenot (*in* Bleeker, *op. cit.*, p. 16) is defined as having the teeth on premaxillaries, dentaries, and vomer in many rows, vomerine teeth in a transverse band interrupted in the middle; eye conspicuous; B. 9; A. 30. Bleeker designated as the type "*Paracetopsis bleekeri* Guich. (Mus. Paris)." Neave (Nomenclator Zoologicus, vol. 3, p. 558, 1940) indicates that Bleeker used a manuscript name of Guichenot for the new genus and species.

Bleeker (Nederl. Tijdschr. Dierk., vol. 1, pp. 115, 116, 1863) cites the genera *Cetopsis*, *Hemicetopsis*, and *Pseudocetopsis* and defines them the same as in 1862. *Paracetopsis* was not mentioned.

Eigenmann and Eigenmann (Proc. California Acad. Sci., vol. 1, p. 157, 1888) list *Hemicetopsis*, *Cetopsis*, *Pseudocetopsis*, and "? subgen. nov. ?" Under the last they list two species, *Cetopsis occidentalis* Steindachner and *Cetopsis ventralis* Gill. The genera are not defined. Eigenmann and Bean (Proc. U. S. Nat. Mus., vol. 31, p. 665, 1907) give a key to the genera discussed above and name the fourth genus listed that lacked a name in Eigenmann and Eigenmann (*op. cit.*, p. 157). They say "the fourth, with *occidentalis* as the type, may be named *Paracetopsis* (see fig. 3)." In their key they define their new genus as: "Teeth all villiform, in bands, those on vomer in two patches; ventrals partly joined to the belly—*Paracetopsis*." This definition by Eigenmann and Bean (*op. cit.*, p. 665) agrees with that

of Bleeker (Atlas ichthyologique . . . , vol. 2, p. 16, 1862), but the type species have different names.

Now Bleeker (*loc. cit.*) apparently used a manuscript name of Guichenot when he designated the genotype *Paracetopsis bleekeri* Guichenot of his new genus *Paracetopsis*. This is the first description of *P. bleekeri*, and apparently it is valid, so the name must be accepted. Steindachner (Denkschr. Akad. Wiss. Wien, vol. 42, p. 99, pl. 8, fig. 2, 2a, 1879) described *Cetopsis occidentalis* from Guayaquil, Ecuador, which agrees in dentition with *bleekeri*. Since no locality is given for *bleekeri*, as first reviser I am referring *occidentalis* to *Paracetopsis bleekeri*. Thus *Paracetopsis* Eigenmann and Bean becomes a synonym of *Paracetopsis* Bleeker because they have the same species as genotype. Eigenmann (Rep. Princeton Univ. Exped. Patagonia, vol. 3, p. 398, 1910) proposed the genus *Cetopsogiton* as a new name for *Paracetopsis* Eigenmann and Bean, which he says is preoccupied; he gave the type as *Cetopsis occidentalis* Steindachner. Thus *Cetopsogiton* Eigenmann becomes a synonym of *Paracetopsis* Bleeker.

Unfortunately, Eigenmann and Bean (*op. cit.*, p. 665) in their key do not define the other three genera (*Cetopsis*, *Hemicetopsis*, and *Pseudocetopsis*) the same as Bleeker did, and from this confusion has resulted. In the following key I have attempted to define the genera according to Bleeker's diagnoses based on the genotypes:

KEY TO THE GENERA OF CETOPSIDAE

- 1a. Gill opening restricted to a slit mostly in front of pectoral fin base.
- 2a. Teeth conical, in three rows on premaxillaries and in one row on dentaries and on vomer; pelvic fins not united.....*Cetopsis*¹⁰ Agassiz
- 2b. Teeth simple (probably all are incisors) in a single row on premaxillaries, dentaries and on vomer; pelvic fins not united; anterior nasal openings much farther apart than posterior ones.....*Hemicetopsis*¹¹ Bleeker
- 1b. Gill opening wide, not restricted to in front of pectoral fin base but reaching a little farther below than above pectoral base; pelvic fins united to each other and to abdomen along their inner ray.
- 3a. Teeth conical, in a band of 3 or 4 rows on premaxillaries and dentaries and transverse band on vomer interrupted in middle; anterior pair of nostrils a little farther apart than posterior ones.....*Paracetopsis*¹² Bleeker
- 3b. Teeth conical, in a band of 2 to 4 rows on premaxillaries and dentaries, and in 1 to 3 irregular rows on vomer, not interrupted in middle.
*Pseudocetopsis*¹³ Bleeker

Genus CETOPSIS Agassiz

Cetopsis AGASSIZ, in Spix, *Selecta genera et species piscium* . . . Brasiliam . . . , p. 11, 1829. (Type designated as *Cetopsis coecutiens* Agassiz by Bleeker, 1862.)

¹⁰ Genotype, *Cetopsis coecutiens* Agassiz.

¹¹ Genotype, *Hemicetopsis candira* (Agassiz).

¹² Genotype, *Paracetopsis bleekeri* Guichenot, in Bleeker = *Cetopsis occidentalis* Steindachner.

¹³ Genotype, *Cetopsis gobioides* Kner. The following species undoubtedly belong to this genus: *Cetopsis ventralis* Gill; *Cetopsis chalmersi* Norman; *Hemicetopsis macilentus* Eigenmann; *Hemicetopsis minutus* Eigenmann; *Hemicetopsis othonops* Eigenmann; *Hemicetopsis amphiloza* Eigenmann; *Cetopsis plumbeus* Steindachner.

CETOPSIS COECUTIENS (Lichtenstein)

Silurus coecutiens LICHTENSTEIN, Wiedemann's Zool. Mag., vol. 1, pt. 3, p. 61, 1819 (ref. copied).

Cetopsis coecutiens AGASSIZ, in Spix, Selecta genera et species piscium . . . Brasiliam . . . , p. 12, tab. 10, fig. 2, and tab. A., fig. 5, 1829 (ref. copied).

Cetopsis coecutiens PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Apure River, Venezuela).

Genus PSEUDOCETOPSIS Bleeker

Pseudocetopsis BLEEKER, Versl. Akad. Amsterdam, vol. 14, p. 403, 1862; Atlas ichthyologique, vol. 2, p. 16, 1862. (Type, *Cetopsis gobioides* Kner.)

TENTATIVE KEY TO THE SPECIES OF PSEUDOCETOPSIS

1a. Dorsal rays i, 5; anal rays about iii or iv, 20 to 23.

2a. Head 4 to $4\frac{1}{2}$ and depth $4\frac{1}{2}$ to $5\frac{1}{2}$ in standard length.

3a. Snout to dorsal origin 2.7 and length of anal base 3.4 in standard length; caudal peduncle longer than deep; maxillary barbel reaching to end of head, posterior mental barbel to end of gill membranes under head; maxillary barbel 1.7 in anal base; pelvics reaching to anus; anus a trifle closer to base of caudal than end of snout.

Pseudocetopsis minutus (Eigenmann)

3b. Snout to dorsal origin a little over 3 in standard length; caudal peduncle as deep as long.-----*Pseudocetopsis chalmersi* (Norman)

2b. Head 3.2, depth 3.2, snout to dorsal 2.8, all in standard length; snout to dorsal 0.85 in anal base and latter 3.1 in standard length; maxillary barbel reaches halfway to end of head and posterior mental barbel two-thirds way to edge of gill membranes below head; anus much closer to base of caudal fin than to snout tip; branchings of chromatophores parallel or nearly so. [This may be the young of some other species already named]-----*Pseudocetopsis macilentus* (Ligennann)

1b. Dorsal rays i, 6; anal rays iii or iv, 20 to 29; pelvics i, 5; head 4 to $4\frac{1}{4}$; depth 4 to $5\frac{1}{2}$ in standard length.

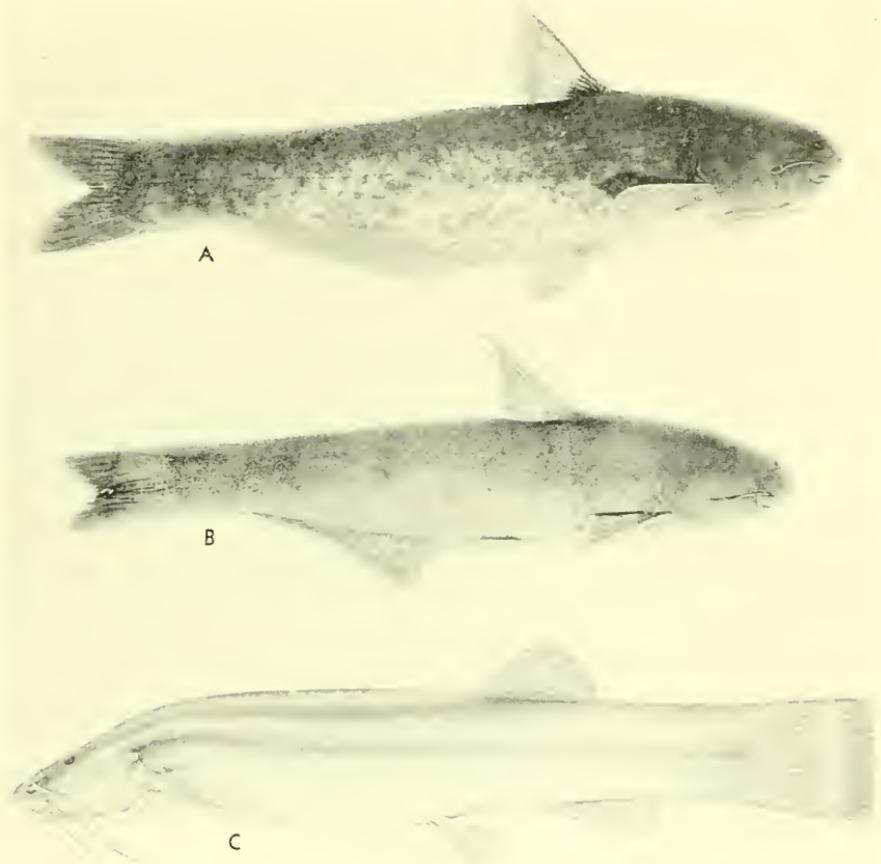
4a. Anal rays about iii or iv, 26 to 29; barbels short, about 3 or 4 times diameter of eye and none reaching more than halfway to end of gill membranes; pelvics reach to anus; latter about equal distance from caudal base to tip of snout or a trifle closer} *Pseudocetopsis ventralis* (Gill)
to caudal base.-----} *Pseudocetopsis amphiloza* (Eigenmann)

4b. Anal rays iii or iv, 20 to 24; anus a little closer to base of caudal fin than to tip of snout.

5a. Color plain grayish above, paler to silvery below, without dark blotches about size of eye; anal rays iii or iv, 20 to 21; head 4 to $4\frac{1}{2}$ and depth 4 to $4\frac{1}{2}$.

6a. Snout to dorsal origin in anal base 1.1 and 3.2 in standard length; anal base 3 in standard length; posterior mental barbel reaches halfway to edge of gill membrane below head, and maxillary barbel two-thirds way to end of head; length of maxillary barbel 2.9 in anal fin base; longest rays of both pectoral and dorsal fins about 1.9 in snout to dorsal-----*Pseudocetopsis gobioides* (Kner)

6b. Snout to dorsal origin 0.8 in anal base and 2.9 in standard length; anal base 3.2 to 3.6 in standard length; posterior mental barbel reaching to edge of gill membranes below head, and maxillary barbel reaching halfway to end of head; maxillary barbel 2.2 in anal base; longest



A, *Pseudocetopsis plumbeus orinoco*, new subspecies: Holotype (U.S.N.M. No. 121263), 95 mm. in standard length; B, *P. plumbeus motatanensis*, new subspecies: Holotype (U.S.N.M. No. 121265), 146.5 mm.; C, *Pygidium emanueli emanueli*, new species and subspecies: Holotype (U.S.N.M. No. 121223), 174 mm. A and B, retouched photographs; C, drawing.



A



B



C

A, *Pygidium emanueli motatanensis*, new subspecies: Holotype (U.S.N.M. No. 121232), 71 mm. in standard length; B, *P. banneau maracaiboensis*, new subspecies: Holotype (U.S.N.M. No. 121227), 43.7 mm.; C, *Tridensimilis venezuelae*, new genus and species: Holotype (U.S.N.M. No. 121290), 19.5 mm. Retouched photographs.

branched rays of dorsal and pectorals 2 to 2.4 in snout to dorsal. (Pectoral rays on six specimens i,8; anal rays iv,20 and iv,21 equally on four examples; pelvises i,5 on six specimens).

Pseudocetopsis othonops (Eigenmann)

5b. Color darker above, paler below, with numerous dark blotches on sides, a little larger than eye; anal base 3.0 to 3.2 in standard length; snout to dorsal 2.8 to 3.2 in standard length and 0.9 to 1.0 in length of anal base; longest branched ray of pectorals 2.0 to 2.3 in snout to dorsal; anal rays iii or iv, 21 to 24.

7a. Posterior mental barbel reaching to edge or a little past gill membranes on underside of head; depth 4.9, head 4.2, all in standard length; least depth of caudal peduncle equal to its length and 2.2 in anal fin base; length of maxillary barbel 3.1 in anal base and it reaches two-thirds way to end of head; anal rays iii (iv ?), 23 or 24.

Pseudocetopsis plumbeus plumbeus (Steindachner)

7b. Posterior mental barbel reaching four-fifths way to edge of gill membrane; depth 3.7 to 4.0; head 3.5 to 4.0 in standard length; least depth of caudal peduncle 0.98 to 1.01 in its length and 2.2 to 2.5 times in length of anal fin base; length of maxillary barbel 4 to 4.2 in anal base and it reaches halfway to end of head; pelvises do not reach anus; anal rays iii or iv, 22 or 23; pectoral rays usually i,9, occasionally i,8.

Pseudocetopsis plumbeus orinoco, new subspecies

7c. Posterior mental barbel reaching two-thirds way to edge of gill membranes or four-fifths in some males; depth 4.6 to 5.1, head 3.5 to 4.0 in standard length; least depth of caudal peduncle 1.2 to 1.25 in its length and 2.6 to 2.8 times in length of anal fin base; length of maxillary barbel $2\frac{1}{2}$ to $3\frac{1}{2}$ in anal base and reaching one-half to three-quarters way to end of head; pelvises not reaching to anus; anal rays iii or iv, 21 to 24, usually 22 or 23; pectoral rays i,9, rarely i,8.

Pseudocetopsis plumbeus motatanensis, new subspecies

PSEUDOCETOPSIS PLUMBEUS ORINOCO, new subspecies

PLATE 5, A

Holotype.—U.S.N.M. No. 121263, a specimen 95 mm. in standard length, collected by Leonard P. Schultz, March 31, 1942, in the Río Torbes, 1 km. above Táriba, Orinoco system, Venezuela.

Paratypes.—U.S.N.M. No. 121264, 2 specimens, 64.5 and 92 mm., collected by L. P. Schultz, G. Zuloaga, Roger Sherman, and William Phelps, Jr., May 12, 1942, in the Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua, Venezuela.

Description.—Detailed measurements made on the three types are recorded below, in hundredths of the standard length, first for the holotype and then for the paratypes in parentheses, respectively. Standard lengths (in mm.) 95 (92; 64.5).

Length of head 26.1 (27.3; 27.1); greatest depth 25.3 (26.7; 25.1); length of snout 9.16 (7.94; 8.22); diameter of eye 2.53 (2.61; 3.26); width of interorbital space 10.0 (10.8; 9.46); postorbital length of head 17.8 (17.9; 17.7); distance between anterior pair of nasal openings

6.10 (6.20; 6.51); distance between the posterior pair of nasal openings 5.48 (5.32; 5.58); tip of snout to dorsal origin 34.7 (35.1; 33.6); snout to anal origin 59.0 (58.7; 59.0); snout to pectoral insertion 24.2 (25.1; 24.2); snout to pelvic insertion 40.8 (42.4; 41.4); snout to anus 53.7 (54.4; 54.2); length of maxillary barbel 10.2 (8.70; 9.46); length of inner or anterior mental barbel 9.05 (9.24; 6.98); length of posterior (outer) mental barbel 10.1 (9.78; 9.61); length of anal base 31.8 (32.1; 31.5); length of caudal peduncle or distance from base of last anal ray to midbase of the caudal fin 13.2 (14.1; 14.7); least depth of the caudal peduncle 13.2 (13.9; 13.9); length of first simple ray of dorsal fin 19.5 (19.3; —); length of longest or first branched ray of dorsal 17.0 (17.5; 17.2); length of first simple ray of pectoral fin 17.9 (16.6; 18.9); length of first or longest branched ray of pectoral fin 14.7 (14.9; 15.5); length of longest branched ray of pelvic fins 11.0 (10.3; 10.4); length of longest upper ray of caudal fin 23.8 (20.1; 24.0); length of longest lower ray of caudal fin 24.7 (19.7; 24.3); shortest middle ray of caudal fin 11.6 (12.5; 13.8); width of head across base of pectorals 18.4 (19.6; 18.0).

The following counts were made, respectively: Anal rays iii,23 (iii,23; iv,22); dorsal i,6 (i,6; i,6); pectoral i,8-i,8 (i,9-1,9; i,8-i,8); pelvics always i,5; branched rays of caudal fin 15 (15; 15); gill rakers — (2 + 6; —).

Head rounded anteriorly, body compressed posteriorly, snout projecting a little beyond the lower jaw, so that mouth is subterminal; anterior nostrils at sides of tip of snout, this pair a little farther apart than posterior pair; eyes embedded, without free margins; gill membranes broadly joined to isthmus, the gill opening wide and extending a little farther below the pectoral base than above it; gill rakers short about 2 + 6 or 7; the pair of maxillary barbels lying in a groove, as do the two pairs of mental barbels on underside of head; first ray of dorsal and pectoral produced beyond branched rays in males; anus equidistant between midcaudal fin base and tip of chin; caudal fin deeply concave; pectoral fin a little rounded; dorsal truncate posteriorly; pelvics at midline joined to body and to each other; caudal peduncle as long as deep; teeth conical in three of four rows on premaxillaries and on dentaries and in one or two irregular rows on the vomer, the latter parallel with premaxillary band of teeth, not interrupted in the middle.

Color.—Brownish black, dark or grayish above, silvery below, the upper sides with numerous blackish blotches, some a little larger than eye; all margins of caudal fin edged with a narrow white band; paired fins pale; dorsal plain grayish, anal with a few black pigment cells mostly posteriorly; peritoneum mostly pale.

Remarks.—This new subspecies is separated from all related forms as indicated in the key on pages 252-253.

This species was taken in a mountain stream in very swiftly flowing water among gravel and rubble.

Named *orinoco* in reference to the river system in which it was collected.

PSEUDOCETOPSIS PLUMBEUS MOTATANENSIS, new subspecies

PLATE 5, B

Holotype.—U.S.N.M. No. 121265, a specimen 146.5 mm. in standard length, collected by Leonard P. Schultz, March 25, 1942, in the Río Motatán, 4 km. above Motatán.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121268, 2 specimens, 113 and 160 mm., collected along with the holotype and bearing the same data; U.S.N.M. No. 121266, an example 57 mm. in standard length, from the Río San Juan at the bridge, south of Mene Grande, Motatán System, March 20, 1942; U.S.N.M. No. 121267, 2 specimens, 67 and 81 mm., from the Río Motatán, 8 km. below Motatán, March 24, 1942; U.S.N.M. No. 121269, 5 examples, 57 to 113 mm., from the Río Motatán at the bridge 22 km. north of Motatán, March 17, 1942.

Description.—Detailed measurements made on the holotype and two paratypes, expressed in hundredths of the standard length, are recorded below, respectively, first for the holotype, then in parentheses for the paratypes. Standard length (in mm.) 146.5 (113; 57).

Length of head 25.2 (25.2; 28.4); greatest depth 21.5 (19.9; 20.5); length of snout 7.16 (7.52; 7.19); diameter of eye 2.46 (2.65; 4.20); interorbital space 10.2 (9.30; 10.0); postorbital length of head 17.1 (17.3; 17.5); distance between anterior pair of nasal openings 5.46 (5.13; 5.61); distance between posterior pair of nasal openings 4.10 (3.81; 4.74); tip of snout to dorsal origin 33.5 (32.7; 35.4); snout to anal origin 58.4 (55.8; 60.2); snout to pectoral insertion 23.2 (23.4; 25.4); snout to pelvic insertion 44.1 (41.6; 44.2); snout to anus 53.9 (53.2; 57.4); length of maxillary barbel 9.56 (12.8; 13.9); length of anterior mental barbel 7.85 (9.74; 11.9); length of outer or posterior mental barbel 8.53 (10.7; 12.3); length of anal fin base 30.7 (30.6; 31.6); length of caudal peduncle 13.6 (13.7; 14.4); least depth of caudal peduncle 11.1 (11.3; 11.9); length of first or simple ray of dorsal fin 21.9 (30.5; 21.8); length of first or simple ray of pectoral fin 16.1 (20.9; 16.0); length of longest or first branched ray of dorsal fin 17.7 (20.3; 18.6); length of longest or first branched ray of pectoral fin 14.4 (16.8; 15.3); length of longest branched pelvic ray 9.22 (11.1; 12.1); length of longest upper ray of caudal fin 20.2 (25.2; 22.3); length of longest lower branched ray of caudal fin 21.9 (24.0; 23.2); length of shortest midcaudal ray 12.3 (13.7; 14.2); width of head across base of pelvics 18.1 (16.4; 16.8).

The following counts were made, respectively: Anal rays iii, 24

(iv, 22; iv, 23; iii, 22; iii, 22; iv, 22; iii, 23; iii, 23; iii, 22; iii, 22; iv, 21); dorsal rays i, 6 (i, 6; i, 6); pectoral rays on ten i, 9-i, 9, on one paratype i, 8-i, 8; pelvics always i, 5 and branched caudal fin rays 15 (15; 15); gill rakers — (—; 2+7).

Head bluntly rounded anteriorly, body compressed posteriorly, snout projecting a little beyond the lower jaw; mouth subterminal; gape moderately wide; anterior pair of nostrils at sides of snout a little more separated than the posterior pair, which is situated between the eyes; interorbital space convex; eyes embedded, their margins not free; gill membranes broadly joined to the isthmus; gill openings wide, a little longer below than above base of pectoral fins; gill rakers short, stiff, about 2+6 or 7; maxillary barbels lying in a groove; mental barbels lying in a shallow depression on under side of head; first ray of dorsal and of pectoral considerably produced in the males beyond the branched rays; anal rays of males longer than in females; anus equal distance from midbase of caudal fin and a little behind rear of eye; caudal fin deeply concave; dorsal truncate or slightly concave posteriorly; pelvics a little rounded and pectorals truncate or rounded; inner sides of pelvics joined and fused with midline of abdomen; caudal peduncle longer than deep; teeth all conical in about three irregular rows on premaxillaries, two on dentaries and an irregular row on vomer, the latter not interrupted in the middle.

Color.—Grayish to brownish above, paler below, with the sides well supplied with small dark blotches, more or less obscure in some specimens; these spots are much less evident in this form than in *orinoco*. Caudal fin edged with white on all margins; inside of white posterior margin the caudal fin pigment is intensified considerably; paired fins plain, pale in color, the dorsal grayish; anal with distal half dark, the edge white; peritoneum mostly pale.

Remarks.—This new species may be separated from all related forms by means of the key on page 253. It was taken in swiftly flowing water among rubble to coarse gravel.

Named *motatanensis* after the stream system in which it was collected.

Family PYGIDIIDAE

KEY TO THE GENERA OF PYGIDIIDAE REPORTED FROM VENEZUELA (MODIFIED MOSTLY AFTER EIGENMANN)

- 1a. Anal fin short with 7 to 11 rays, its origin usually behind, rarely under that of dorsal fin; eyes superior.
- 2a. A pair of nasal barbels; no mental barbels; mandible with considerable anteroposterior extent, teeth extending along less than half its total length; teeth strong; anal short; no mental barbels; opercle and interopercle with spines; two barbels at angle of mouth; opercle without a dermal flap; caudal peduncle compressed; anal partly or entirely behind dorsal; pelvics present; outer pectoral ray usually prolonged.

Pygidium Meyen

- 2b. No nasal or mental barbels; mouth inferior; anal short, of 7 to 11 rays, its origin usually behind, rarely under that of dorsal; lower barbel at angle of mouth minute; eyes superior.
- 3a. Mouth wide, teeth very numerous, in several very regular series; rami of lower jaw transverse, meeting, with teeth along its entire length; premaxillary large.
- 4a. Accessory caudal rays few, not conspicuous; caudal not fan-shaped or excessively contracted at base; upper tip with fine, hairlike, movable teeth.
- 5a. Gill membrane confluent with isthmus; gill openings reduced to a narrow slit in front of pectoral; opercle with 4 to 12 spines.
- 6a. Caudal emarginate or obliquely rounded, origin of pelvics nearly equidistant from base of caudal fin and snout to opercle; color, if present, in spots.....*Homodiaetus* Eigenmann and Ward
- 6b. Caudal rounded; few accessory rays; origin of pelvics $1\frac{1}{2}$ to 2 times as far from snout as from caudal.
- 7a. Eyes superior and close together.....*Stegophilus* Reinhardt
- 7b. Eyes large, far apart, and lateral.....*Haemomaster* Myers
- 5b. Gill membrane, united free from isthmus...*Acanthopoma* Lütken
- 4b. Accessory caudal rays very numerous, tail like that of a tadpole, base of caudal very narrow; no hairlike teeth on upper lip.
- Ochmacanthus* Eigenmann
- 3b. Mouth narrow, rami of lower jaw not transverse, teeth few, feeble, not meeting in middle; a few depressible teeth in a single series in middle of upper jaw; mandibles without teeth, or with a few excessively minute teeth on ends of rami; caudal rounded to emarginate; long, slender fishes.....*Vandellia* Cuvier and Valenciennes
- 1b. Anal long with 15 to 25 rays; its origin in front of that of dorsal fin; eyes lateral, seen as well from above as from below. (TRIDENTINAE.)
- Tridensimilis*, new genus

Subfamily STEGOPHILINAE

Genus PYGIDIUM Meyen

Trichomycterus VALENCIENNES, in Humboldt, Recueil d'observations de zoologie . . . , vol. 2, p. 348, 1811 (non *Trichomycterus* Humboldt).

Pygidium MEYEN, Reise um die Erde, vol. 1, p. 475, 1834 (ref. copied from Neave). (Type, *Pygidium fuscum* Meyen.)

KEY TO THE SPECIES OF PYGIDIUM REPORTED FROM VENEZUELA

- 1a. Caudal fin rounded; maxillary barbels slender, reaching to middle of pectoral rays; nasal barbel short, reaching a little past eye or about halfway to end of operculum; origin of dorsal a trifle closer to base of midcaudal fin rays than to tips of branched rays of pectoral; insertion of pelvics equal distance between base of midcaudal fin rays and end of operculum; length of upper prolonged pectoral ray $1\frac{1}{2}$ times in distance from its tip to insertion of pelvics; a vertical line through origin of dorsal passes a little closer to insertion of pelvics than to anus; color pattern of dark diffuse spots or blotches, no lateral band.....*Pygidium meridae* (Regan)
- 1b. Caudal fin emarginate or a little concave; teeth all pointed, no incisors, on jaws.
- 2a. Color plain or sides with one or more continuous dark bands, but no dark spots on back or sides.

3a. Three dark bands, two on sides and one along middorsal line anteriorly; a wide diffuse blackish band along lateral line, with wide pale streaks above and below; above upper pale band a second wide blackish band beginning at base of nasal barbel and passing through eye, thence along upper sides close to base of dorsal fin, thence fading posteriorly on upper sides of caudal peduncle; a third blackish streak separated from second black band by a pale streak running along middorsal line of head and back, fading in front of dorsal fin; nasal barbel long, reaching past end of operculum; origin of dorsal equal distance between base of midcaudal fin rays and posterior one-quarter of length of branched pectoral rays; insertion of pelvics equal distance from base of midcaudal fin rays and middle of postorbital length of head or eye in young; length of prolonged upper ray of pectoral fin about equal to distance from its tip to insertion of pelvics; usually a more or less evident dark streak across outer two-thirds of length of caudal fin.-----*Pygidium emanueli emanueli*, new species and subspecies

3b. Three dark bands on sides, none along middorsal line of back anteriorly; a blackish band on midsides along lateral line, above and below which is a pale band or streak; below lower pale streak a band, more or less a series of diffuse blotches running together, beginning in axil of pectoral and continuing above pelvic base and fading posteriorly; above upper pale streak a third intense dark band, beginning at base of nasal barbel, passing through eye, thence a little distance away from base of dorsal, fading posteriorly; no middorsal dark streak; origin of dorsal fin equal distance from base of midcaudal fin rays and middle of length of branched rays of pelvics; insertion of pelvics equal distance from base of midcaudal fin rays and about middle of postorbital length of head; nasal barbel reaches past end of operculum; length of upper prolonged pectoral ray contained 1 to $1\frac{1}{2}$ times in distance from its tip to insertion of pelvics.

Pygidium emanueli motatanensis, new subspecies

3c. Color plain in adults, but in young about 30 to 40 mm. or shorter, a single black streak along midsides, but at 70 mm. the streak barely discernible; origin of dorsal equal distance from base of midcaudal fin rays and tips of branched rays of pectoral; insertion of pelvics equal distance from base of midcaudal fin rays and middle of postorbital length of head; length of first (prolonged) ray of pectoral contained $1\frac{1}{2}$ to $1\frac{3}{4}$ in distance from its tip to insertion of pelvics; nasal barbel reaches a little past end of operculum; pelvics not reaching past anus.

Pygidium knerii (Steindachner)

2b. Back or sides or both with numerous blackish or brownish spots, these small or of moderate size; caudal fin a little concave; belly plain; sometimes spots along midsides more or less fusing into a dark, narrow streak; origin of dorsal a little closer to tips of branched rays of pectoral fin than to midbase of caudal fin; insertion of pelvics equidistant from midcaudal fin base and second third of postorbital length of head; length of upper prolonged ray of pectoral equal to 0.9 to 1.2 times in distance between its tip and pelvic insertion; nasal barbel extending considerably past end of operculum.

Pygidium banneau maracaiboensis, new subspecies

PYGIDIUM MERIDAE (Regan)

- Trichomycterus meridae* REGAN, Ann. Mag. Nat. Hist., ser. 7, vol. 12, p. 624, 1903 (Río Albiregas, above Mérida, Venezuela [Río Chama system]).—RIBEIRO, Rev. Mus. Paulista, vol. 10, p. 725, 1918 (Mérida).
- Pygidium meridae* EIGENMANN, Mem. Carnegie Mus., vol. 7, No. 5, p. 315, pl. 49, fig. 2, 1918 (Cordillera of Mérida, Venezuela); Bol. Soc. Col. Cien. Nat., vol. 8, p. 161, 1920 (Mérida).

PYGIDIUM EMANUELI EMANUELI, new species and subspecies

LAUCHA

PLATE 5, C

Holotype.—U.S.N.M. No. 121223, a specimen 174 mm. in standard length, collected by Leonard P. Schultz, April 3, 1942, in the Río Chama at Estanques, Estado de Mérida, Venezuela.

Paratypes (all taken by L. P. Schultz).—U.S.N.M. No. 121224, 51 examples, 52 to 170 mm. in standard length, collected along with the holotype and bearing the same data; U.S.N.M. No. 121225, 19 specimens, 74 to 203 mm., from the Río Gonzáles tributary to Río Chama, at La Gonzáles, Estado de Mérida, March 29, 1942; U.S.N.M. No. 121226, 14 specimens, 58 to 245 mm., in the Río Chama, 10 km. below Lagunillas, Estado de Mérida, March 30, 1942.

The above specimens were taken in swift mountain streams among rubble and loose gravel in the Río Chama system.

Description.—Based on the holotype and paratypes listed above. Measurements of the holotype and two paratypes, expressed in hundredths of the standard length, are recorded below, the paratypes in parentheses, respectively. Standard length (in mm.) 174 (245; 77.7).

Length of head to end of opercle 18.0 (18.5; 19.0); width of head across base of pectorals 14.2 (15.3; 14.1); greatest depth of body 18.6 (20.8; 16.1); length of snout 8.9 (9.3; 9.0); diameter of eye 1.38 (1.55; 2.06); least width of fleshy interorbital space 5.17 (6.12; 6.05); post-orbital length of head 8.15 (8.57; 9.01); length of longest ray (first branched) of anal fin 11.8 (12.2; 12.5); length of longest ray of dorsal 10.6 (12.1; 14.2); length of longest ray of pelvics 8.67 (9.43; 10.7); length of prolonged upper ray of pectoral fin 18.3 (18.2; 17.6); least depth of caudal peduncle 12.6 (13.9; 12.2); length of caudal peduncle 21.0 (22.0; 22.0); length of longest ray of caudal fin 14.6 (15.3; 19.0); distance from snout to origin of dorsal fin 62.0 (63.7; 64.6); distance from snout to origin of anal fin 69.8 (73.0; 71.5); snout to anus 65.4 (67.4; 67.7); snout to pelvics 55.5 (56.6; 57.7); distance from insertion of pelvics to anal origin 17.3 (17.1; 18.1); length of maxillary barbel 15.9 (16.3; 17.4); length of lower maxillary barbel 12.2 (12.2; 14.2); length of nasal barbel 14.5 (13.6; 16.1); distance from eye to margin of posterior nostril 3.39 (3.88; 3.22); distance from tip of prolonged upper pectoral ray to pelvic fin insertion 20.3 (23.8; 17.5); distance that upper ray of pectoral extends beyond tips of branched pectoral rays 6.60 (6.32; 3.86).

The following counts were made: Dorsal rays v, 6 (v, 6; v, 6); anal v, 4 (v, 4; v, 4); pectoral i, 8—i, 8 (i, 8—i, 8; i, 8); pelvic always i, 4; branched rays of caudal fin 11 (11; 11); number of gill rakers on first gill arch usually 2+5.

Head depressed, body compressed posteriorly; gill membranes extending moderately forward, joined, and forming a narrow free fold; anus about three-fourths the way from base of pelvics to anal origin; a vertical line through dorsal origin passes about midway between pelvic insertion and anal origin; pelvics do not reach past anus; caudal fin truncate; other fins rounded; eye small, without free margin, more or less embedded; maxillary barbel reaching to rear of base of pectoral fin; lower maxillary barbel reaching to insertion of pectorals or a trifle beyond; nasal barbel reaching a little past tip of opercle; teeth villiform, pointed, in a band on premaxillaries and at front of dentaries.

Color consisting of a dark band along midsides, another along upper sides from nostrils through eye past base of dorsal fin and a third along middorsal line anteriorly fading before dorsal fin, these three black bands separated by pale bands; no spots anywhere; belly plain, light grayish yellow. The band along midsides very intense in the young but more or less diffuse in adults; all fins grayish.

Remarks.—This species differs from all other forms with a truncate caudal fin and nasal barbels that reach past the opercle in having three blackish bands, two on the side and one along middorsal line anteriorly.

Named *emanueli* in honor of Juan F. Emanuel, former governor of the district of Goajira, who acted as my guide in much of my collecting in the lowlands of the Maracaibo Basin.

PYGIDIUM EMANUELI MOTATANENSIS, new subspecies

LAUCHA

PLATE 6, A

Holotype.—U.S.N.M. No. 121232, a specimen 71 mm. in standard length, taken by Leonard P. Schultz, March 17 and 20, 1942, in the Río San Juan at the bridge south of Mene Grande, Motatán system, Maracaibo Basin.

Paratypes.—U.S.N.M. No. 121233, 5 specimens, 42.5 to 56 mm., collected along with the holotype and bearing the same data.

All the types came from among rubble and coarse gravel.

Description.—Based on the holotype and paratypes listed above. Measurements of the holotype and paratype, expressed in hundredths of the standard length, are recorded below, first for the holotype, then for the paratype in parentheses, respectively. Standard length (in mm.) 71 (45.6).

Length of head to end of operculum 18.4 (21.5); width of head to base of pectorals 14.4 (16.9); greatest depth 18.0 (16.5); length of snout 8.17 (8.77); diameter of eye 2.53 (3.29); width of fleshy interorbital 5.92 (6.59); postorbital length of head 9.16 (9.87); length of longest (first branched) ray of anal fin 11.5 (13.2); length of longest dorsal ray 14.5 (15.4); length of longest pelvic ray 9.43 (10.5); length of first (upper) ray of pectoral 18.3 (18.6); least depth of caudal peduncle 13.4 (12.9); length of caudal peduncle 20.4 (20.0); length of longest ray of caudal fin 18.4 (20.4); distance from tip of snout to origin of dorsal 63.0 (65.8); snout to anal origin 73.4 (73.7); snout to pelvic insertion 58.0 (57.2); snout to anus 65.9 (66.9); distance from pelvic insertion to anal origin 18.2 (17.5); length of maxillary barbel 18.3 (21.9); length of lower maxillary barbel 13.4 (15.1); length of nasal barbel 18.4 (20.0); distance from eye to rim of posterior nostril 2.96 (2.85); distance from tip of prolonged upper pectoral ray to pelvic insertion 21.8 (21.1); length of prolonged tip of upper pectoral ray beyond branched rays of pectoral 6.34 (4.17). Caudal fin truncate or a trifle concave; other fins rounded; barbels as in *P. emanueli emanueli*.

The following counts were made: Dorsal always v, 6; anal always v, 4; pelvic always i, 4; branched caudal rays 11; pectoral rays i, 8—i, 8 (i, 8—i, 8); gill rakers about 2+5 to 7, rather rudimentary.

The shape and proportions of the body are the same as in *Pygidium emanueli emanueli* from the Río Chama system.

Color.—No black band along middorsal line of back; belly pale, yellowish in alcohol. The black band along middorsal line is most distinct, bordered above and below by a pale band; above the upper pale band is another blackish band extending from nostrils through eye backward to opposite dorsal fin, fading posteriorly; below the lower pale band is a third darkish band made up of more or less diffuse spots that run together, this band begins in axil of pectoral fin and passes above base of pelvics, then fading posteriorly; all fins a little grayish; peritoneum pale.

Remarks.—This subspecies differs from *P. emanueli emanueli* in lacking the black streak anteriorly along the middorsal line and in the presence of a dark streak on lower lateral sides.

Named *motatanensis* after the river system in which it was collected.

PYGIDIUM KNERII (Steindachner)

Trichomycterus knerii STEINDACHNER, Sitzb. Akad. Wiss. Wien, vol. 86, p. 81, pl. 5, fig. 1, 1a, 1882 (Canelos).

U.S.N.M. No. 121235, 9 specimens, 29 to 160 mm. in standard length, collected March 31, 1942, by Leonard P. Schultz, in the Río Torbes, 1 km. above Tárriba, Orinoco system. The three smallest specimens in this lot have a distinct black streak along middorsal line; on a specimen about 71 mm. in length, this black streak is barely visible, while on larger sizes the sides are plain brownish in alcohol.

U.S.N.M. No. 121234, 2 specimens, 29 and 65.5 mm., collected by Leonard P. Schultz, March 31, 1942, in the Río Cobre above its mouth, tributary to Río Quinta, thence Río La Grita, Catatumbo system; U.S.N.M. No. 101616, an example 53.5 mm., collected by Nicéforo María in the Río Pamplonita near Cucuta, Colombia (Catatumbo system).

Certain measurements were made on two specimens of *knerii*, the first from the Río Torbes and the other from the Río Cobre; these data, expressed in hundredths of the standard length, respectively, are recorded below. Standard length (in mm.) 71.2, 64.7.

Length of head to end of opercle 19.2, 19.3; greatest depth 15.7, 16.2; length of longest pelvic ray 9.97, 10.2; length of upper prolonged ray of pectoral 14.9, 16.2; distance from tip of snout to origin of dorsal 64.0, 64.2; snout to pelvic insertion 54.8, 59.5; snout to anal origin 71.4, 74.2; distance from dorsal origin to tip of caudal fin 52.5, 52.8; pelvic insertion to tip of caudal fin 61.0, 60.1; distance from pelvic insertion to anal origin 15.9, 15.3; length of snout 8.85, 8.50; post-orbital length of head 9.13, 8.81; interorbital space 5.62, 6.18; length of nasal barbel 16.3, 14.8; length of upper maxillary barbel 19.8, 18.6.

For counts of fin rays see table 11.

PYGIDIUM BANNEAUI MARACAIBOENSIS, new subspecies

PLATE 6, B

Holotype.—U.S.N.M. No. 121227, a specimen 43.7 mm. in standard length, collected by Leonard P. Schultz, March 17 and 20, 1942, in the Río San Juan near bridge, south of Mene Grande, tributary to Río Motatán, Maracaibo Basin.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121228, 5 examples, 31 to 56 mm., taken along with the holotype and bearing the same data; U.S.N.M. No. 121229, 16 specimens, 31.5 to 48.6 mm., from the Río Machango, 20 km. above the bridge south of Lagunillas, Maracaibo Basin, March 21, 1942; U.S.N.M. No. 121231, 2 specimens, 33.5 and 65 mm., from the Río Motatán, 4 km. above Motatán, March 25, 1942; U.S.N.M. No. 121230, an example 50.7 mm., from the Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21, 1942.

Description.—Based on the holotype and paratypes listed above. Measurements of the holotype and two paratypes, expressed in hundredths of the standard length, are recorded below, first for the holotype followed by those for the paratypes in parentheses, respectively. Standard length (in mm.) 43.7 (46.5; 33.5).

Length of head to end of opercle 20.1 (19.3; 20.3); width of head across base of pectorals 15.6 (15.3; 15.2); greatest depth 15.6 (19.3; 14.3); length of snout 8.70 (8.17; 8.36); diameter of eye 2.29 (1.93; 2.39); interorbital space (fleshy) 5.26 (5.38; 5.97); postorbital length of head 10.3 (11.2; 10.4); length of longest or first branched ray of

anal fin 13.0 (14.4; 12.8); length of longest ray of dorsal 13.0 (15.3; 14.0); length of longest ray of pelvics 10.8 (9.89; 9.85); length of prolonged ray of pectoral 20.4 (19.3; 18.8); least depth of caudal peduncle 11.9 (13.1; 9.85); length of caudal peduncle 19.9 (18.9; 21.2); length of longest ray of caudal fin 19.7 (17.6; 17.6); tip of snout to origin of dorsal fin 67.0 (69.0; 66.2); snout to origin of anal 73.2 (74.8; 72.2); snout to anus 68.2 (69.9; 67.2); snout to pelvic insertion 57.9 (57.0; 56.7); distance from pelvic insertion to anal origin 15.1 (17.4; 15.8); length of maxillary barbel 25.2 (22.6; 20.9); length of lower maxillary barbel 18.3 (16.1; 14.9); length of nasal barbel 21.3 (18.5; 16.7); distance from eye to posterior nostril 2.52 (2.15; 2.09); distance from tip of prolonged upper ray of pectoral fin to pelvic insertion 19.7 (21.5; 20.0); length of the prolonged upper pectoral ray beyond tips of branched rays 5.95 (5.59; 4.18).

The following counts were made, respectively: Dorsal v, 6 (v, 6; v, 6); anal v, 4 (v, 4; v 4); pectoral i, 7-1, 7 (i, 7-1, 7; i, 7-i, 7); pelvic i, 4 (i, 4; i, 4); branched rays of caudal fin always 11. For additional counts refer to table 11.

Head depressed, body compressed, greatest depth a little in front of pelvics; nasal barbel extending considerably past rear of head; upper maxillary barbel reaching almost to middle of branched pectoral rays; lower maxillary barbel reaches a little past pectoral insertion; caudal fin a little concave, all other fins rounded; least depth of caudal peduncle is near the middle of its length instead of just behind anal fin base; distance from origin of dorsal fin to midbase of caudal fin is equal to distance from origin of dorsal fin to tip of prolonged upper pectoral ray; pelvics equidistant from midbase of caudal fin and second third of postorbital length of head; origin of dorsal a little in front of a line through anus, about over tips of pelvics which do not quite reach to anus; length of upper prolonged ray of pectoral equal to 0.9 to 1.2 times in the distance from its tip to insertion of pelvics.

Color.—Everywhere, except on ventral surface in front of anus, the body is profusely brown-spotted; on some specimens these spots are a little larger than the eye, while on others they are smaller; usually the spots are more or less arranged in a row along midsides, with a pale streak above and below more or less setting that series of spots off; however, in females with abdomens distended with eggs, the spots are smaller and not arranged in such definite rows; dorsal surface of head spotted; fins plain grayish, with a little intensification of the pigment basally.

Remarks.—This new subspecies is like *Pygidium banneaui banneaui* Eigenmann, except in color. In *banneaui* there is a series of large brown spots well separated from each other along midsides and another

similar series each side of middorsal line anteriorly, with a few along middorsal line, while in the new subspecies, *maracaiboensis*, the dorsal surface has numerous small irregularly placed brown spots, and below the series along the midsides is another series of small spots, lacking in *banneau*.

Named *maracaiboensis* after the drainage basin in which it was collected.

TABLE 11.—*Fin-ray counts for various species of Pygidium*

Species	Dorsal	Anal	Pectoral			Pelvic	Caudal (branched rays)
	v,6	v,4	i,7	i,8	i,9	i,4	11
<i>knerii</i>	5	5	2	6	-----	3	3
<i>emanueli emanueli</i>	9	8	-----	11	-----	7	5
<i>emanueli montanensis</i>	7	7	-----	12	1	4	3
<i>banneau</i> <i>maracaiboensis</i>	12	12	24	-----	-----	4	3
<i>banneau banneau</i>	4	4	7	-----	-----	3	3

Genus HOMODIAETUS Eigenmann and Ward

Homodiaetus EIGENMANN and WARD, in Eigenmann, McAtee, and Ward, Ann. Carnegie Mus., vol. 4, p. 117, 1907. (Type, *Homodiaetus anisitsi* Eigenmann and Ward.)

HOMODIAETUS HAEMOMYZON Myers

Homodiaetus haemomyzon MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 98, 1942 (Río Guárico, at Calabozo and at El Sombrero; lagoon 10 km. south of San Fernando de Apure, Venezuela).

Genus STEGOPHILUS Reinhardt

Stegophilus REINHARDT, Vid. Medd. Naturh. Foren. Kjøbenhavn, 1858, p. 79, pl. 2. (Type, *Stegophilus insidiosus* Reinhardt.)

STEGOPHILUS SEPTENTRIONALIS Myers

Stegophilus septentrionalis MYERS, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 130, 1927 (Santa Barbara, Orinoco, Venezuela).

Genus HAEMOMASTER Myers

Haemomaster MYERS, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 131, 1927. (Type, *Haemomaster venezuelae* Myers.)

HAEMOMASTER VENEZUELAE Myers

Haemomaster venezuelae MYERS, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 131, 1927 (Santa Barbara, Orinoco; Playa Tama-Tama, Bifurcation, Orinoco, Venezuela).

Genus ACANTHOPOMA Lütken

Acanthopoma LÜTKEN, Vid. Medd. Naturh. Foren. Kjøbenhavn, 1891, p. 53, fig. (Type, *Acanthopoma annecleris* Lütken.)

ACANTHOPOMA BONDI Myers

Acanthopoma bondi MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 97 fig. 5, 1942 (Río Apure at San Fernando de Apure; Río Guárico at El Sombrero, Venezuela).

Genus OCHMACANTHUS Eigenmann

Ochmacanthus EIGENMANN, Mem. Carnegie Mus., vol. 5, p. 213, 1912. (Type, *Ochmacanthus flabelliferus* Eigenmann.)

KEY TO THE SPECIES OF OCHMACANTHUS REPORTED FROM VENEZUELA

1a. Marking variable, a double or triple series of large, irregular, alternating blotches with narrow interspaces, the spots usually partially coalescing forward on back; some specimens finely mottled; caudal mottled, in some a dark medium streak to tip; head $5\frac{1}{2}$, depth $5\frac{1}{2}$ in standard length; dorsal rays 8, anal 8, pectoral 6; eye $4\frac{1}{2}$ in head.

Ochmacanthus alternus Myers

1b. Back mottled, a single series of oblong dark patches of unequal length down middle of sides to caudal base; head 6, depth $6\frac{2}{3}$ in standard length; eye 4 in head; dorsal rays 8, anal 7, pectoral 5.

Ochmacanthus orinoco Myers

OCHMACANTHUS ALTERNUS Myers

Ochmacanthus alternus MYERS, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 129, 1927 (Caño de Quirihana, near Caicara, Venezuela).

OCHMACANTHUS ORINOCO Myers

Ochmacanthus orinoco MYERS, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 130, 1927 (Playa Matepalma, Orinoco, Venezuela).

Subfamily VANDILLIINAE

Genus VANDELLIA Cuvier and Valenciennes

Vandellia CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 18, p. 386, pl. 547, 1846. (Type *Vandellia cirrhosa* Cuvier and Valenciennes.)

KEY TO THE SPECIES OF VANDELLIA REPORTED FROM VENEZUELA (AFTER EIGENMANN)

1a. Dorsal rays 8 or 9; anal 9 or 10; pectoral 6; depth 9 in standard length; premaxillaries with 5 to 8 teeth; maxillary barbel 2 in the head; caudal fin slightly emarginate, the lobes rounded, equal; pectorals longer than head.

Vandellia cirrhosa Cuvier and Valenciennes

1b. Dorsal rays 9; anal 8; pectoral 7; depth 12; premaxillaries with 5 to 9 teeth; maxillary barbels less than half length of head; caudal emarginate, lobes rounded; pectorals as long as head.....*Vandellia plazaii* Castelnau

VANDELLIA CIRRHOSA Cuvier and Valenciennes

Vandellia cirrhosa CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 18, p. 386, pl. 547, 1846.—PELLEGRIN, Bull. Soc. Philom. Paris, vol. 1, p. 198, 1909 (Apure).—EIGENMANN, Mem. Carnegie Mus., vol. 7, No. 5, p. 361, fig. 29, 1918 (Apure, Orinoco).

VANDELLIA PLAZAII Castelnau

Vandellia plazaii CASTELNAU, Expédition dans les parties centrales de l'Amérique du Sud . . . , vol. 3, Poissons, p. 51, pl. 28, fig. 1, 1855.

Vandellia plazai PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Apure River, Venezuela).

Subfamily TRIDENTINAE

KEY TO THE GENERA OF THE SUBFAMILY TRIDENTINAE

- 1a. Opercular and interopercular patches of spines confluent; several series of strong teeth in each jaw; gill membranes broadly united with isthmus, without a free margin.....*Miuroglanis*¹⁴ Eigenmann and Eigenmann
- 1b. Opercular and interopercular patches of spines distinct and separately movable; eyes lateral, seen as well from below as from above; gill membranes joined across isthmus, forming a wide free fold.
- 2a. Opercle with 10 curved spines; interopercle with 3 or 4 smaller but similar spines; depth 13, head 9, in standard length; 2 maxillary barbels present but minute; nasal barbels absent; branchiostegals 4; dorsal rays 10 to 12; anal 20 to 25; pelvic i, 2, minute; pectoral i, 4; caudal said to be rounded.....*Tridens*¹⁵ Eigenmann and Eigenmann
- 2b. Opercular spines 6 to 10; interopercular spines 4 to 8; depth 4 to 8; head 5 to 6½ in standard length; teeth curved and in 3 rows in upper jaw.
- 3a. Opercular spines 10; interopercular spines 8; 2 maxillary barbels well developed; nasal barbel present or absent; dorsal rays 7 to 10; anal 17 to 21; pelvic probably i, 4.....*Tridentopsis*¹⁶ Myers
- 3b. Opercular spines 6; interopercular spines 4 to 6, usually 6; dorsal rays 9 to 11; anal 20 to 23; nasal barbel absent; branchiostegals 5; pelvics i, 4; pectorals i, 5.....*Tridensimilis*, new genus

TRIDENSIMILIS, new genus

Eigenmann and Eigenmann (Proc. California Acad. Sci., ser. 2, vol. 2, pp. 53-54, 1889) described the genus *Tridens*, based on *T. melanops* (genotype) and represented by 27 specimens from Iça, Amazons. One of the paratypes, U.S.N.M. No. 41522, was sent to the National Museum and has been studied by me. At the same time, Eigenmann and Eigenmann (*op. cit.*, p. 54) described *Tridens brevis* from a single specimen taken at Tabatinga, but this type was lost years ago at the Museum of Comparative Zoology. Myers (Copeia, No. 148, p. 84, 1925) described the genus *Tridentopsis*, based on *T. pearsoni* (genotype) and recorded previously by Pearson (Indiana Univ. Studies, No. 64, pp. 17-18, 1924) as *Tridens brevis* from Lake Rogoagua, Bolivia. Miss La Monte (Amer. Mus. Nov., No. 1024, p. 1, 1939) described *Tridentopsis tocantinsi* from the Rio Tocantins, northeastern Brazil. Obviously her species is close to *pearsoni*, except in the absence of nasal barbels.

It should be noted that up to the present time all species referred to the Tridentinae have come from the Amazon Basin. However, I had

¹⁴ Genotype, *Miuroglanis platycephalus* Eigenmann and Eigenmann, Proc. California Acad. Sci., vol. 2, p. 58, 1889 (Jutahy).

¹⁵ Genotype, *Tridens melanops* Eigenmann and Eigenmann, Proc. California Acad. Sci., vol. 2, p. 53, 1889 (Iça). Most of these data are from U.S.N.M. No. 41522, one of the paratypes of *T. melanops*.

¹⁶ Genotype, *Tridentopsis pearsoni* Myers, Copeia, No. 148, p. 84, 1925, based on *Tridens brevis* Pearson (not of Eigenmann and Eigenmann) (Lake Rogoagua, Bolivia).—*Tridentopsis tocantinsi* La Monte, Amer. Mus. Nov., No. 1024, p. 1, 1939 (Rio Tocantins, Brazil).

the good fortune to collect 29 specimens of a new species in the Lago Maracaibo Basin. This is the first record of this subfamily in northern South America.

Eigenmann (Mem. Carnegie Mus., vol. 7, No. 5, p. 369, 1918) suggested that *Tridens brevis* should probably be placed in a separate genus. Thus Myers created the genus *Tridentopsis* and said, "I feel justified in forming a new genus for *brevis* and Pearson's fish, which I provisionally recognize as a distinct species." Thus *brevis*, because of its inadequate description with no figure, has been shifted about. Now I feel justified in view of new material in putting *brevis* into still another genus.

This new genus, *Tridensimilis*, may be distinguished from all other members of the subfamily Tridentinae by the following combination of characters: Opercular spines 6 in number and interopercular spines 4 to 6, these patches of spines separately movable and distinctly separated; gill membranes joined across isthmus with a broad free fold; eyes lateral; depth of body 6 to 8, head 5 to 6½ in standard length, teeth small, curved, conical, in three separate rows above; dorsal rays ii or iii (probably iii), 7 or 8; anal ii or iii (probably iii as the first simple ray is rudimentary) 18 to 21; pelvic i,4; pectoral i,5; branchiostegals 5; nasal barbel absent.

Other characters are those of the new species, *Tridensimilis venezuelae*, described below.

Genotype.—*Tridensimilis venezuelae*, new species.

TRIDENSIMILIS VENEZUELAE, new species

PLATE 6, C

Holotype.—U.S.N.M. No. 121290, a specimen 19.5 mm. in standard length (total length 23.5), collected by Leonard P. Schultz, March 2, 1942, in the Río Negro below the mouth of the Río Yasa, Maracaibo Basin.

Paratypes.—U.S.N.M. No. 121291, 28 specimens, 13.8 to 20.5 mm. in standard length and 16.5 to 24 mm. in total length, collected along with the holotype and bearing the same data.

Description.—Based on the holotype and paratypes listed above. Measurements of the holotype and one paratype, expressed in hundredths of the standard length are recorded below, first for the holotype, then for the paratype in parentheses. Standard length (in mm.) 19.5 (20.4).

Length of head 16.9 (15.7); width of head across eyes 14.9 (15.7); greatest depth of body 16.9 (17.1); length of snout 8.72 (8.82); diameter of eye 4.62 (3.92); width of interorbital space 8.72 (9.32); postorbital length of head 6.16 (5.88); length of longest ray of anal fin 6.66 (7.35); longest ray of dorsal fin 8.20 (8.33); longest ray of pelvics

7.18 (7.84); longest ray of pectorals 10.2 (9.80); least depth of caudal peduncle 6.66 (6.86); length of caudal peduncle 17.9 (17.6); longest ray of caudal fin 14.9 (16.7); distance from tip of snout to origin of dorsal fin 7.08 (6.96); snout to anal origin 55.9 (64.2); snout to pelvics 45.1 (44.6)*.

The following counts were made: Dorsal rays iii,8 (iii,8) and, in addition, 6 paratypes had iii,8, and 3, iii,9 rays; anal rays iii,18 (iii,20), in addition one paratype had iii,18, 2, iii,19, 3, iii,20, and 2, iii,21 anal rays; pectoral rays i,5 (i,5) and i,5 in 9 other examples counted; pelvic rays always i,4; branched caudal fin rays always 11, with 5 above and 6 below.

The head is greatly depressed forward, the body becoming rounded opposite pectoral fins and much compressed from pelvic fins posteriorly; the greatest depth occurs between pelvics and anal origin; the greatest width is across the eyes; mouth inferior but lower lip not reverted except at corner of mouth; a single maxillary barbel not reaching past pupil; margin of eyes not free; pupil round; gill membranes joined across isthmus with wide free fold; pectorals reaching about one-third the way to pelvics; pelvics short, the distance between pelvic insertion and anal origin about 6 times in standard length; pelvics inserted closer to tip of snout than to base of caudal fin by 2 eye diameters; anal origin about $1\frac{1}{2}$ eye diameters in front of a vertical line through dorsal origin; first rays of anal longest, tapering to shorter rays posteriorly; caudal fin concave; nostrils widely separated, connected by a tube, the anterior nostril with a raised rim, posterior opening covered by a valvular flap; anus immediately in front of anal origin.

Color (in alcohol).—White, eyes black; a series of black pigment cells along bases of dorsal and anal fins, and a line of larger black pigment cells extends from below and behind pectoral fins to anal origin; caudal fin slightly dusky posteriorly, other fins translucent. No pigment spots on top of the head.

Remarks.—This new species may be distinguished from all other members in the subfamily Tridentinae by means of the keys on page 266 and below.

The following key gives the main differences between *Tridensimilis venezuelae* and *T. brevis*, which I believe should be referred to this new genus until such time as additional specimens of *brevis* are collected and then its true nature determined. Perhaps then on the basis of two maxillary barbels *brevis* should be made the type of still another genus.

- 1a. A single maxillary barbel present at angle of mouth not extending past pupil; distance of origin of dorsal $2\frac{1}{2}$ in total length; distance of anal origin from tip of caudal $2\frac{1}{4}$ to $2\frac{1}{2}$ in total length; first pectoral ray not produced; no pigment spots on head.-----*Tridensimilis venezuelae*, new species

- 1b. Two maxillary barbels at angle of mouth, outer one extending to base of pectoral, inner to gill opening; distance of origin of dorsal from tip of caudal a little more than 2 in length; origin of anal from tip of caudal less than 2 in length; first pectoral ray greatly produced; head with brown dots.

Tridensimilis brevis (Eigenmann and Eigenmann)

Family DORADIDAE

KEY TO THE GENERA AND SPECIES OF [DORADIDAE] REPORTED FROM [VENEZUELA]¹⁷

- 1a. Head depressed, width of head across base of pectorals (cleithrum) greater than length of head to end of opercle; barbels all simple.

- 2a. Series of lateral scutes, numbering 19 to 25, beginning over region of anus and continuing posteriorly along the lateral line; anteriorly lateral line without scutes; caudal peduncle naked above and below; eye in front of middle of head; mouth subterminal, upper lip in front of tip of lower jaw; pectoral spines serrated in front and behind; dorsal spine serrated in front and in small specimens behind, only rough in adults; adipose fin base longer than base of anal, but without keel forward; caudal fin forked; dorsal II, 5; anal iv, 8 to 10; pectoral about I, 9; scutes 19 to 25; color blackish above, paler below, peritoneum white.

Doraops zuloagai, new genus and species

- 2b. Lateral scutes in a continuous series along lateral line; caudal peduncle covered above and below by plates.

- 3a. Lateral scutes very narrow, as wide as eye, leaving greater part of sides naked, with one in feeble contact with dorsal plate; eye just anterior to middle of head; head $3\frac{1}{2}$ in standard length; eye $6\frac{1}{2}$ in head; dorsal I, 5; anal 11; lateral scutes 29; mouth terminal; caudal forked; color blackish with a white line down row of scutes, continued forward to eye; dorsal mottled lightly, first soft ray and its membrane black; caudal mottled, with two longitudinal black bands, these continuing the black of sides above and below white scutes.

Orinocodoras eigenmanni Myers

- 3b. Lateral scutes very deep, leaving only a narrow naked area along back; 3 scutes in contact with dorsal plate; eye in middle of head; dark brown, rows of large white spots above and below lateral line; smaller white spots on belly and caudal; dorsal black with a few large white spots; maxillary with black and white rings; outer surface of humeral process with two series of spines, reaching fourth lateral scute; 29 lateral scutes; maxillary barbel reaching pectoral.

Agamyxis albomaculatus (Peters)

- 1b. Head not depressed; width of head across base of pectorals (cleithrum) shorter than length of head to end of opercle; teeth feeble or lacking.

- 4a. Maxillary barbel simple; mental barbels not united by a membrane joining their bases; nuchal shields without a foramen; adipose fin continued forward as a low keel, longer than anal fin base; first nostril remote from lip; eye behind middle of head; caudal peduncle naked above and below; lateral scutes 3 + 18 to 23; rows of tentacles on roof of mouth; dorsal I, 6; anal 11; head 3 to $3\frac{3}{4}$ in length; eye $4\frac{1}{2}$ to 8 in head; color dark brown, fins black-----*Pseudodoras niger* (Valenciennes)

¹⁷ I am not certain which species is actually involved in Eigenmann and Eigenmann's (Occ. Papers California Acad. Sci., vol. 1, p. 234, 1890) reference to *Doras armatulus* from Venezuela.

- 4b. Maxillary barbel fringed with minute barbels; mental barbels with barblets; nuchal shields with a foramen; back without scutes; origin of pelvics nearer caudal fin than to snout; adipose not continued forward as a ridge; scutes well developed, keel and point of humeral process below line of hooks of lateral series; a black spot on base of dorsal and a narrow oblique black spot on base of each caudal lobe; color marking diffuse; pale along lateral scutes, which number 33 to 35; dorsal I, 5; anal 12.-----*Opsodoras leporhinus* (Eigenmann)

DORAOPS, new genus

Description.—Head depressed, its length a little greater than its width at base of pectoral spines, or the width of coracoids $1\frac{1}{2}$ in length of head; eye in front of middle of length of head and from 3 to 4 times in the snout; width of mouth contained about $2\frac{1}{4}$ times in head; gill openings restricted, extending a little below base of pectorals and their length a little greater than length of snout; mouth subterminal, the upper lip in front of lower jaw; a wide median dorsal groove in front of middle of head with a fontanel posteriorly between rear of orbits; a wide band of villiform teeth on premaxillaries and at front of dentaries, the length of these bands about equal to the length of the snout; barbels all simple, not fringed, a pair of maxillary and two pairs of mental barbels; two pairs of nostrils, without barbels, the anterior pair tubular and the posterior pair with elevated rims; lateral scutes posteriorly beginning over region of anus and ending at base of caudal fin rays, numbering 19 to 25; each scute provided with a spine posteriorly directed; no scutes on dorsal or ventral sides of caudal peduncle; three or four partly embedded bony scutes, without spines, at front of the lateral line, the first two of which are each connected with the epiotic by a bony stay; pectoral spines serrated in front and behind; dorsal spine serrated in front and in small specimens behind, rough only in adults 300 mm. in standard length and becoming obsolete with age; adipose fin base longer than base of anal but not continued forward to form a keel; intestines much convoluted; peritoneum white; skin leathery; caudal fin forked; air bladder very large, with an anterior compartment separated from the posterior section by a constriction, the posterior section having long fingerlike projections, with numerous constrictions across them, that extend to under the end of the body cavity posteriorly.

Remarks.—This new genus differs from other genera of the family Doradidae in having spiny scutes only posteriorly in the lateral series, for in all other genera referred to the family as revised by Eigenmann (Trans. Amer. Philos. Soc., vol. 22, pp. 304–306, 1925) the lateral series of spiny scutes is continuous.

Myers (Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 124, 1927) described the new genus *Orinocodoras* as having laminate plates

entirely covering the caudal peduncle above and below, while in *Doraops* this area is naked.

Fowler (Proc. Acad. Nat. Sci. Philadelphia, vol. 91, p. 226, 1940) described a new Peruvian genus, *Liosomadoras*, and referred it to the family Doradidae. This genus differs from *Doraops* in lacking the lateral series of bony scutes and in having an adipose fin with its base shorter than that of the anal fin. The large air bladder does not agree in structure with any figure of an air bladder from other species.

Named *Doraops* in reference to its similarities to other members of the family Doradidae.

Genotype.—*Doraops zuloagai*, new species.

DORAOPS ZULOAGAI, new species

MARIANO

FIGURE 5; PLATE 7, A

Holotype.—U.S.N.M. No. 121015, a female, 287 mm. in standard length, taken by Leonard P. Schultz in Río de Los Pajaros, 3 km. above Lago Maracaibo, April 30, 1942. This "río" is actually a caño about 200 feet wide and 15 feet deep that extends back into a "ciénaga" or swampy jungle for several kilometers. Bottom of deep mud and debris.

Paratypes (all taken by L. P. Schultz).—U.S.N.M. No. 121017, 4 specimens, 231 to 355 mm. in standard length, from the Río Negro, about 3 km. below the mouth of the Río Yasa, Santa Ana system, Maracaibo Basin, March 2, 1942; U.S.N.M. No. 121018, a specimen 365 mm. in standard length, taken April 7–9, 1942, in a gill net set in Lago Maracaibo 1 km. off Pueblo Viejo in 2 meters of water; U.S.N.M. No. 121016, 7 specimens, 318 to 460 mm. in standard length, from the Río Apón, a few kilometers below the mouth of the Río Cogollo and about 35 km. south of Rosario, Maracaibo Basin, February 26, 1942.

In all these localities where this fish occurred the bottom was muddy. They had been feeding on small crabs and snails.

Description.—Based on the holotype and 12 paratypes listed above. All measurements are given in hundredths of the standard length, those for the holotype outside the parentheses and those for the paratypes within parentheses, respectively. Standard length (in mm.) 287 (365; 355; 317; 231); total length (in mm.) 345 (447; 432; 380; 275). The caudal fin appears to wear off with age so that the upper and lower lobes wear off rounded, thus giving a proportionally shorter fish in relation to the standard length.

Width of head at base of pectoral spine 23.0 (23.3; 21.8; 22.5; 23.3); length of head 24.9 (25.2; 26.2; 24.9; 25.4); length of snout 9.23 (9.04; 8.73; 8.36; 8.49); postorbital length of head 14.5 (14.5; 15.8;

14.5; 14.9); least width of fleshy interorbital space 7.51 (7.59; 7.47; 7.35; 7.36); diameter of eye 2.54 (2.28; 2.90; 2.90; 3.46); length of caudal peduncle or distance from base of last anal ray to midbase of caudal fin rays 16.9 (17.0; 15.8; 18.5; 16.5); least depth of caudal peduncle 6.00 (6.51; 5.38; 6.30; 6.50); length of base of adipose fin 18.1 (17.8; 16.2; 14.5; 16.7); length of base of anal fin 12.4 (13.3; 11.7; 11.5; 12.5); length of base of dorsal fin 14.4 (13.1; 12.8; 12.4; 13.8); greatest depth of body at base of dorsal spine 24.4 (21.9; 21.7; 19.4; 18.2); distance between centers of anterior and posterior nostrils 5.05 (4.21; 3.95; 4.42; 4.37); length of maxillaries or tip of snout to

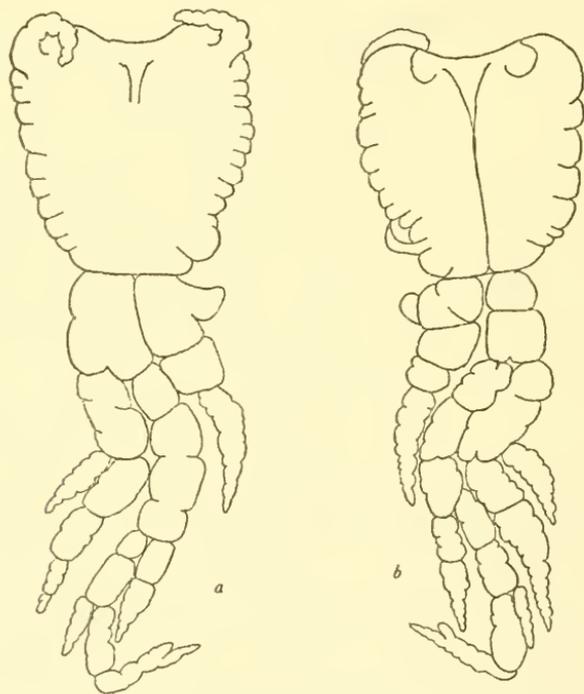


FIGURE 5. Sketch of air bladder of *Doraops zuloagai*: a, Ventral side; b, Dorsal side.

rear edge of mouth 6.76 (8.04; 6.99; 7.10; 6.71); length of maxillary barbel 32.3 (17.5; 29.0; 31.3; 27.9), this pair of barbels becoming shorter and heavier with age; length of inner mental barbel 7.67 (6.01; 8.17; 7.57; 8.87); length of outer mental barbel 14.5 (11.0; 12.5; 12.9; 12.8); distance from tip of snout to origin of dorsal fin 35.5 (35.6; 36.6; 34.7; 36.4); snout to origin of anal 72.2 (69.9; 73.2; 73.5; 72.7); snout to origin of adipose fin 68.0 (67.1; 70.4; 68.1; 68.0); snout to insertion of pelvises 54.0 (54.8; 55.2; 54.6; 53.7); snout to anus 66.9 (66.0; 66.8; 67.2; 65.0); snout to tip of humeral process 36.1 (35.9; 38.1; 36.0; 39.4); length of shortest midray of caudal fin 8.01 (8.36; 8.74; 8.20; 8.76); length of longest upper ray of caudal lobe 20.6 (25.4; 23.5;

23.8; 23.8); length of longest lobe of caudal 18.7 (20.8; 20.0; 20.3; 20.2); length of pectoral spine 19.2 (21.9; 21.2; 20.5; 23.4); length of dorsal spine 20.9 (24.7; 19.9; 22.4; 22.3); distance from origin of anal fin to center of anus 4.45 (5.04; 6.68; 6.30; 5.84).

The following counts were made: Anal rays iv, 8; (iv, 10; iv, 9; iv, 9; iv, 8; iv, 9; iv, 8; iv, 8; iv, 8; iv, 8; iv, 8; iv, 8; iv, 8); dorsal rays always II, 5; pectoral I, 9; number of scutes with spines in the lateral series 21-21 (21-21; 20-20; 24-25; 19; 20; 20; 19; 20; 20; 22; 21; 19); branched caudal fin rays usually 15.

Head depressed; dorsal surface of head bony, with a raised crest from occiput to origin of dorsal fin and a shallow groove in middorsal line between orbits, but not quite reaching tip of snout; posteriorly this groove has a fontanel; mouth small, subterminal, the upper lip in front of lower jaw, both lips somewhat plicate; a wide band of villiform teeth on front of premaxillaries and on front of dentary; the pair of maxillary barbels blackish and the two pairs of mental barbels grayish, pale on some specimens; gill membranes united, the opening restricted mostly to the sides, and the distance between the lower edges of gill opening equal to length of caudal peduncle; posterior nostril about an eye diameter in front of eye; pectoral spine with a backward curve serrated anteriorly and posteriorly; dorsal spine with a similar backward curve serrated anteriorly and posteriorly in young, but the posterior serrations becoming obsolete with age; pelvics reaching to opposite anus; intestine much coiled and convoluted; the lateral series of scutes, each bearing a spine, directed posteriorly beginning over anus and ending at base of midcaudal fin rays; the length of the humeral process about $1\frac{1}{2}$ times interorbital space; gill rakers on first gill arch of one paratype 7+17, short and slender; air bladder large, the anterior compartment divided by a median partition, and deep groove along dorsal midline; at the outer ventral anterior angles is a convoluted horn; the posterior section separated from the anterior by a constriction with several long convoluted tubelike projections extending past the anus to the posterior end of the body cavity; these fingerlike projections constricted in several places; measurements as follows: Total length of air bladder 185 mm., in a female specimen 405 mm. standard length, greatest width anterior compartment 65 mm. and its length 70 mm.; greatest width of posterior section 38 mm. and to first constriction on dorsal side 28 mm.; the fingerlike projections extend backward for 90 mm. with a forward-projecting recurved tip 30 mm. Origin of adipose fin above anus, its base a little longer than that of anal fin; caudal peduncle somewhat constricted without plates on its dorsal or ventral sides; caudal fin forked, the upper lobe longest.

The lateral series of plates is represented by three or four more or less embedded rough plates without spines at the anterior end of the series; then no scutes until over the anus, where they begin and con-

tinue to base of caudal fin rays, each scute posteriorly with a single backward-directed sharp spine; the first two plates at the anterior end of the series are each connected with the epiotic by a bony stay just under the skin; skin somewhat thick and a little leathery.

Color.—Blackish above and white to pale grayish below; in some specimens the belly is mottled with grayish and in others almost blackish; dorsal and pectoral fins blackish with a wide, pale border distally; adipose blackish; caudal fin blackish, on one specimen grayish with some scattered blackish spots; distally the caudal fin is pale in color; pelvics and anal grayish to blackish; maxillary barbels blackish, mental barbels grayish; peritoneum white.

Remarks.—This new species can be distinguished from all other genera and species referred to the family Doradidae by the absence of lateral scutes anteriorly, these beginning over region of anus and continuing to base of caudal fin.

Named *zuloagai* for Dr. Guillermo Zuloaga, assistant chief of exploration, Standard Oil Co. of Venezuela, who was largely responsible for inviting me to study the fishes of the Maracaibo Basin. In his honor I take much pleasure in naming this species.

Genus ORINOCODORAS Myers

Orinocodoras MYERS, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 124, 1927. (Type, *Orinocodoras eigenmanni* Myers.)

ORINOCODORAS EIGENMANNI Myers

Orinocodoras eigenmanni MYERS, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 124, 1927 (Caño de Quiribana, near Caicara, Venezuela).

Genus AGAMYXIS Cope

Agamyxis COPE, Proc. Amer. Philos. Soc., vol. 17, p. 322, 1878. (Type, *Agamyxis pectinifrons* Cope.)

AGAMYXIS ALBOMACULATUS (Peters)

Doras albomaculatus PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 470 (Calabozo, Venezuela).—EIGENMANN and EIGENMANN, Proc. California Acad. Sci., ser. 2, vol. 1, p. 161, 1888; Occ. Papers California Acad. Sci., vol. 1, p. 231, 1890 (Calabozo, Venezuela).

Platydoras albomaculatus EIGENMANN, Trans. Amer. Philos. Soc., vol. 22, pt. 5, p. 317, 1925 (Calabozo).

Agamyxis albomaculatus MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 97, 1942 (Caño de Quiribana, Caicara, Río Orinoco, Venezuela).

Genus PSEUDODORAS Bleeker

Pseudodoras BLEEKER, Ichthyologiae Archipelagi Indici Prodrum, vol. 1, p. 53, 1858. (Type, *Doras niger* Valenciennes.)

PSEUDODORAS NIGER (Valenciennes)

Doras niger VALENCIENNES, in Humboldt, Recueil d'observations de zoologie . . . ; vol. 2, p. 184, 1811.

Rhinodoras niger PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 471 (Calabozo, Venezuela).

Pseudodoras niger EIGENMANN, Trans. Amer. Philos. Soc., vol. 22, pt. 5, p. 333, pl. 1, fig. 16; pl. 17, figs. 1-4; pl. 23, fig. 1; figs. 2, 6, 7, 10; 1925.

Genus OPSODORAS Eigenmann

Opsodoras EIGENMANN, Trans. Amer. Philos. Soc., vol. 22, pt. 5, p. 348, 1925.
(Type, *Opsodoras orthacanthus* Eigenmann.)

OPSODORAS LEPORHINUS (Eigenmann)

Hemidoras leporhinus EIGENMANN, Rep. Princeton Univ. Exped. Patagonia, vol. 3, p. 394, 1910 (*nomem nudum*); Mem. Carnegie Mus., vol. 5, p. 195, pl. 19, fig. 1, 1912 (British Guiana at Tumatumari, Potaro River and Crab Falls, Essequibo River).

Opsodoras leporhinus EIGENMANN, Trans. Amer. Philos. Soc., vol. 22, pt. 5, pp. 303, 354, 1925 (Orinoco and Venezuela).

Family CALLICHTHYIDAE

KEY TO THE GENERA OF CALLICHTHYIDAE REPORTED FROM VENEZUELA (AFTER GOSLINE, 1940)

- 1a. Snout depressed, interorbital width greater than or equal to depth of head at forward margin of orbit; eye more or less superiorly situated, i. e., not equally visible from above and below, its diameter contained two or more times in its distance from lower end of bony opercle; foremost plates of upper lateral series, or nuchal plates, fused across midline between supra-occipital and dorsal.
- 2a. Abdomen between pectoral fins completely covered with flesh; suborbital covered with flesh.....*Callichthys* Scopoli
- 2b. Coracoids expanded on surface of abdomen between bases of pectorals; suborbital bones not covered with flesh.....*Hoplosternum* Gill
- 1b. Snout compressed or rounded, interorbital width considerably less than depth of head at forward rim of orbit; barbels at either end of mouth, i. e., rictal barbels, not reaching much beyond gill opening; lower lips reverted to form a single pair of short barbels; nuchal plates not meeting along middorsal line; coracoids usually more or less expanded on abdomen between pectoral bases; fontanel elongate; dorsal fin with a spine and 7 or 8, possibly 9, rays.
Corydoras Lacepède

Genus CALLICHTHYS Scopoli

Callichthys (Gronovius) SCOPOLI, Introductio ad historiam naturalem, p. 451, 1777. (Type, *Callichthys cirris quattuor* Gronovius=*Callichthys callichthys* Linnaeus). (Ref. copied.)

CALLICHTHYS CALLICHTHYS (Linnaeus)

CURITO

Silurus callichthys LINNAEUS, Systema naturae, ed. 10, p. 307, 1758 (America).

Callichthys callichthys PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Apure River, Venezuela).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 408, 1931 (Pitch Lake at Guanoco, Venezuela).

Genus HOPILOSTERNUM Gill

Hoplosternum GILL, Ann. Lyc. Nat. Hist. New York, vol. 6, p. 395, 1858. (Type, *Callichthys laevigatus* Valenciennes=*H. littorale* Hancock.)

KEY TO THE SPECIES OF HOPILOSTERNUM REPORTED FROM VENEZUELA (AFTER GOSLINE, 1940)

1a. Median (azygous) preadipose scutes extending two-thirds of way or less forward to dorsal; postorbital a weak vertical rod; no platelet below anterior scute of upper lateral series; all caudal rays of approximately same thickness; body, dorsal, and caudal spotted.

Hoplosternum thoracatum (Cuvier and Valenciennes)

1b. Azygous preadipose scutes extending the entire distance between adipose and dorsal; postorbital well developed, longer than deep; a roundish platelet below anterior scute of upper lateral series; outer caudal rays considerably thickened; body, dorsal, and caudal plain in color.

Hoplosternum littorale (Hancock)

HOPILOSTERNUM THORACATUM THORACATUM (Cuvier and Valenciennes)

Callichthys thoracatus CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 15, p. 309, pl. 443, 1840.—PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 471 (San Fernando de Apure, Venezuela).—REGAN, Proc. Zool. Soc. London, 1906, pt. 1, p. 388 (Brazil; Guiana; Venezuela; Trinidad).—RÖHL, Fauna descriptiva de Venezuela, p. 375, 1942 (Orinoco).

Hoplosternum thoracatum FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 436, 1911 (La Pedrita, on the Caño Uracoa, Venezuela).

Hoplosternum thoracatum thoracatum GOSLINE, Stanford Ichth. Bull., vol. 2, No. 1, p. 7, 1940 (Orinoco).

Hoplosternum oronocoi FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 66, p. 229, fig. 8, 1915 (La Pedrita, Caño Uracoa, Venezuela).

HOPILOSTERNUM THORACATUM MAGDALENAE Eigenmann

Hoplosternum magdalenae EIGENMANN, in Ellis, Ann. Carnegie Mus., vol. 8, Nos. 3, 4, p. 412, 1913.

I do not have available at present sufficient specimens of the forms from the Orinoco and Magdalena systems to be able to distinguish the form in the Maracaibo Basin from the other supposed subspecies.

The following specimens were collected by Leonard P. Schultz during 1942, in the Maracaibo Basin, Venezuela:

U.S.N.M. No. 121118, a specimen 87.7 mm. in standard length, from the Río San Juan at bridge, tributary to Río Motatán, March 20, 1942.

U.S.N.M. No. 121120, 30 specimens, 17 to 65 mm., muddy pool, tributary, during rainy season, Río Gé, near Rosario, collected with the aid of Mr. Butcher and Mr. Refshauge, March 8, 1942.

U.S.N.M. No. 121119, 4 specimens, 17 to 30 mm., pond tributary to Río Gé at Rosario, Río Palmar drainage, March 8, 1942, collected with the aid of Mr. Butcher and Mr. Refshauge. The fishes were dark reddish brown, pale ventrally, barbels dark reddish brown. They lived in the mud and among weeds.

HOPILOSTERNUM LITTORALE (Hancock)

Callichthys littoralis HANCOCK, Zool. Journ., vol. 4, p. 244, 1828.—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Apure River, Venezuela).

Hoplosternum littorale FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 436, 1911 (La Pedrita, on the Caño Uracoa, Venezuela); vol. 66, p. 229, 1915 (Trinidad and Venezuela).

Genus *CORYDORAS* Lacepède

Corydoras LACEPÈDE, Histoire naturelle des poissons, vol. 5, p. 145, 1803.
(Type, *Corydoras geoffroy* = *C. punctatus* Bloch.)

KEY TO THE SPECIES OF *CORYDORAS* REPORTED FROM VENEZUELA (AFTER GOSLINE, 1940)

- 1a. Snout long, its profile straight or concave; bony interorbital contained 1.7 to 2 times in snout; 22 or 23 scutes in upper lateral series; no bristles on cheek; width of body contained 1.4 times or less in depth; sides of body in adult without small spots but with striking black blotches; anal and posterior rays of dorsal plain; posterior dark blotch extending vertically across caudal peduncle just ahead of caudal fin; interorbital 2.6 to 3.3 in head..... *Corydoras septentrionalis* Gosline
- 1b. Snout short, its profile rounded or sometimes nearly straight; bony interorbital contained 1.4 or less in snout; no black, hastate spot at base of caudal; width of naked area between coracoids greater than diameter of eye; coracoids incompletely surrounding pectoral bases on surface of body; dorsal spine not reaching adipose when laid back.
- 2a. Depth of suborbital in adult equal to or greater than diameter of eye; dorsal spine short, about equal to length of snout.

Corydoras aeneus (Gill)

- 2b. Depth of suborbital in adult less than diameter of eye.

3a. Sides of body with a trilineate pattern formed of a dark band along junction of rows of lateral scutes bordered on either side by a lighter band, these lighter bands in turn delimited above and below by darker pigmentation of sides; flesh of abdomen without small platelets; dorsal without a black blotch; caudal plain... *Corydoras bondi* Gosline

3b. Sides of body without a trilineate pattern; sides with many small dark spots but no blotches and no band along junction of rows of scutes; depth 3 or less in standard length; 21 to 24 scutes in upper lateral series; eye 5 or less in head; dorsal spine about equal to length of head; a vertical band from top of head through eye.

Corydoras melanistius Regan*CORYDORAS SEPTENTRIONALIS* Gosline

Corydoras septentrionalis GOSLINE, Stanford Ichth. Bull., vol. 2, No. 1, p. 16, 1940 (Río Pina, north of Maturin; Río Guanipa, north of El Tigre; Río Amaná, east of Santa Barbara; Río Tinaquillo, at Tinaquillo, Venezuela).—MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 100, fig. 6, 1942 (Venezuela).

CORYDORAS AENEUS (Gill)

Hoplosoma aeneum GILL, Ann. Lyc. Nat. Hist. New York, vol. 6, p. 403, 1858 (Trinidad).

Corydoras venezuelanus IHERING, Rev. Mus. Paulista, vol. 8, p. 383, 1911 (Río Cabriales, Valencia, Estado de Carabobo, Venezuela).

Corydoras aeneus EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 9, 1920 (Maracay, Río Bue, Venezuela).—GOSLINE, Stanford Ichth. Bull., vol. 2, No. 1, p. 19, 1940 (Lake Valencia; Río Urana, 40 km. west of Puerto Cabello; Río Carichapo, 30 km. east of Upata, in Venezuela).—RIBEIRO, Rev. Mus. Paulista, vol. 10, p. 721, 1918 (Río Cabriale, Venezuela).

CORYDORAS BONDI Gosline

Corydoras bondi GOSLINE, Stanford Ichth. Bull., vol. 2, No. 1, p. 20, 1940 (Río Yuruari, 3 km. east of El Callao and at El Callao; Río Carichopo, tributary of Río Yuruari, 30 km. east of Upata, in Venezuela).—MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 100, fig. 2, 1942 (Venezuela).

CORYDORAS MELANISTIUS Regan

Corydoras melanistius REGAN, Ann. Mag. Nat. Hist., ser. 8, vol. 10, p. 216, 1912 (Essequibo).—MYERS, Bull. Mus. Comp. Zool., vol. 68, p. 126, 1927 (Caño de Quiribana, near Caicara, on the Orinoco).—GOSLINE, Stanford Ichth. Bull., vol. 2, No. 1, p. 21, 1940 (Venezuela).

Family ASTROBLEPIDAE

Genus ASTROBLEPUS Humboldt

Astroblepus HUMBOLDT, Recueil d'observations de zoologie . . ., vol. 1, p. 37, 1805. (Type, *Astroblepus grimaldii* Humboldt.)

In working up the fishes of this family from the Maracaibo Basin, I found it necessary to prepare the following tentative key, separating various species referred to the genus *Astroblepus*. This key should not be considered a revision, since many of the data were obtained from the original description and specimens of several species were not obtainable for examination. This genus is a very difficult one and is in need of careful revision. Perhaps too much emphasis has been placed on the length of the first rays of pelvics and pectorals.

TENTATIVE KEY TO THE SPECIES OF ASTROBLEPUS OF NORTHERN SOUTH AMERICA

- 1a. Teeth in outer row of premaxillary (except possibly last one or two lateral ones) bicuspid or incisors.
- 2a. Teeth (except sometimes one or two of lateral ones) in outer row of premaxillary Y-shaped or bicuspid, sometimes one lobe smaller than the other; pectoral spine extending one-half to three-quarters way out pelvics; nasal flaps not ending in a distinct barbel.
- 3a. Maxillary barbel reaching to gill opening or beyond; pelvic fins reaching two-thirds to three-quarters way to anus.
- 4a. Adipose fin with spine connected by a membrane to caudal peduncle; pelvics inserted in front of dorsal origin (Colombia).

Astroblepus homodon (Regan)

- 4b. Adipose fin without spine or with it embedded and only tip showing; pelvics inserted under dorsal origin.

5a. Interorbital space equal to distance from eye to posterior nasal opening (Ecuador)-----*Astroblepus fissidens* (Regan)

5b. Interorbital space about equal to three-quarters distance from eye to posterior nasal opening (Magdalena system, Colombia).

Astroblepus nicefori Myers

- 3b. Maxillary barbel not quite reaching gill opening, usually three-quarters to four-fifths of the distance; pelvic fins reaching to anus; adipose fin with a spine connected by membrane to caudal peduncle; pelvics inserted almost under origin of dorsal; interorbital space a little narrower than distance from eye to posterior nasal opening (Colombia).

Astroblepus guentheri (Boulenger)

- 2b. Bilobed teeth of outer row of premaxillaries gradually changing to broadly pointed incisors laterally; nasal flap ending in a barblet; adipose fin elongate but no spine showing; interorbital space about equal to distance from eye to posterior nostril; pelvics reach from three-quarters way to a little beyond anus; pectorals extending one-half to two-thirds way out pelvics; pelvics inserted a little behind origin of dorsal; maxillary barbel reaches to gill opening or beyond; anus closer to base of caudal than gill opening.....***Astroblepus festae*** (Boulenger)
- 2c. Outer row of premaxillary teeth incisors, but sometimes with a notch at centers; these teeth never sharp-pointed.
- 6a. Teeth of both upper and lower jaws broad incisors; adipose fin with spine connected to caudal peduncle by a membrane; interorbital space a little shorter than distance from eye to posterior nostril; pelvics inserted under or a trifle in front of dorsal origin; pectoral spine reaches to middle of pelvics; nasal flap ending in a barblet; barbel reaches to gill opening; pelvics extending one-half way to anus (Magdalena system, Colombia).....***Astroblepus chapmani*** (Eigenmann)
- 6b. Teeth of only upper jaw incisors, those of lower jaw bilobed; adipose fin without spine or with it embedded and only tip showing; pelvics extending one-half to two-thirds way to anus; pectorals extending one-third to one-half way out pelvics; nasal flap not ending in a barbel.
- 7a. Pelvics inserted considerably in advance of dorsal origin; maxillary barbel reaching to rear of lip or one-half way to gill opening; adipose fin with spine embedded but showing; interorbital space equals distance from eye to posterior nasal opening (Río Negro in Colombia).
Astroblepus latidens Eigenmann
- 7b. Pelvics inserted under or almost under dorsal origin; adipose fin without an evident spine.
- 8a. Interorbital about equal to distance from eye to posterior nasal opening; maxillary barbel reaching about three-quarters to four-fifths way to gill opening; pelvics reach two-thirds way to anus (Peru).....***Astroblepus simonsi*** (Regan)
- 8b. Interorbital a little less than distance from eye to posterior nasal opening; pelvics reaching one-half to three-fifths way to anus (Peru).....***Astroblepus peruanus*** (Steindachner)
- 1b. In outer row all lateral teeth on premaxillary unicuspid, but sometimes blunt pointed, often one or two pairs of bicuspid teeth occurring at midline.
- 9a. Adipose fin absent or almost absent, at least not developed enough to be definitely evident; pelvics inserted under dorsal origin; maxillary barbel extending three-quarters to four-fifths way to gill opening; pelvics reaching two-thirds to three-quarters way to anus; interorbital space a little less than distance from eye to posterior nasal opening; pectorals extending one-third to one-half way out pelvics; nasal flap without barbel (Peru and Ecuador).....***Astroblepus vanceae***¹⁸ (Eigenmann)
- 9b. Adipose fin developed, with a free spine or with it embedded in adipose tissue of fin or with it absent.
- 10a. Insertion of pelvics considerably in advance of a vertical line through origin of dorsal fin; interorbital space a little narrower than distance from eye to posterior nasal opening.

¹⁸ To this species I refer as a synonym *Astroblepus mariae* (Fowler).

- 11a. Adipose fin well developed, with spine absent or embedded; barbel short, barely reaching to opposite rear margin of lower lip; teeth in outer row of premaxillary broadly unicuspid; pelvics reaching one-half to two-thirds way to anus; pectorals reaching one-third way out along pelvics; no nasal barbel on flap; anus usually a little closer to base of pelvics than base of caudal fin.
Astroblepus orientalis (Boulenger)
- 11b. Adipose fin with an obvious spine and usually connected by a membrane to caudal peduncle.
- 12a. Maxillary barbel reaching to gill opening, pelvics extending three-fourths way to anus; pectorals extending two-thirds out pelvics; nasal flap without barbel (Canelos, Ecuador).
Astroblepus boulengeri (Regan)
- 12b. Maxillary barbel reaching not more than one-half distance to gill opening or to opposite lower lip.
- 13a. Pectorals reaching one-third to two-fifths way out pelvics; nasal flap with a small barbel; barbel reaching halfway to gill opening; pelvics reaching four-fifths way to anus; color pattern in young with three pale bars, but in adults reduced to a single bar across caudal peduncle (Balsas, Peru).
Astroblepus supramollis Pearson
- 13b. Pectorals reaching one-half to four-fifths distance out pelvics; nasal flap triangular without barbel.
- 14a. A pale bar across caudal peduncle in adults and three in young; premaxillary teeth broadly pointed; pelvics reach two-thirds way to anus; maxillary barbel reaches to rear of lower lip (Río Dagua, Colombia).
Astroblepus trifasciatus (Eigenmann)
- 14b. No pale bars on body; teeth pointed; maxillary barbel reaching halfway to gill openings.
- 15a. Lips very thick and wide; pelvics reach three-fourths way to anus (Balsas, Peru)-----*Astroblepus labialis* Pearson
- 15b. Lips normal; pelvics reach two-thirds way to anus (Río Dagua, Colombia)----*Astroblepus retropinna* (Regan)
- 10b. Insertion of pelvic fins a trifle in front, directly under, or a little behind origin of dorsal fin.
- 16a. First ray of pectorals long, reaching to tips of pelvics or beyond, pelvics long too, the first ray reaching to anus or beyond; adipose fin elongate without a spine or spine completely embedded; teeth on outer row of premaxillary broadly pointed, and in large adults, 140 mm. long, some of teeth may be bilobed; maxillary barbel reaching to gill opening or a little beyond; interorbital equal to or a trifle shorter than distance from eye to margin of posterior nostril; anus about one-third to three-eighths closer to pelvic base than to caudal fin base; nasal flap ending in a short barbel (Peru to Colombia)-----*Astroblepus longifilis*¹⁹ (Steindachner)
- 16b. First ray of pectorals not reaching to tips of first ray of pelvics, usually not more than three-fourths way out pelvics.
- 17a. Adipose fin without spine, or spine completely embedded, or with tip of spine showing.
- 18a. Maxillary barbel reaching to gill opening or beyond.

¹⁹ To this species I refer as a synonym *A. heterodon* (Regan).

- 19a. Interorbital space equal to or a little greater than distance from eye to margin of posterior nasal opening.
- 20a. Nasal flap without a barbel at its tip; pelvics reaching a little beyond anus; pectorals reaching three-fourths way out pelvics.
- 21a. Spine of adipose fin embedded, its tip sometimes showing (Ecuador, Colombia, northern Venezuela).
*Astroblepus chotae*²⁰ (Regan)
- 21b. No trace of spine in adipose fin.
Astroblepus pirrense (Meek and Hildebrand)
- 20b. Nasal flap with a short barbel at its tip; pelvics reach to anus; pectorals extend halfway out pelvics (Peru).
Astroblepus rosei Eigenmann
- 19b. Interorbital space a little less than distance from eye to margin of posterior nasal opening.
- 22a. Pelvics reaching two-thirds way to anus; pectorals reaching two-thirds way out pelvics; triangular nasal flap without a barbel at its tip (Peru to Colombia).
Astroblepus taczanowskii (Boulenger)
- 22b. Pelvics reaching to anus or a little beyond; pectorals one-third to one-half way out pelvics; nasal flap sometimes with a small barbel (Ecuador to Colombia).
*Astroblepus grixalvii*²¹ Humboldt
- 18b. Maxillary barbel not reaching to gill opening.
- 23a. Pelvics reaching to anus or beyond; interorbital space a little shorter than distance between eye and margin of posterior nasal opening; nasal flap without a barbel.
- 24a. Maxillary barbel reaching halfway to gill opening; pectorals extend to middle of pelvics (Peru and Ecuador).
*Astroblepus sabalo*²² (Cuvier and Valenciennes)
- 24b. Maxillary barbel reaching three-fourths to four-fifths way to gill opening; pectorals extending two-thirds to three-fourths way out pelvics (Magdalena system).....*Astroblepus micresens* Eigenmann
- 23b. Pelvics not reaching to anus; nasal flap without barbel at its tip.
- 25a. Maxillary barbel relatively long, reaching three-fourths to four-fifths way to gill opening; no pale bar across caudal peduncle; pectorals extending two-thirds way out pelvics; interorbital space a little narrower than distance from eye to rim of posterior nasal opening; pelvics reaching two-thirds to three-fourths way to anus (Peru and Bolivia).
Astroblepus longiceps Pearson
- 25b. Maxillary barbel short reaching not over halfway to gill openings, usually about opposite the lower lip.
- 26a. Pelvics reaching only halfway to anus; interorbital space a little wider than distance from eye to

²⁰ To this species I refer as a synonym *A. marmoratus* (Regan).

²¹ To this species I follow Eigenmann and refer as synonyms the following species: *A. prenatalis* (Cuvier and Valenciennes); *A. brachycephalus* (Günther); *A. vailanti* (Regan); *A. regani* (Pellegrin); *A. whympersi* (Boulenger); *A. eigenmanni* (Regan).

²² I refer to this species as a synonym *A. ubidiai* Pellegrin, which was described from Lake St. Paul.

posterior nasal opening; pectorals extending one-third way out pelvics; anus five-elevenths or five-twelfths closer to pelvic base than base of caudal fin; no pale bar across caudal peduncle (Peru).

Astroblepus praeliorum Allen

- 26b. Pelvics extending two-thirds to four-fifths way to anus; interorbital space a little narrower than distance from eye to rear margin of posterior nasal opening; a pale bar across caudal peduncle below spine of adipose fin; pectorals extending one-third to one-half way out pelvics; premaxillary teeth in outer row broadly pointed (Peru to Colombia).

*Astroblepus frenatus*²³ Eigenmann

- 17b. Adipose fin with spine movable and connected by a membrane to dorsal surface of caudal peduncle, or continuation of adipose tissue.
- 27a. Pelvics reaching to anus; interorbital space equal to or a little greater than distance from eye to margin of posterior nasal opening; barbel reaches out to last fifth before gill opening; nasal flap sometimes with a short barbel.

- 28a. A pale color bar across peduncle; maxillary barbel reaching to gill opening; pectorals reach one-fourth to middle of pelvics (Ecuador and Colombia).

*Astroblepus cyclopus cyclopus*²⁴ (Humboldt)

- 28b. A pale color bar across caudal peduncle; maxillary barbel not quite reaching to gill opening; pectorals reaching only to base of pelvics (Ríos Dagua and San Juan).

*Astroblepus cyclopus cirratus*²⁵ (Regan)

- 28c. No pale color bar across caudal peduncle (Santander, Colombia)-----*Astroblepus cyclopus santanderensis* Eigenmann

- 27b. Pelvics not reaching to anus; interorbital space two-thirds to equal to distance from eye to margin of posterior nasal opening; no barbel at tip of nasal flap.

- 29a. Maxillary barbel extends four-fifths way to gill opening; pectorals extend to middle of pelvics; a pale bar across the caudal peduncle (Río Dagua and Magdalena systems).

Astroblepus unifasciatus (Eigenmann)

- 29b. Maxillary barbel reaching to rear of lower lip or a trifle farther, not over halfway to gill opening; no definite pale bar across caudal peduncle, but region just behind and below the adipose spine pale; body plain grayish or with black spots, or sometimes marbled; anus halfway between insertion of pelvics and base of caudal fin or a little closer to base of pelvics.

Astroblepus phelpsi, new species

ASTROBLEPUS ORIENTALIS (Boulenger)

Arges orientalis BOULENGER, Ann. Mag. Nat. Hist., ser. 7, vol. 11, p. 601, 1903 (Albirregas and Milla Rivers above Mérida, Venezuela).—REGAN, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 313, pl. 21, fig. 4, 1904 (Albirregas and Milla Rivers above Mérida).

²³ To this species I refer *A. mancoi* Eigenmann as a synonym.

²⁴ To this species I refer as a synonym *A. chimborazoi* Fowler.

²⁵ I follow Eigenmann and refer *A. ventrale* (Eigenmann) to this species as a synonym.

The following specimens were collected by Leonard P. Schultz in the Maracaibo Basin during 1942:

U.S.N.M. No. 121125, Río Gonzáles, tributary to Río Chama at La Gonzáles, Estado de Mérida, March 29, 78 specimens, 18.5 to 60.5 mm.

U.S.N.M. No. 121124, Río Chama at Estanques, Estado de Mérida, April 3, 1 specimen, 45.7 mm.

U.S.N.M. No. 121123, Río Barregas, tributary to Río Chama just below Egido, Estado de Mérida, March 29, 2 specimens, 28.5 and 47 mm.

ASTROBLEPUS CHOTAE (Regan)

Arges chotae REGAN, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 313, pl. 21, fig. 5, 1904 (Chota Valley, Marañon Basin, northern Peru).

Three of the specimens listed below from the Río Cobre were measured, and the data are presented in table 12.

U.S.N.M. No. 121129, Río Cobre, above its mouth, tributary to Río Quinta, latter tributary to Río La Grita, Catatumbo system, March 31, 1942, Leonard P. Schultz, 9 specimens, 35 to 93.5 mm.

U.S.N.M. No. 101617, Río Pamplonita, near Cucuta, Colombia, Maracaibo Basin, Nicéforo María, 1 specimen, 60 mm.

ASTROBLEPUS FRENATUS Eigenmann

Astroblepus frenatus EIGENMANN, Proc. Amer. Philos. Soc., vol. 56, p. 676, 1918 (Quebrada de San Joaquín, Santander, Colombia).

U.S.N.M. No. 121128, Río Torbes, 1 km. above Táriba, Venezuela, Orinoco drainage, collected by Leonard P. Schultz, March 31, 1942, 72 specimens, 20.5 to 52.5 mm.

ASTROBLEPUS PHELPSI, new species

PLATE 7, D

Holotype.—U.S.N.M. No. 121126, a male specimen 53.6 mm. in standard length, collected by Leonard P. Schultz, March 31, 1942, in the Río Cobre above its mouth near La Grita, tributary of Río Quinta, latter tributary to Río La Grita, Catatumbo system, Venezuela.

Paratypes.—U.S.N.M. No. 121127, 550 specimens, 9 to 65 mm., collected along with the holotype and bear the same data.

These types were taken from among rubble in rapidly flowing water.

Description.—The holotype and two paratypes, male and female, were measured, and data for these, expressed in hundredths of the standard length, are recorded in table 12. In addition certain counts were made, and these are presented in table 13.

The head is contained about 4 times in the standard length, and the greatest depth at origin of dorsal about 4 times; the insertion of the pelvics is nearly under the origin of the dorsal; premaxillary teeth unicuspid but blunt-pointed in outer row, but as is usual in this genus one or two pairs of the median teeth may be bilobed, outer row of teeth on each ramus numbers seven or eight; teeth of lower jaw all

strongly bilobed; interorbital space a little narrower than the distance from the eye to the rim of the posterior nasal opening; maxillary barbel short, scarcely reaching as far back as opposite the rear margin of the lower lip; all the lips finely papillate; anus five-elevenths to five-twelfths closer to the insertion of the pelvics than to the midbase of the caudal peduncle; adipose fin elongate, with a spine partly embedded but the tip is connected by a membrane to the caudal peduncle, which sometimes appears to be a continuation of the adipose fin; first ray of dorsal not extending beyond the branched rays, this fin short, contained 2 times in distance from insertion of pelvics to origin of anal fin; pectorals short, reaching about one-fourth the way out the short pelvics, the latter extending three-fourths the way to the anus, tips of first rays of pelvics, pectorals, and caudal very slightly elongate; snout $1\frac{1}{2}$ in the head; eye small, $2\frac{1}{4}$ to 3 times in the interorbital space.

Color.—Variable, usually plain grayish with a pale area at adipose spine, or the body may be mottled to brown or black spotted; caudal fin barred; sometimes on small specimens the pale area at adipose spine extends as a broken pale bar across the caudal peduncle, and a similar pale bar across middle of caudal fin, belly pale.

TABLE 12.—Measurements, in hundredths of the standard length, for species of *Astroblepus* from the Maracaibo Basin

Character	<i>Astroblepus phelpsi</i>			<i>Astroblepus chotae</i>		
	Paratype	Holotype	Paratype			
Standard length (in mm.).....	64	53.6	35.6	93.5	64.7	47.6
Length of head to gill opening.....	25.8	27.4	28.1	25.6	26.0	26.0
Width of head at base of pectorals.....	25.3	25.9	28.4	28.4	28.6	28.6
Length of maxillary barbel.....	10.9	8.58	8.70	16.0	17.9	16.2
Postorbital length of head.....	6.72	7.28	7.02	7.49	7.73	6.93
Greatest depth.....	20.3	20.5	19.9	23.0	22.4	21.8
Length of snout.....	18.1	18.6	19.7	17.6	17.3	17.0
Diameter of eye.....	2.03	2.05	3.09	2.24	2.63	3.36
Width of interorbital.....	5.78	6.90	7.30	6.95	8.04	7.98
Distance from eye to rear nostril.....	9.22	7.28	8.14	6.95	7.11	6.51
Width of ramus of upper jaw.....	7.50	7.10	7.30	6.20	7.42	6.51
Width of gape of mouth.....	13.3	13.2	13.2	12.9	12.4	11.3
Distance from anus to anal origin.....	11.4	11.6	10.1	14.6	13.4	12.8
Tip of snout to anus.....	71.9	67.4	69.1	64.6	68.0	65.1
Tip of snout to dorsal origin.....	42.6	45.0	45.2	47.0	42.6	43.9
Tip of snout to anal origin.....	84.6	78.4	77.2	79.4	78.6	78.0
Tip of snout to pectoral insertion.....	26.6	28.2	30.9	30.2	28.6	27.1
Tip of snout to pelvic insertion.....	43.9	43.8	43.0	39.1	44.2	41.0
Length of first dorsal ray.....	17.5	18.1	21.3	20.1	22.7	21.0
Length of first anal ray.....	11.8	13.6	15.7	12.4	13.8	17.2
Length of first pelvic ray.....	20.5	21.5	22.8	21.9	23.5	21.4
Length of first pectoral ray.....	20.6	24.4	22.5	31.0	32.8	30.7
Length of longest upper caudal ray.....	25.5	25.9	28.9	26.1	31.1	33.2
Length of shortest middle caudal ray.....	18.6	18.8	21.9	19.8	18.9	22.1
Length of caudal peduncle.....	18.3	17.7	16.9	16.0	16.1	17.0
Least depth of caudal peduncle.....	14.1	14.9	13.2	-----	-----	-----

Remarks.—This new species may be distinguished from others referred to the genus *Astroblepus* by the key to the species prepared for this genus, pages 278–282.

Named *phelpsi* in honor of William H. Phelps, of Caracas, who is a well-known leader in furthering the development of the biological sciences in Venezuela.

TABLE 13.—Counts made on two species of *Astroblepus*

Species	Number of fin rays							Number of branched rays in caudal fin
	Dorsal		Anal	Pectoral			Pelvic	
	i, 6	i, 7	i, 6	i, 9	i, 10	i, 11	i, 4	
<i>phelpsi</i>	31	-----	13	1	10	2	10	3
<i>chotae</i>	7	2	9	4	8	-----	6	3

Family LORICARIIDAE

KEY TO THE GENERA OF LORICARIIDAE REPORTED FROM VENEZUELA BASED ON SPECIMENS FROM THAT AREA

- 1a. Eyes on dorsal surface of head and not at all visible from below; bones of pectoral arch not exposed that connect across ventral side of body between pectoral fin bases.
- 2a. Caudal peduncle not greatly depressed and elongate, but if present rounded or triangular or compressed; adipose fin represented by a spine; no notch in posterior part of orbit; snout not greatly produced or pointed; plates in lower lateral series 30 or fewer.
- 3a. Width of ramus of lower jaw contained fewer than $1\frac{1}{2}$ times in interorbital space, usually the two being nearly equal in length and width; belly naked; teeth, bilobed, very numerous, about 100 to 150 on each ramus of jaw; dorsal origin a little in advance of a vertical line through insertion of pelvics; dorsal rays I, 7 to I, 9; anal I, 2 to I, 5; plates along lower sides 23 to 27.
- 4a. At least one-fourth of anterior dorsal surface of snout naked and without barbels; interopercle and opercle separately movable, former with short evertible spines, sometimes with curved or hooked tips..... *Chaetostoma* Heckel
- 4b. Snout bony to its tip; interopercle and opercle separately movable, former with graduated elongate, hooked spines not arranged in a rosette, but evertible..... *Pseudancistrus* Bleeker
- 3b. Width of ramus of lower jaw contained more than $1\frac{3}{4}$ times in interorbital space, usually 2 to 5 times.
- 5a. Dorsal rays I, 10 to 15; anal I, 3 or I, 4; interopercle and opercle moderately but not independently movable, former sometimes with spines or with spines rudimentary; dorsal origin in front of the pelvic insertion; plates keeled; teeth numerous, bilobed.
Pterygoplichthys Gill
- 5b. Dorsal rays I, 6 to I, 8 (usually I, 7); anal I, 3 to I, 5.

6a. Anterior fourth or more of upper surface of snout naked and with barbels at least in males well developed; in females snout bonier and barbels sometimes absent; interopercle and opercle separately movable, former with graduated evertible spines with tips hooked; belly naked; teeth with elongate bilobed tips; dorsal a little in front of pelvics; about 23 to 26 plates in lower lateral series.

Ancistrus Kner

6b. Anterior dorsal surface of snout bony, except on a few species with tip of snout having a roundish naked patch not much larger, sometimes smaller than orbit.

7a. Teeth usually 3-3 on premaxillaries and 6 to 12+6 to 12 on dentaries, tips elongate but not spoon-shaped; interopercle with a bunch of spines with curved tips; dorsal I, 7; anal I, 3 to I, 5; pectoral I, 5 or I, 6; lateral scutes about 24 to 26.

Lithoxus Eigenmann

7b. Teeth in ramus of each jaw number 5 to 16, expanded tips spoon-shaped or cupped, with or without a smaller lobe; dorsal rays always I, 7; anal I, 4; no barbels on tip of snout.

8a. Interopercle and opercle separately movable, former with graduated, elongate, evertible spines, except in young; about 6 to 8 cup-shaped teeth on ramus of each jaw; belly covered with platelets, except on young; dorsal origin nearly over insertion of pelvics; 24 to 26 plates in lower lateral series.

Panaque Eigenmann and Eigenmann

8b. Interopercle and opercle slightly but not independently movable; spines on interopercle absent or obsolete; dorsal origin a little in front of a verticle line through insertion of pelvics; 25 to 28 plates in lower lateral series; color of upper surfaces usually consisting of numerous dark spots, these sometimes occurring on belly.....*Cochliodon*²⁶ Heckel

7c. Teeth in each ramus of jaws number more than 20, usually 25 to 65, and expanded tips are elongate and bilobed; dorsal origin in front of that of pelvics.

9a. Interopercle and opercle separately movable, former with a rosette of graduated spines with hooked tips and long slender bristles arranged around outer margin of spines; dorsal I, 7; anal I, 5; plates in lower lateral series 24 or 25; belly naked.....*Lasiancistrus* Regan

9b. Spines and bristles on interoperculum, if present, not arranged in pattern of a rosette; belly with latelets except in young.

10a. Interopercle and opercle separately but moderately movable, former with short or elongate evertible spines; plates along lower sides 26 to 28 in number.

Hemiancistrus Bleeker

10b. Interopercle and opercle slightly but not independently movable; interopercle without spines, or spines obsolete; plates along lower sides about 28 in number.

Hypostomus Lacepède

²⁶ On the young up to a standard length of about 50 mm. the unworn teeth of my specimens from the Maracaibo Basin have their expanded tips twice as long as wide and a small lobe on the outer side, but in those about 60 mm. the lobe seems to have fused with the rest of the tooth as it wears down to half its original length; the teeth on the lower jaw lack the second small lobe at a much shorter length, it appears, therefore, from the specimens available, that one must cast serious doubt on the validity of the genus *Cheiridodus* Eigenmann.

- 2b. Caudal peduncle greatly depressed and sometimes almost knifelike; adipose fin lacking; snout may be greatly produced and pointed; interopercle and opercle not separately movable; dorsal surface of snout bony; spines absent on interopercle, except bristles on males.
- 11a. Teeth on each ramus of jaws about 4 to 13; a more or less distinct notch at posterior dorsal corner of orbit; dorsal origin over insertion of pelvis; plates in lower lateral series 28 to 31.
- 12a. Teeth with elongate bilobed tips.....**Loricaria** Linnaeus
- 12b. Tips of teeth with both lobes spoon-shaped, inner lobe largest.
Spatuloricaria, new genus
- 11b. Bilobed teeth on ramus of each jaw 15 to 40; no notch at rear of orbit; plates in lower lateral series 32 to 37; belly plated.
- 13a. Dorsal origin nearly over anal origin; 8 or 9 plates between dorsal and supraoccipital; teeth 15 to 29 on each ramus of jaws.
Farlowella Eigenmann and Eigenmann
- 13b. Dorsal origin nearly over insertion of pelvis; 4 plates in front of dorsal; teeth 30 to 40 on each ramus of jaws...**Sturisoma** Swainson
- 1b. Eyes at sides of head situated so that they are visible from below as well as from dorsal aspect; bones exposed on under side of body that connect between base of pectorals, in two series of one pair each; adipose a rudimentary spine; snout depressed; teeth numerous, bifid in a single row; 23 or 24 plates along sides.....**Hypoptopoma** Günther

Genus CHAETOSTOMA²⁷ Heckel

Chaetostoma HECKEL, in Tschudi, Fauna Peruana, Ichthyologie, p. 26, 1846.
(Type, *C. lobarhyncha* Tschudi.)

KEY TO THE SPECIES OF CHAETOSTOMA REPORTED FROM VENEZUELA

- 1a. A small, fleshy, usually blackish keel at rear tip of supraoccipital plate; dorsal rays I, 8; anal I, 5; usually 4 or 5 hooked spines on interopercle; blackish spots on membranes of dorsal fin between rays and not on rays.
- 2a. About 25 to 28 marginal lappets on rear edge of lower lip; a group of about 3 short papillae inside of mouth about two-thirds way out from midline on plate; a similar group but longer papillae about halfway out on plate of lower jaw; upper surface of head anteriorly with numerous small darkish spots, none on body; a black spot on the membrane between base of dorsal spine and first soft ray and fainter dark spots, mostly on membrane and naked area at base of fin near base of each soft ray; 5 or 6 dark spots on membranes between dorsal rays and not on rays; other fins mostly plain pale; caudal fin deeply concave, color plain, with dark pigment evident near tips of middle rays forming an obscure dark band across rear edge of caudal, except white tips of upper and lower lobes.....**Chaetostoma tachiraensis**, new species
- 2b. Dorsal surface of head and that of body everywhere covered with numerous blackish spots, those on sides of body arranged in about 4 to 6 rows; caudal fin only slightly concave, tips of upper and lower lobes white; about 16 to 22 marginal lappets on rear edge of lower lip; inside of mouth about halfway out on plate of upper jaw a group of 3 or 4 papillae, sometimes lacking; those on plate of lower jaw well developed.

Chaetostoma milesi Fowler

²⁷ The specimen reported upon by Myers as *C. anomalus* Regan from the upper Rio Meta system, Guacaramo, Colombia, is without doubt some other species and should not be associated with the true *C. anomala* of the Maracaibo Basin.

1b. No fleshy keel at posterior edge of supraoccipital plate; if dark color bars present on dorsal fin, color occurring on rays, not as round dark spots on membranes between rays; dorsal surface of head and of body without dark spots.

3a. Anal rays I, 4; dorsal I, 8; about 4 or 5 hooked spines on interopercle.

4a. A dark spot on membrane between dorsal and first soft ray; upper surface of head with some pale areas; pectoral fin with 2 or 3 cross bars; eye 5 to 7 times in head.

*Chaetostoma guairensis*²⁸ Steindachner

4b. Eye diameter 10 times in head; no black spots anywhere along base of dorsal fin..... *Chaetostoma stanni* Lütken

3b. Anal rays usually I, 3 or I, 4, rarely I, 5; dorsal rays I, 7 to I, 9; about 5 to 10 spines on the interopercle, these spines nearly straight, except a little hooked in *pearsei*.

5a. Dorsal rays I, 8 or I, 9; anal I, 4 occasionally I, 3.

6a. A distinct black spot on membrane between dorsal spine and first soft ray, but no such spots near base of following soft rays.

7a. Usually 3 (2 to 4) dark bars across upper rays of caudal fin; eye contained in interorbital space 2.3 to 3.0 times; Río Motatán system, Maracaibo Basin.

Chaetostoma anomala sovichthys, new subspecies

7b. Usually 4 (3 to 5) dark bars across upper rays of caudal fin; eye 2.6 to 3.2 in interorbital space.

Chaetostoma anomala anomala Regan

6b. No black spots at bases of dorsal rays; dorsal fin rays I, 9, anal I, 4; upper parts with faint light spots... *Chaetostoma pearsei* Eigenmann

5b. Dorsal I, 7, anal I, 4; a black spot on membrane between dorsal spine and next ray and on membrane near base of each following ray.

Chaetostoma nudirostris Lütken

CHAETOSTOMA TACHIRAENSIS, new species

CORRONCHO

PLATE 7, B, C

Holotype.—U.S.N.M. No. 121052, a specimen 58.6 mm. in standard length collected by Leonard P. Schultz in the Río Táchira 7 km. north of San Antonio, Estado de Táchira, Venezuela, on April 1, 1942. The Río Táchira is a tributary of the Río Zulia, Catatumbo system, Maracaibo Basin.

Paratype.—U.S.N.M. No. 101612, a specimen 87.0 mm. in standard length collected by Nicéforo María in the Río Pamplonita, near Cucuta, Colombia, Catatumbo system, Maracaibo Basin.

Description.—Based on the holotype and paratype; all measurements are given in hundredths of the standard length, those for the paratype in parentheses. Standard length (in mm.) 58.6 (87.0); total length 83.0 (—) mm.

²⁸ Although I have not seen material of this species, I am inclined to believe that it was based on an immature specimen and may be the same as *milesi* or my *tachiraensis*.

TABLE 14.—Counts and measurements made on the species and subspecies of *Chaetostoma* from the Maracaibo Basin

Species and locality	Number of fin rays					Number of dark bars across upper half of caudal fin			Number of times eye is contained in interorbital space														
	Dorsal			Anal		2	3	4	5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	
	I,7	I,8	I,9	I,2	I,3																		I,4	I,5
<i>anomala anomala</i> :																							
Rfo Chama.....	2	13			2	13										1			2	4	2	1	
Rfo Barregas.....		6				6		1	11	1													
Rfo Chama (Regan).....	15	197	23	2	47	186																	
Total.....	17	216	23	2	49	205		1	11	1					1			2	4	2	1		
<i>anomala sorichthys</i> :																							
Rfo San Pedro.....		15			3	12	2	10	2				2		2	1	1	3		2			
Rfo San Juan.....		5	1			6																	
Rfo Motatán.....	1	5				6	1	6						1	1	2							
Total.....	1	25	1		3	24	3	16	2				2	1	3	3	1	3		2			
<i>tachiraensis</i>			2				2							1			1						
<i>milesi</i>		4					4				1			1									

TABLE 15.—Measurements, in hundredths of the standard length, made on various species of *Chaetostoma*

Characters	<i>anomala sorichthys</i>	<i>enomala anomala</i>			<i>tachiraensis</i>		<i>fisheri</i> (Panama)	<i>milesi</i>	
					Holo-type	Para-type		Honda, Colombia	Rfo Guarico
Standard length.....	43.2-72.0	82.5	44.2	61.1	58.6	87.0	76.6	89.0	108.5
Greatest depth body.....	16.9-18.7	19.5	17.9	19.1	20.5	21.3	17.0	18.2	21.2
Width head at coracoids.....	36.6-40.2	39.3	37.6	35.1	35.4	35.6	30.3	32.8	32.9
Length head (to supraoccipital).....	34.7-37.3	33.4	35.7	36.0	36.0	33.6	31.1	34.5	32.0
Snout.....	24.5-28.0	24.6	25.1	24.5	24.9	24.3	21.0	24.3	22.6
Interorbital.....	11.5-12.7	11.6	12.4	12.6	12.5	12.4	10.4	10.3	10.7
Eye.....	4.20-5.09	3.64	4.75	4.58	5.12	4.55	4.57	4.72	4.06
Length caudal peduncle.....	22.2-26.9	27.9	25.1	25.0	26.3	29.0	28.9	28.7	24.9
Least depth caudal peduncle.....	11.8-12.3	12.2	12.2	13.3	14.7	14.6	12.0	12.8	13.2
Length first ray dorsal.....	18.7-22.5	21.2	24.4	23.7	28.5	29.1	27.5	26.1	27.2
Length last ray dorsal.....	16.4-20.1	16.5	14.9	17.2	16.6	17.4	14.6	16.6	16.8
Length outer upper ray caudal.....	18.5-25.0	24.4	28.5	27.5	35.0		26.1	30.2	29.5
Length first ray caudal.....	26.8-32.4	29.6	34.2	33.4	40.3		33.3	36.6	35.0
Length pectoral spine.....	24.5-27.1	25.2	25.3	26.4	30.9	35.4	28.1	28.5	28.9
Longest ray anal.....	8.10-9.51	9.94	10.2	8.84	12.0	12.8	12.4	13.7	12.0
Length ramus lower jaw.....	10.1-10.9	11.5	12.0	12.6	12.0	12.5	9.00	10.3	10.6
Distance nostrils to snout.....	18.5-25.0	17.0	17.2	19.3	17.0	18.6	15.0	17.1	16.8
Distance nostrils to eye.....	5.32-6.48	5.54	6.70	6.3	5.12	5.98	4.30	4.72	5.13
Distance snout to origin dorsal.....	46.5-48.6	46.8	48.2	48.2	48.1	44.3	42.0	44.8	42.4
Distance snout to origin anal.....	69.6-74.1	69.7	72.4	71.8	70.3	69.5	67.4	71.6	61.3
Distance snout to origin adipose.....	82.4-85.7	83.1	83.7	83.8	83.7	84.0	80.4	81.0	77.0
Length base of dorsal fin.....	25.2-26.6	26.7	27.1	27.1	27.5	25.6	22.2	25.0	25.0
Eye to rear edge temporal plate.....	8.40-9.20	8.12	8.60	7.69	8.88	10.5	8.50	8.20	7.92
Snout to gill opening.....	30.6-34.0	32.2	30.6	31.1	29.2	28.4	25.5	27.6	27.5

Width of head at base of humeral process or coracoids 35.4 (35.6); length of head from tip of snout to posterior end of supraoccipital plate 36.0 (33.6); length of head from snout to rear of temporal plate 37.9 (34.6); tip of snout to upper edge of gill opening 29.2 (28.4); greatest depth of body 20.5 (21.3); length of snout 24.9 (24.3); width of fleshy interorbital space 12.5 (12.4); diameter of eye 5.12 (4.55); length from base of last anal ray to midbase of caudal fin rays 26.3 (29.0); least depth of caudal peduncle 14.7 (14.6); length of ramus of lower jaw 12.0 (12.5); greatest width of lower lip 6.49 (6.55); rear edge of eye to posterior edge of temporal plate opposite first lateral line pore 8.88 (10.5); length of first ray of dorsal fin 28.5 (29.1); length of last ray of dorsal 16.6 (17.4); length of pectoral spine 30.9 (35.4); length of upper ray of caudal fin 35.0 (—); length of lower ray of caudal fin 40.3 (—); length of ray of adipose fin 11.1 (10.8); length of longest anal fin ray 12.0 (12.8); length of base of dorsal fin 27.5 (25.6); distance from bony edge of nasal opening to tip of snout 17.0 (18.6); distance from edge of nasal opening to eye 5.12 (5.98); tip of snout to origin of dorsal fin 48.1 (44.3); tip of snout to origin of anal fin 70.3 (69.5); tip of snout to origin of adipose 83.7 (84.0); distance from anus to anal origin 8.20 (9.30).

The following counts were made: Dorsal rays I,8 (I,8), anal I,5 (I,5); pelvic I,5 (I,5); pectoral I,6 (I,6); series of lateral scutes 24 (24); pores in lateral line 25 (25); interopercle with 4 (5) hooked spines; about 6 (8) spines on operculum; 11 (12) scutes between anal and base of caudal; 5 (5) scutes between dorsal and adipose and 4 (4) in front of dorsal.

The body is short and its width broad as in *C. anomala*; the width at coracoids is equal to the distance from tip of snout to rear of supraoccipital plate and is contained 2.9 times in the standard length; a small dermal keel, a little longer than pupil, lies along middorsal line at rear tip of the supraoccipital plate; interorbital space about 1% in the snout; eye 2½ in interorbital space and 4% in the snout; length of depressed anal a little longer than the width of interorbital space; plates all prickly; dorsal spine not much larger than the soft rays; pectoral spine enlarged with strong spines; soft rays of pelvics and pectorals with prickles; anterior third of snout fleshy, without plates, but with small folds; lips papillate; belly naked; a barbel at each corner of the mouth; a narrow naked area along base of dorsal, but along base of adipose the naked area is obsolete; intestines much coiled; peritoneum blackish; caudal fin deeply concave, the upper lobe equal to distance from snout to rear of supraoccipital.

Color.—Grayish brown above paler below; top of head and sides with small dark spots caudal plain grayish, as in many specimens of *C. anomala anomala* and *C. anomala sovichthys*, but the forked caudal

has pale tips to the upper and lower caudal lobes; the middle rays at tips are slightly blackish, interradiial membranes of caudal with black pigment; a somewhat diffuse yet distinct dark streak along midsides; traces of four dark saddles on back, one in front of dorsal, the second at front of dorsal, third at rear of dorsal, fourth through adipose base and on caudal peduncle; pectoral spines blackish above; pelvics plain like body; the conspicuous black spot between dorsal spine and first branched ray is present but smaller, then less distinct dark spots occur on the naked area of body between the bases of each soft dorsal ray, the pigment extends a trifle on the base of the interradiial membranes; membranes between soft dorsal rays with five or six dark spots, the rays pale

Named *tachiraensis* for the river in which it was taken.

Remarks.—This new species may be distinguished from all other species of *Chaetostoma* by the small dermal fold or keel at rear tip of the supraoccipital, this keel about equal in length to diameter of pupil. Fowler (Proc. Acad. Nat. Sci. Philadelphia, vol. 91, p. 238, figs. 28, 29, 1940) describes *C. furcata* from Peru as having a bony protuberance at rear tip of supraoccipital, but in *tachiraensis* this is a dermal keel. *C. furcata* has I, 4 anal and I, 7 dorsal rays, while the new species has I, 5 and I, 8 rays, respectively. The color pattern of small dark spots anteriorly on head and with the pigment spot on the interradiial membranes of the dorsal instead of on the rays is characteristic of this new species. The species most closely related to *tachiraensis* is Fowler's *C. milesi* (Notulae Naturae, No. 73, p. 2, figs. 1-5, 1941) described from Honda, Colombia. This species is represented by three specimens in U.S.N.M. No. 116467, measuring 64 to 89 mm. in standard length, from the Magdalena River, Honda, Colombia. Regan's species *C. thomsoni* (Trans. Zool. Soc. London, vol. 17, pt. 3, p. 250, pl. 14, fig. 2, 1904), from Villeta, Colombia, is very similar to *C. milesi* Fowler. However, both of these species differ in color; the dorsal fin of *C. tachiraensis* has the color spots on the membranes of the dorsal instead of on the rays as in *C. thomsoni*, there is a lateral dark band on *tachiraensis*, but in *C. milesi* there are about four rows of small dark spots along the sides; all three specimens of *milesi* before me agree with Fowler's figures, except there are no spots on the dorsal membranes. The caudal fin is much less concave in *milesi* and *thomsoni* than in *tachiraensis*, it is almost forked in the latter.

CHAETOSTOMA MILESI Fowler

Chaetostoma milesi FOWLER, Notulae Naturae, No. 73, p. 2, figs. 1-5, 1941 (Honda, Colombia).

U.S.N.M. No. 121051, 2 specimens, 98 and 130 mm., from Río Guárico (Orinoco system) and tributaries between San Sebastián and San Casimiro, Estado de

Aragua, Venezuela, collected by Leonard P. Schultz, W. H. Phelps, Jr., Roger Sherman, and G. Zuloaga, May 12, 1942.

U.S.N.M. No. 116467, from Magdalena River, near Honda, Colombia, collected by Cecil Miles.

Measurements for this species are given in tables 14 and 15.

CHAETOSTOMA GUAIRENSIS Steindachner

CORRONCHO

Chaetostomus guairensis STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 43, p. 121, pl. 3, figs. 1, 1a, 1882 (Guaire at Caracas, Venezuela).—REGAN, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 249, 1904 (Caracas).—EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 9, 1920 (Río Castaño, at Maracay, Venezuela).—RÖHL, Fauna descriptiva de Venezuela, p. 384, 1942 (no locality).

CHAETOSTOMA STANNII Lütken

Chaetostomus stannii LÜTKEN, Vid. Medd. Naturh. Foren. Kjøbenhavn, pts. 12–16, p. 206, 1874 (Puerto Cabello, Venezuela).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 43, p. 120, pl. 5, fig. 4, 4a, 1882 (Puerto Cabello).—REGAN, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 248, 1904 (Puerto Cabello).

CHAETOSTOMA ANOMALA SOVICHTHYS, new subspecies

CORRONCHO

PLATE 8, A, B

Holotype.—U.S.N.M. No. 121053, a specimen 71.5 mm. in standard length taken by Leonard P. Schultz on March 20, 1942, near the bridge over the Río San Pedro, a tributary of the Río Motatán, southeast of Mene Grande, in the Maracaibo Basin. This river was a succession of pools and riffles, the bottom covered with rubble.

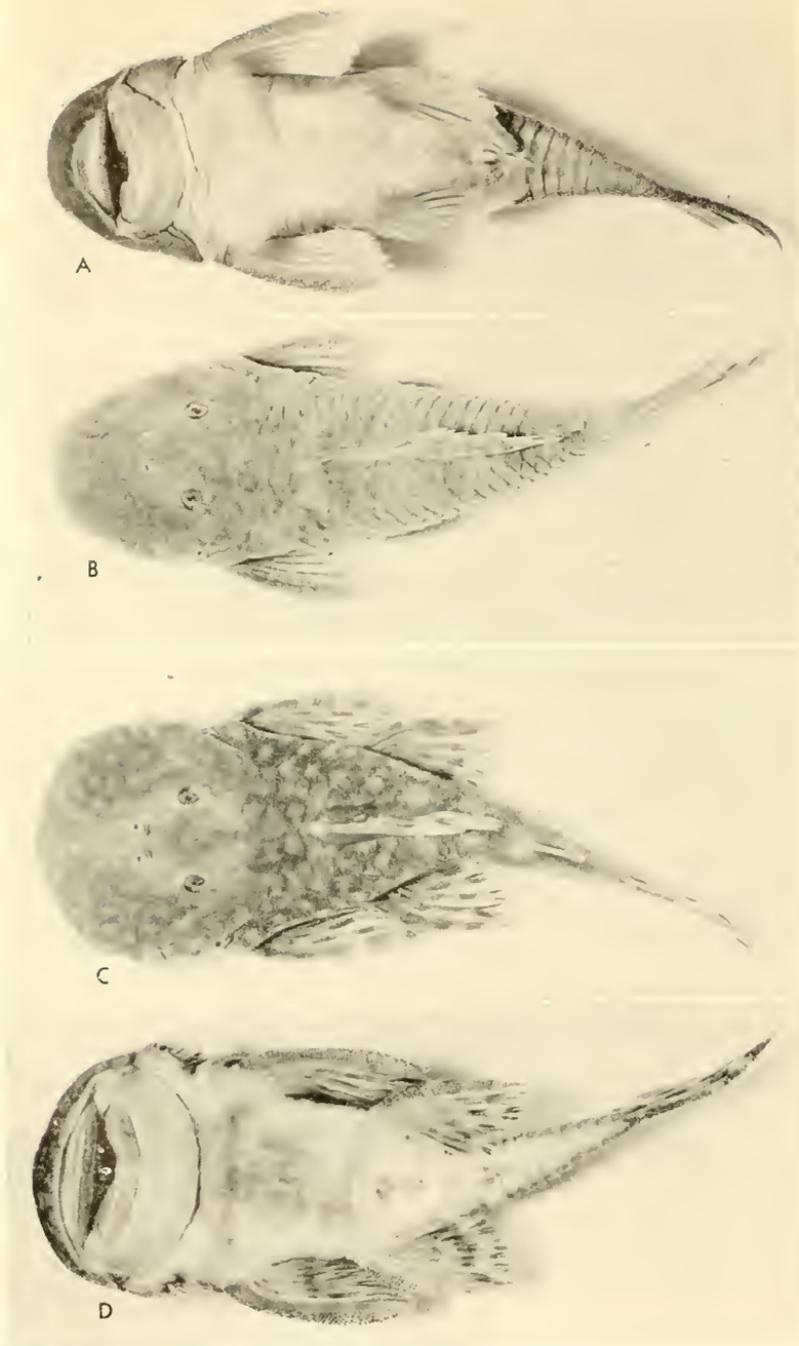
Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121056, 118 specimens, 19 to 72.5 mm. in standard length, taken along with the holotype and bearing the same data; U.S.N.M. No. 121058, 14 specimens, 43.8 to 62.7 mm. in standard length, taken on March 17 and 20, 1942, near the bridge in the Río San Juan, tributary of the Río Motatán, southeast of Mene Grande, Maracaibo Basin; U.S.N.M. No. 121055, 20 specimens, 12.8 to 45.2 mm. from the Río Motatán, 4 km. above Motatán, March 25, 1942; U.S.N.M. No. 121057, 3 specimens, 17.5 to 45 mm., from the Río Jimelles, 12 km. east of Motatán, a tributary of the Río Motatán, Maracaibo Basin, March 24, 1942; U.S.N.M. No. 121054, 15 specimens, 12 to 30 mm., from the Río Motatán, 8 km. below Motatán, March 24, 1942.

In addition, Dr. H. Pittier, in 1923, collected 2 specimens, U.S.N.M. No. 86262, 20 and 36.5 mm., in the Río Motatán near Valeria, Estado de Trujillo, Venezuela.

In all the localities where this species occurred the water flowed rapidly and the stream bottoms were composed of gravel to rubble.



A, *Doraops zuloagai*, new genus and species: Holotype (U.S.N.M. No. 121015), 287 mm. in standard length; B, C, *Chaetostoma tachiraensis*, new species: Holotype (U.S.N.M. No. 121052), 58.6 mm.; D, *Astroblepus phelpsi*, new species: Holotype (U.S.N.M. No. 121126), 53.6 mm. A, drawing; B and C, photographs; D, retouched photograph.



A, B, *Chaetostoma anomala sovichthys*, new subspecies: Holotype (U.S.N.M. No. 121053), 71.5 mm. in standard length; C, D, *Pseudancistrus torbesensis*, new species: Holotype (U.S.N.M. No. 121001), 64.6 mm. Photographs.

Description.—Based on the holotype and numerous paratypes listed above. All measurements are given in hundredths of the standard length, those for the holotype first and then in parentheses those for the paratypes that were measured in detail. Standard length (in mm.) 71.5 (72.0; 43.2; 60.2); total length 96.1 (92.0; 58.1; 77.0) mm.

Width of head at base of humeral process in front of base of pectoral spine 28.0 (27.5; 25.0; 24.5); length of head from tip of snout to posterior end of supraoccipital plate 36.5 (36.4; 37.3; 34.7); tip of snout to upper edge of gill opening 33.0 (34.0; 30.8; 33.0; 30.6); greatest depth of body 18.3 (18.7; 17.4; 16.9); length of snout 28.0 (27.5; 25.0; 24.5); width of fleshy interorbital space 11.9 (11.5; 12.7; 11.5); diameter of eye 4.20 (4.30; 5.09; 5.00); the eye is larger on the smaller specimens; length from base of last anal ray to midbase of caudal fin rays 26.9 (25.7; 22.2; 24.4); least depth of caudal peduncle 12.2 (11.8; 12.3; 12.1); length of ramus of lower jaw 10.6 (10.1; 10.9; 10.3); greatest width of lower lip 7.27 (6.94; 7.64; 6.29); rear edge of eye to posterior edge of temporal plate opposite first lateral line pore 8.40 (8.61; 9.20; 8.71); length of first ray of dorsal fin 22.4 (22.4; 22.5; 18.7); length of last dorsal ray 17.5 (20.1; 16.4; 18.7); length of pectoral spine 26.7 (27.1; 24.5; 24.5); length of upper bony ray of caudal fin 23.6 (22.5; 25.0; 18.5); length of lower bony ray of caudal fin 30.1 (30.0; 32.4; 26.8); length of ray of adipose fin 6.71 (7.08; 6.72; 8.38); length of longest anal fin ray 9.51 (8.48; 8.10; 8.54); length of base of dorsal fin 26.6 (26.5; 25.7; 25.2); distance from bony edge of nasal opening to tip of snout 19.9 (19.7; 25.0; 18.5); distance from edge of nasal opening to eye 6.29 (5.73; 6.48; 5.32); tip of snout to origin of dorsal fin 47.6 (46.5; 48.6; 47.6); tip of snout to origin of anal 74.1 (73.1; 73.2; 69.6); tip of snout to origin of adipose 84.6 (85.2; 85.7; 82.4); distance from anus to anal origin 8.67 (9.03; 10.4; 8.55).

The following counts were made, respectively: Rays in dorsal fin I, 8 (I, 8; I, 8; I, 8); anal fin I, 4 (I, 4; I, 4; I, 4); pectoral rays always I, 6 and pelvic rays always I, 5; pores in lateral line 24 (24; 24; 25); series of plates along sides 24 (23; 24; 24); always 4 series of plates in front of dorsal, and 4 or 5 plates between dorsal and adipose fins; 11 series of plates between anal base and midbase of caudal fin rays; the spines on the opercle consist of 2 strong ones and 6 to 8 weaker ones, those on the interopercle are irregular in number, usually in three groups of 2 or 3 + 2 to 4 + 3 or 4, starting dorsally.

Head broad, depressed, its width at base of pectoral a little greater than its length (from tip of snout to rear of supraoccipital); eyes small mostly in posterior quarter of the head; bony covering everywhere

prickly; the first rays of all the fins, except anal, are enlarged and bony, with strong prickles, and those on the pectoral spine recurved spinules; the soft rays of pelvics and pectorals also with prickles; the anterior third of the snout not bony and without prickles, this fleshy area is more or less composed of very small plicate folds; both lips papillate; the small barbel at the outer corners of the lips is rather short, and is contained about 3 to $3\frac{1}{4}$ times in the fleshy interorbital space; two pairs of nasal openings close together near middorsal line, a little in front of the eyes, the posterior opening of each pair covered by a dermal flap; a rather wide area along base of dorsal and adipose fins naked; belly naked to anal fin; intestine elongate, much coiled.

Color.—Grayish to brownish above, paler below, the blackish peritoneum conspicuous through the skin; five pale areas dorsally separated by dark saddles, the first at front of dorsal, second at rear base of dorsal, third in front of adipose fin, last behind that fin; these dark-colored saddles join along midsides to form a more or less obvious wide lateral band. Top of head finely mottled or speckled with pale; dorsal fin barred, the black and pale areas on the rays, the membranes pale or plain grayish; caudal fin with three distinct bars on upper and middle rays with an additional bar on the lower lobe near the ends of the rays, seldom are there two or four bars on the upper lobe of the caudal fin; pelvics sometimes with two dark bars and pectorals plain or with about three or four bars; anal with its base usually blackish; dorsal fin with a conspicuous black spot on the membrane between the bases of the spine and first soft ray; belly yellowish when alive and also the tip of the upper lobe of caudal fin yellowish.

Named *sovichthys* in honor of and in appreciation of the help extended to me by the Standard Oil Co. of Venezuela while I was a guest at the camps of the Lago Petroleum Corporation.

Remarks.—This new subspecies differs from *Chaetostoma anomala anomala* Regan of the Río Chama system, Maracaibo Basin, in having a larger eye, in reference to width of interorbital space, and in color. The eye is contained 2.3 to 3.0 (average about 2.7) in the interorbital space in *sovichthys* of the Río Motatán system, and in *anomala* 2.7 to 3.3 (average about 3.0) on specimens of comparable sizes, 25 to 75 mm. in standard length. The dark bars on the upper lobe and middle rays of the caudal fin in *sovichthys* are wider and number three, only occasionally two or four, while in *C. a. anomala* they are narrower and almost always number four, only rarely three or five; thus the caudal fin of the Río Chama form is barred the same as the dorsal, while *sovichthys* of the Motatán system has more distinct but fewer dark bars across its caudal. There are in addition some statistical differences in bodily proportions when the same sizes of specimens are compared.

CHAETOSTOMA ANOMALA ANOMALA Regan

CORRONCHO; CHAROCA

Chaetostomus anomalus REGAN, Ann. Mag. Nat. Hist., ser. 7, vol. 11, p. 599, 1903 (Mérida, Venezuela, 1,500 meters; Albirregas and Milla Rivers above Mérida, 3,500 meters); Trans. Zool. Soc. London, vol. 17, pt. 3, p. 250, pl. 12, fig. 2, 1904 (Mérida, Venezuela).

Collections made in 1942 by Leonard P. Schultz in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121059, taken April 3, in the Río Chama at Estanques, Estado de Mérida, 60 specimens, 23.5 to 79 mm.

U.S.N.M. No. 121060, taken March 30, in the Río Chama 10 km. below Lagunillas, Estado de Mérida, 5 specimens, 18.5 to 26 mm.

U.S.N.M. No. 121061, Río Táchira, 7 km. north of San Antonio, Catatumbo system, April 1, 1 specimen, 61.1 mm.

U.S.N.M. No. 121062, Río Barregas, tributary to Río Chama just below Egi-do, Estado de Mérida, March 29, 457 specimens.

U.S.N.M. No. 121063, Río Gonzáles, tributary to Río Chama at La Gonzáles, Estado de Mérida, March 29, 159 specimens, 10.2 to 76.6 mm.

In addition, U.S.N.M. Nos. 101608 and 101615, one specimen each, were collected by Nicéforo María in the Río Pamplonita, near Cucuta (Catatumbo system), Santander del Norte, Colombia.

The following measurements, expressed in hundredths of the standard length, were made on two specimens from the Río Barregas at Egi-do, Estado de Mérida (standard length 82.5; 44.2 mm., total length 107; 60.2 mm.): Width of head at base of humeral process or in front of base of pectoral spine 39.3; 37.6; length of head from tip of snout to posterior end of supraoccipital plate 33.4; 35.7; tip of snout to upper edge of gill opening 32.2; 30.6; greatest depth of body 19.5; 17.9; length of snout 24.6; 25.1; width of fleshy interorbital space 11.6; 12.4; diameter of eye 3.64; 4.75; length from base of last anal ray to midbase of caudal fin rays 27.9; 25.1; least depth of caudal peduncle 12.2; 12.2; length of ramus of lower jaw 11.5; 12.00; greatest width of lower lip 7.52; 7.96; rear edge of eye to posterior edge of temporal plate opposite first lateral line pore 8.12; 8.60; length of first ray of dorsal fin 21.2; 24.4; length of last dorsal ray 16.5; 14.9; length of pectoral spine 25.2; 25.3; length of upper bony ray of caudal fin 24.4; 28.5; length of lower bony ray of caudal fin 29.6; 34.2; length of ray of adipose fin 6.30; 5.56; length of longest anal fin ray 9.94; 10.2; length of base of dorsal fin 26.7; 27.1; distance from bony edge of nasal opening to tip of snout 17.0; 17.2; distance from edge of nasal opening to eye 5.54; 6.79; tip of snout to origin of dorsal fin 46.8; 48.2; tip of snout to origin of anal fin 69.7; 72.4; tip of snout to origin of adipose 83.1; 83.7; distance from anus to origin of anal 10.5; 10.6.

The number and arrangement of scutes and spines appear to be the same in both *anomala* and *sovichthys*.

CHAETOSTOMA PEARSEI Eigenmann

CORRONCHO

Chaetostomus pearsei EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 8, fig. 3, pl. 2, 1920 (Río Castaño at Maracay, Río Tuy at El Concejo, Venezuela).—PEARSE, Univ. Wisconsin Studies, No. 1, pp. 20, 43, 1920 (Río Castaño, Venezuela).

CHAETOSTOMA NUDIROSTRIS Lütken

Chaetostomus nudirostris LÜTKEN, Vid. Medd. Naturh. Foren. Kjøbenhavn, 1874, p. 207 (Valencia, Venezuela).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 43, p. 120, pl. 5, fig. 2, 2a, 1882 (Valencia).—REGAN, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 251, 1904 (Valencia).—EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 8, 1920 (no specimen secured).

Genus PSEUDANCISTRUS Bleeker

Pseudancistrus BLEEKER, Atlas ichthyologique, vol. 2, p. 2, 1862; Ned. Tijdschr. Dierk., 1863, vol. 1, p. 78. (Type, *Hypostomus barbatus* Cuvier and Valenciennes.) (Ref. copied.)

KEY TO THE SPECIES OF PSEUDANCISTRUS FROM VENEZUELA

- 1a. Anal rays I, 5; 3 plates from dorsal fin base to adipose origin.
Pseudancistrus torbesensis, new species
- 1b. Anal rays I, 4; 4 to 6 plates from dorsal base to adipose origin.
 2a. Dorsal rays usually I, 6 or I, 7.
 3a. Five plates from dorsal fin base to adipose origin; 11 plates from anal base to midbase of caudal fin.
Pseudancistrus coquenani (Steindachner)
- 3b. Four plates from dorsal fin base to adipose origin; 9 (probably 10) plates from base of anal to midbase of caudal fin.
Pseudancistrus yaravi (Steindachner)
- 2b. Dorsal rays usually I, 8 or I, 9; usually 11 plates between anal base and midcaudal fin base; 5 or 6 plates from dorsal fin base to adipose origin.
Pseudancistrus pediculatus cobrensis, new subspecies

PSEUDANCISTRUS TORBESENSIS, new species

PLATE 8, C, D

Holotype.—U.S.N.M. No. 121001, a specimen 64.6 mm. in standard length, taken by Leonard P. Schultz on March 31, 1942, 1 km. above Táriba in the Río Torbes, Orinoco system.

Paratypes.—U.S.N.M. No. 121002, 174 specimens, 15.5 to 64.6 mm. in standard length, taken along with the holotype and bearing the same data. These types all came from swiftly running water among boulders, rubble to coarse gravel.

Description.—Based on the holotype and paratypes; detailed measurements, expressed in hundredths of the standard length, are recorded for the holotype and three paratypes, the data for the latter included in parentheses, respectively. Standard length (in mm.) 64.6 (64.5; 51.2; 44.2; 21.5); total length 83.0 (82.0; 66.8; 59.8; 28.7) mm.

TABLE 16.—Counts recorded for certain species and subspecies of *Pseudancistrus*

Species	Number of fin rays										Number of plates												Number of spines on interopercle			
	Dorsal					Anal					In lower lateral series				From dorsal fin to origin adipose fin				From anal to base of mid-caudal fin rays							
	I, 6	I, 7	I, 8	I, 9	I, 3	I, 4	I, 5	24	25	26	27	3	4	5	6	7	9	10	11	12	6-10	11-15	16-20	21-25		
<i>daguae</i>			11	32		1		1	1					1	1										Av.	
<i>carnegiei</i>			3	10		1		1	1	1				1	1						Few	Av.				
<i>setosus</i>	1	1			1									1	1									Av. ♀	Av. ♂	
<i>pediculatus pediculus</i>	5	46	2		2		1	2	1					1	1	1				1	Av.					
<i>pediculatus cobrensis</i>	2	44	8		4		3	1						7	7				4		14					
<i>torbesensis</i>			28				28	4	1				5					1	4				3		1	
<i>coquenani</i>	1	1			3		3							1					1							
<i>yaravi</i>	1				1		1						1						1					Av.		

TABLE 17.—Measurements, in hundredths of the standard length, for two species of *Pseudancistrus*, computed from Steindachner's descriptions

Character	<i>yaravi</i>	<i>coquenani</i>	
Standard length (in mm.).....	47	81	76
Length of head.....	38.3	35.8	34.9
Width of head.....	31.9	30.9	32.9
Greatest height of body.....	19.2	18.5	18.4
Height of caudal peduncle.....	10.6	12.3	11.8
Length of caudal peduncle.....	31.9	25.9	26.3
Diameter of eye.....	6.38	3.70	3.29
Length of snout.....	22.3	23.5	23.7
Length of mandible.....	8.50	8.64	9.21
Width of interorbital space.....	12.8	11.1	10.5
Height of dorsal rays.....	23.4	21.0	21.7
Height of last dorsal rays.....		13.6	13.1
Length of dorsal base.....	25.5	22.8	22.4
Snout to dorsal origin.....	46.8	44.4	46.0
Distance from base last dorsal ray to adipose fin.....	12.8	16.1	14.5
Length of pectoral.....	29.8	25.9	26.3
Length of pelvic.....	29.8	23.5	22.4
Snout to pelvic insertion.....	46.8	49.4	48.7
Height of anal.....	10.6	11.1	11.8
Length of lower lobe of caudal.....	26.6	30.9	32.9
Distance of nasal opening from front border of head.....	16.0		
Distance of nare from front of eye.....	6.38		
Distance between nostrils.....	5.32		

Length of head from tip of snout to rear edge of temporal plate 41.2 (40.3; 39.5; 41.0; 37.2); length from tip of snout to posterior tip of supraoccipital 39.0 (39.7; 38.1; 41.0; 37.7); width of head at base of pectoral spine 39.3 (39.1; 38.1; 38.7; 32.1); greatest depth of body 15.5 (13.2; 15.6; 17; 14.0); length of snout 28.2 (27.3; 27.1; 29.4; 23.7); width of fleshy interorbital space 11.6 (11.3; 11.3; 11.8; 11.2);

distance from eye to bony edge of nostril 6.50 (6.82; 6.44; 6.56; 5.16); longest spine of interopercle 15.5 (16.4; 16.4; 13.1; —); diameter of eye 3.87 (4.34; 4.50; 4.52; 5.11); length of ramus of lower jaw 12.9 (12.7; 13.9; 13.1; 10.7); greatest width of lower lip 10.1 (9.92; 10.7 11.8; 11.6); length of caudal peduncle (distance from base of last anal ray to base of midcaudal fin rays) 25.5 (24.0; 27.7; 25.1; 28.4); least depth of caudal peduncle 7.60 (6.66; 6.83; 7.02; 6.05); length of depressed dorsal 32.8 (33.3; 33.4; 32.2; 29.3); length of depressed anal 7.74 (7.75; 6.83; 8.47; 11.6); length of base of dorsal fin 23.5 (24.8; 25.6; 24.5; 22.8); length of dorsal spine 22.6 (22.6; 22.5; 23.8; 19.5); length of adipose spine 12.7 (12.1; 12.9; 11.2; 9.77); length of pectoral spine 31.0 (31.0; 27.3; 28.5; 25.6); length of pelvic spine 27.1 (27.3; 24.6; 26.9; 22.8); length of upper ray of caudal fin 19.7 (19.1; 20.5; 22.2; 25.6); length of lower ray of caudal fin 29.7 (28.4; 33.2; 33.3; 35.3); distance from snout to origin of dorsal fin 47.8 (48.8; 46.9; 51.2; 44.2); snout to origin of adipose fin 78.0 (77.5; 78.5; 77.6; 74.0); snout to origin of anal fin 68.2 (71.0; 70.8; 69.8; 61.4); snout to insertion of pelvic fin 53.4 (55.2; 53.2; 55.5; 51.2).

The following counts were made, respectively: Dorsal rays I, 8 (I, 8; I, 8; I, 8; I, 8); anal I, 5 (I, 5; I, 5; I, 5; I, 5); pectoral I, 6 (I, 6; I, 6; I, 6; I, 6); pelvic I, 5 (I, 5; I, 5; I, 5; I, 5); number of scutes in lower lateral series 24 (24; 24; 24; 25); plates from dorsal to origin of adipose 3 (3; 3; 3; 3); plates from base of anal to base of midcaudal fin rays 11 (11; 11; 10; 11); plates in front of dorsal fin always 3; spines on interopercle about 20 (23; 16; 19; undeveloped); for additional counts see table 17.

This species is greatly depressed forward; the greatest depth at front of dorsal is about twice the least depth of the caudal peduncle, one-half length of snout, and $2\frac{3}{4}$ in width at base of pectorals; prickles on head completely covering the snout; interorbital space flat, rims of orbits a trifle elevated on large males, the area from eye to nostrils strongly convex; supraoccipital plate bordered posteriorly by the pair of plates at its outer edges, and in the midline by a median plate, which has a median suture; the posterior tip of the supraoccipital plate is fleshy; strong spines occur on the upper surfaces of the pectoral spine in mature males; the interopercular spines are graduated in length evenly from the front of the bony elements to the most posterior spine, which is longest; all have hooked tips except the shortest ones; on the fully mature males, there is along the upper surface of each ray an elongate dermal flap, the one on the pelvic spine widest and a little more than diameter of eye; cross section of the caudal peduncle would show it to be triangular in shape, the ventral surface flat; the scutes along the lower lateral series posteriorly are keeled; adipose fin well developed; anal fin small, the anal spine weak and without prickles as in the other fins.

Color.—Grayish above, paler below, with a blackish irregular band along the midsides that joins with four or five blackish saddles dorsally and has four or five dark projections ventrally; first dorsal saddle under front of dorsal fin, second at rear of dorsal fin, third in front of adipose; fourth behind adipose; fifth at base of caudal fin rays; these saddles enclose pale areas dorsally, ventrally the pale areas are not enclosed by the dark bars; usually three dark bars on pelvics and four across pectorals, these bars diffuse in the immature so that the fins are evenly blackish except distally pale; dorsal with irregular, wide bars in adults, plain blackish in young, tips of first dorsal rays pale; caudal similar to dorsal but with four or five dark bars on lower ray; tips of rays of upper lobe of caudal fin pale.

Remarks.—This new form differs from all other species referred to the genus *Pseudancistrus* in having only three plates between the dorsal and adipose fins and in its color pattern. Other members of the genus have four or more plates between dorsal and adipose. The greatly depressed and very wide head, compared with the short body, is a characteristic feature of this new species.

Named *torbesensis* after the stream in which it was found.

PSEUDANCISTRUS COQUENANI (Steindachner)

Ancistrus (Pseudancistrus) coquenani STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 93, p. 90, pl. 11, figs. 3 to 5, 1917 (Río Coquenán, tributary to Río Caroní in Venezuela). (Based on *A. guntheri* Regan, ♀; see table 17 for measurements.)

PSEUDANCISTRUS YARAVI (Steindachner)

Ancistrus (Hemiancistrus) yaravi STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 93, p. 87, 1917 (Río Coquenán, Venezuela).

See table 17 for measurements. It is doubtful that this and the preceding species are correctly placed. Steindachner does not mention certain characters needed for this identification. They are placed in *Pseudancistrus* because the rami of the jaws are contained fewer than $1\frac{1}{2}$ times in the interorbital, which is flattish.

PSEUDANCISTRUS PEDICULATUS COBRENSIS, new subspecies

PLATE 9, A, B

Holotype.—U.S.N.M. No. 121036, a male 78.6 mm. in standard length, total length 105 mm., taken by Leonard P. Schultz on March 31, 1942, in the Río Cobre, tributary to Río Quinta, latter tributary to Río La Grita, below La Grita, Catatumbo system, Maracaibo Basin.

Paratypes.—U. S. N. M. No. 121037, 4,820 specimens, 9 to 79 mm. in standard length, taken along with the holotype and bearing the same data. All these were taken in very swiftly running water among rubble to gravel.

Description.—Based on the holotype and paratypes. Detailed measurements, expressed in hundredths of the standard length, are recorded for the holotype and three paratypes, respectively. The data for the paratypes are enclosed in parentheses. Standard length (in mm.) 78.6 (56.9; 53.7; 31.7); total length 105 (76.6; 71.6; 42.5) mm.

Length of head from tip of snout to rear edge of temporal plate 35.8 (35.5; 35.0; 36.9); length from tip of snout to posterior tip of supraoccipital 34.6 (34.5; 33.9; 36.6); width of head at base of pectoral spine 34.5 (33.6; 34.6; 34.7); greatest depth of body 17.2 (17.6; 18.3; 19); length of snout 22.9 (22.5; 21.8; 24.0); longest spine of interopercle 25.0 (21.1; 17.3; 24.6); width of fleshy interorbital space 10.2 (10.7; 10.4; 12.3); distance from eye to bony edge of nostril 5.10 (5.27; 4.66; 5.99); diameter of eye 3.82 (4.39; 4.65; 5.36); length of ramus of lower jaw 10.1 (10.5; 10.6; 9.78); greatest width of lower lip 7.76 (8.44; 8.84; 8.20); length of caudal peduncle (distance from base of last anal ray to base of midcaudal fin rays) 26.1 (23.7; 26.1; 25.8); least depth of caudal peduncle 10.8 (10.5; 11.0; 11.7); length of depressed dorsal 38.8 (39.5; 39.1; 36.0); length of depressed anal 9.29 (8.96; 6.70; 6.62); length of base of dorsal fin 26.7 (28.3; 25.0; 24.6); length of dorsal spine 23.5 (24.8; 24.2; 25.2); length of adipose spine 9.68 (8.79; 7.45; 10.7); length of pectoral spine 45.8 (39.4; 23.3; 30.9); length of pelvic spine 25.2 (24.0; 22.3; 25.8); length of upper ray of caudal fin 22.3 (23.7; 23.5; 28.0); length of lower ray of caudal fin 32.4 (34.3; 31.7; 36.6); distance from snout to origin of dorsal fin 47.3 (46.8; 46.2; 48.9); snout to origin of adipose 87.3 (87.2; 85.6; 80.8); snout to origin of anal 70.2 (73.8; 72.4; 72.6); snout to origin of pelvics 44.6 (51.0; 49.4; 51.1).

The following counts were made, respectively: Dorsal rays I,8 (I,9; I,8; I,8); anal rays I,4 (I,4; I,4; I,4); pectorals I,6 (I,6; I,6; I,6); pelvics I,5 (I,5; I,5; I,5); number of scutes in lower lateral series 25 (24; 24; 24); plates from dorsal to origin of adipose fin 6 (5; 6; 5); plates from base of anal to base of midcaudal fin rays 11 (11; 11; 11); plates in front of dorsal fin always 4; spines on interopercle always 2 long ones with 2 to 4 or 5 very short ones posteriorly on the interopercular bony elements. For additional counts see table 16.

Head and body depressed, interorbital space a little convex; no enlarged prickles around eye; prickles on head continuing to snout, but there is a small naked area near tip of snout, on males a few enlarged prickles occur at sides of snout; supraoccipital plate bounded posteriorly by a paired plate; belly naked to anal fin; lips papillate; the posterior margin of lower lip with about 20 to 25 lappets; teeth on jaws bifid, slender, very numerous, 75 or more on each ramus; spines of interopercle graduated, one very long spine reaching past head, then a shorter one, both with hooked tips, then two to four or five

very short spines; separately the two interopercular bony elements bearing spines are barely movable; bases of movable interopercular bones in front of opercle and eye; barbel at corner of mouth about equal to diameter of pupil; on the males the pectoral rays are greatly elongate, sometimes extending to tips of pelvic rays, while in females and young they extend to opposite the middle third of the pelvic fins; adipose fin well developed; anal fin small, the spiny element rarely with prickles as found on the spine of the other fins.

Color.—Grayish, with about five more or less indistinct dark blotches, little larger than eye, along midsides posteriorly; a black spot on membrane between base of dorsal spine and first soft ray of dorsal; dorsal fin barred, the pale and dark colors on the rays and not on the membranes; caudal fin similarly barred; four small dark blotches or saddles on back, first at front of dorsal, second at rear of dorsal fin base; third in front of origin of adipose and last on upper edge of caudal peduncle; pelvics and pectorals occasionally with indications of two or three dark bars, these at best indistinct.

Remarks.—This new subspecies differs mostly in color pattern from *C. pediculatus pediculatus* of the upper Río Meta system, Villavicencio, Colombia, and in small average differences in counts as recorded in the table.

Named *cobrensis* after the stream in which it was collected.

Genus PTERYGOPLICHTHYS Gill

Pterygoplichthys GILL, Ann. Lyc. Nat. Hist. New York, vol. 6, p. 408, 1858.
(Type, *Hypostomus duodecimalis* Cuvier and Valenciennes.)

KEY TO THE SPECIES OF PTERYGOPLICHTHYS REPORTED FROM VENEZUELA

- 1a. Interorbital space 2.4 to 2.6 in head; dorsal rays I, 12; or I, 13; plates along sides 28 to 30.-----*Pterygoplichthys punctatus* Günther
1b. Interorbital space 2 to 2.25 in head; ramus of lower jaw $3\frac{1}{2}$ to 4 in interorbital space; dorsal rays I, 12 or 13; plates along sides 28 to 30.
Pterygoplichthys multiradiatus (Hancock)

PTERYGOPLICHTHYS PUNCTATUS Günther

Pterygoplichthys punctatus GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 251, 1864 (S. Vincente, Brazil).—EIGENMANN and EIGENMANN, Occ. Papers California Acad. Sci., vol. 1, p. 431, 1890 (Venezuela).

Ancistrus punctatus GÜNTHER, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 229, 1904 (Venezuela; Upper and Middle Amazon).

Pterygoplichthys duodecimalis PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Apure River, Venezuela).

PTERYGOPLICHTHYS MULTIRADIATUS (Hancock)

CORRONCHO

Hypostomus multiradiatus HANCOCK, Zool. Journ., vol. 4, p. 245, 1828 (Demarara) (ref. copied).

Plecostomus (Liposarcus) pardalis PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 471 (Calabozo, Venezuela).

Genus **ANCISTRUS**²⁹ Kner

Ancistrus KNER, Denkschr. Akad. Wiss. Wien, vol. 7, p. 272, 1854. (Type, *Hypostomus cirrhosus* Cuvier and Valenciennes.)

For certain counts made on species of this genus see table 18.

KEY TO THE SPECIES OF ANCISTRUS REPORTED FROM VENEZUELA

1a. Anal rays I, 3; plates from dorsal fin base to origin of adipose fin usually 4, rarely 5; plates in lower lateral series usually 23, seldom 24; pale spots on belly, if present, not running together, but roundish in shape: black spot at base of front of dorsal indistinct; ramus of lower jaw 1.7 to 2.4 in interorbital (upper Río Meta system).

Ancistrus triradiatus triradiatus Eigenmann^{29a}

1b. Anal rays about equally I, 3 and I, 4; plates from dorsal to adipose 5; plates in lower lateral series usually 24; pale spots on adults elongate and oblong on the belly and running together; black spot at front base of dorsal distinct; ramus of lower jaw contained 2.3 to 2.7 in interorbital space (upper Catatumbo system)-----*Ancistrus triradiatus martini*, new subspecies

1c. Anal rays I, 4, rarely I, 3; plates from dorsal to adipose 5 to 7, rarely 4.

2a. Plates from dorsal to adipose fin usually 6 or 7; from anal to caudal fin base 10 or 11; in lower lateral series 23 or 24; ramus of lower jaw 2.4 to 2.6 in interorbital space; interorbital space 2 to 2.25 in head; a dark spot at base of first interradiial membrane in dorsal (San Esteban and Puerto Cabello, Venezuela)-----*Ancistrus gymnorhynchus* Kner

2b. Plates from dorsal to adipose fin usually 5, rarely 4; plates in lower lateral series almost always 24, rarely 23 or 25.

3a. Body plain in color, apparently without pale spots; no black spots at front of base of dorsal fin; two or three black spots in front of dorsal fin; no pale bar across caudal peduncle on base of caudal fin rays; ramus of lower jaw 3.0 to 3.5 in interorbital space (Río Tuy system).

Ancistrus brevifilis brevifilis Eigenmann

3b. Body anteriorly on adults with numerous pale spots; a black spot at front base of dorsal fin on membrane between spine and first soft ray; no black spots in front of dorsal; pale bar across caudal peduncle at base of caudal fin rays; ramus of lower jaw 2.3 to 3.0 in the interorbital space.

Ancistrus brevifilis bodenhameri, new subspecies

ANCISTRUS TRIRADIATUS MARTINI, new subspecies

PLATE 9, C, D

Holotype—U.S.N.M. No. 121064, a male 81.5 mm. in standard length, collected by Leonard P. Schultz on April 1, 1942, in the Río Táchira, 7 km. north of San Antonio, Catatumbo system.

²⁹ Regan gives an indefinite record for *Xenocara cirrhosum* Cuvier and Valenciennes in the Proc. Zool. Soc. London, 1906, pt. 1, p. 389, as "Paraguay to Venezuela." Steindachner (Denkschr. Akad. Wiss. Wien, vol. 43, p. 123, 1852) records *Chaetostomus (Ancistrus) dolichopterus* Kner from Caracas, Venezuela. A reexamination of the material mentioned above will be necessary before it is possible to identify the specimens.

^{29a} *Ancistrus triradiatus triradiatus* Eigenmann, Proc. Amer. Philos. Soc., vol. 56, No. 7, p. 650, 1917 (Quebrada Cramalote, Villavicencio, Barrigona, Colombia), is included in this key for purposes of comparison with *A. l. martini*, although it has not been reported from Venezuela.

TABLE 18.—Counts made on species of *Ancistrus*

Species	Number of fin rays				Number of plates											
	Dorsal		Anal		From dorsal to adipose fin				From anal to caudal fin			In lower lateral series				
	I, 6	I, 7	I, 3	I, 4	4	5	6	7	10	11	12	23	24	25	26	
<i>triradiatus triradiatus</i>	1	6	7	---	6	1	---	---	---	2	5	6	1	---	---	
<i>triradiatus martini</i>	---	4	2	2	---	4	---	---	---	---	4	---	4	---	---	
<i>brevifistis brevifistis</i>	---	1	---	1	---	1	---	---	---	---	1	---	1	---	---	
<i>brevifistis bodenhameri</i>	---	15	1	14	1	14	---	---	---	7	8	1	13	1	---	
<i>chagresi</i>	---	2	2	1	---	1	1	1	---	2	2	---	1	1	1	
<i>spinus</i>	---	1	---	1	---	---	---	1	---	1	1	---	1	---	---	
<i>rothschildi</i>	---	1	---	1	---	---	---	1	1	1	1	---	1	1	---	

Paratypes.—U.S.N.M. No. 121065, 3 specimens, 14 to 51.6 mm., taken along with the holotype and bearing the same data; U.S.N.M. No. 120094, a female, 80 mm. in standard length, collected by Nicéforo María, near Cúcata, Colombia, Catatumbo system.

Description.—Based on the holotype and paratypes listed above. Measurements, expressed in hundredths of the standard length, are recorded for the holotype, followed by those for two paratypes in parentheses. Standard length (in mm.) 81.5 (51.6; 80); total length 104.5 (71.1; ---) mm.; sex ♂ (♀; ♀).

Length of head from tip of snout to rear edge of temporal plate 38.9 (36.0; 34.6); length of head to posterior tip of supraoccipital 38.6 (36.5; 33.8); width of head at base of pectorals 31.5 (33.9; 32.0); postorbital length of head 12.5 (10.1; 11.2); greatest depth of body 12.5 (10.1; 11.2); length of snout 24.5 (22.5; 20.2); distance from eye to middorsal tip of bony area of snout 13.1 (20.0; 18.6); diameter of eye 4.29 (5.23; 4.50); width of preorbital bony space 2.45 (9.11; 8.88); width of fleshy interorbital space 17.1 (16.9; 15.9); length of ramus of lower jaw 6.26 (6.00; 5.75); length of longest spine on interopercle 10.5 (6.59; 6.62); distance from eye to bony edge of nostril 3.19 (3.49; 4.87); greatest width of lower lip 6.13 (5.92; 5.25); length of caudal peduncle 26.5 (27.7; 24.4); least depth of caudal peduncle 10.8 (11.6, 11.9); length of depressed dorsal fin 39.9 (40.1; 40.3); length of depressed anal fin 11.2 (10.3; 10.8); length of base of dorsal fin 22.1 (24.2; 24.1); length of dorsal spine 27.0 (29.1; 27.2); length of last ray of dorsal fin 20.1 (19.5; 18.2); length of adipose spine 7.36 (9.11; 7.87); length of pectoral spine 33.7 (33.1; 33.8); length of anal spine 8.94 (10.1; 8.38); length of pelvic spine 26.4 (29.1; 26.9); length of upper ray of caudal fin 27.8 (30.2; ---); length of lower ray of caudal fin 29.9 (37.8; ---); distance from snout to origin of dorsal fin 49.1 (47.1; 47.0); distance from snout to origin of adipose fin 80.5

(83.3; 83.5); distance from snout to origin of anal fin 68.2 (70.7; 72.5); distance from snout to insertion of pelvics 51.3 (49.6; 52.7).

The following counts were made, respectively: Dorsal rays I, 7 (I, 7; I, 7; I, 7); anal I, 3 (I, 3; I, 4; I, 4); pectoral always I, 6 and pelvic always I, 5; number of scutes in lower lateral series 24 (24; 24; 24); plates from dorsal to origin of adipose 5 (5; 5; 5); plates from base of anal to base of midcaudal fin rays 12 (12; 12; 12); plates in front of dorsal fin 4 (4; 4; 4); number of spines on the interopercle 15 (13; 13; 12); number of tentacles at corner of mouth plus marginal series plus those at other corner of mouth 5+8+5 (0+0+0; 0+0+0; 5+8+5); for additional counts see table 13.

Head depressed, snout with the anterior portion without bony covering, this area much wider in males than in females; the dermal cirri on adult males are multifid, especially those in the Y-shaped group near the middorsal line; I can find no tentacles on the snout of females; the preopercular spines are hooked, and the longest are contained $1\frac{1}{2}$ to 2 times in the interorbital length; there are three plates bordering the supraoccipital behind, the middle one not divided in the midline; in addition there are three other plates in front of the dorsal; depressed dorsal fin reaches to base of the long adipose spine thus beyond the platelet in front of this spine but forming part of that fin; none of the plates keeled; belly naked; breast naked; teeth small, very numerous and bifid; lips papillate; a small barbel at corners of mouth; pectoral spine on adult male reaches to beginning of second third of length of pelvic spine; caudal fin concave in young but a little convex in adults, lower lobe longest; posterior margin of dorsal a little convex.

Color.—Dorsal surfaces anterior to dorsal fin with obvious pale spots more or less oblong to squarish, belly with pale, elongate to oblong streaks or spots, some of which join each other to form a loose marbling effect; the pale spots and blotches may be obscure or entirely absent on the young; a black spot at base of membrane between dorsal spine and first soft ray, dorsal fin barred, these numbering four to six; other fins similarly barred; tips of upper and lower caudal lobes white; a pale bar across caudal peduncle, more distinct in smaller specimens, at base of caudal fin rays; sides of body more or less with darkish blotches; a somewhat obscure pale oblique bar between rear base of dorsal and adipose fin from back downward across upper sides.

Remarks.—This new subspecies differs from *Ancistrus triradiatus triradiatus* Eigenmann from the upper Orinoco system in having the anal rays about equally I, 3 or I, 4 instead of almost always I, 3; the number of plates from the dorsal fin base to the origin of the adipose is usually four (seldom five) in *triradiatus* while in *martini* almost

always five; *triradiatus* averages about one less plate in the lower lateral series than does *martini*. The pale color spots on *triradiatus* are round and less distinct, but on *martini* they are elongate and especially distinct on the ventral surfaces anteriorly.

Named *martini* after Bethea Martin, of the Lago Petroleum Corporation, who aided me in the collection of fishes in Venezuela.

ANCISTRUS GYMNORHYNCHUS Kner

Ancistrus gymnorhynchus KNER, Denkschr. Akad. Wiss. Wien, vol. 7, p. 275, 1854 (Puerto Cabello, Venezuela).—GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 249, 1864 (Puerto Cabello).

Xenocara rothschildi REGAN, Nov. Zool., vol. 12, p. 242, 1905 (San Esteban, near Puerto Cabello, Venezuela).

?*Chaetostomus gymnorhynchus* LÜTKEN (not of Kner), Vid. Medd. Naturh. Foren. Kjøbenhavn, pts. 12–16, p. 204, 1874 (Puerto Cabello, Venezuela).

ANCISTRUS BREVIFILIS BREVIFILIS Eigenmann

Ancistrus brevifilis EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 7, fig. 2, pl. 1, 1920 (El Concejo, Río Tiguirito, Venezuela).

ANCISTRUS BREVIFILIS BODENHAMERI, new subspecies

PLATE 10, A

Holotype.—U.S.N.M. No. 121066, a male 61.2 mm. in standard length, taken March 20, 1942, by Leonard P. Schultz in the Río San Pedro at the bridge south of Mene Grande, Motatán system.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121067, 132 specimens, 22.5 to 65. mm. in standard length, collected along with the holotype and bearing the same data; U.S.N.M. No. 121068, 1 specimen, 25.6 mm., taken February 26, 1942, in the Río San Juan about 12 km. south of Rosario in Maracaibo Basin; U.S.N.M. No. 121069, 2 specimens, 28 and 54.4 mm., taken March 16, 1942, in the Río Machango at the bridge south of Lagunillas, Estado de Zulia; U.S.N.M. No. 121299, a specimen 26.8 mm., taken February 26, 1942, in the Río San Juan 12 km. south of Rosario, western side of Maracaibo Basin.

Description.—Based on the holotype and paratypes. Measurements, expressed in hundredths of the standard length, are recorded for the holotype followed by those for three paratypes in parentheses. Standard length (in mm.) 61.2 (61.5; 50.2; 54.4); total length (in mm.) 81.6 (81.7; 69.1; 75.5); sex ♂ (♂; ♀; ♀).

Length of head from tip of snout to rear edge of temporal plate 36.8 (40.6; 37.1; 36.6); length of head to posterior tip of supraoccipital plate 36.1 (39.7; 35.7; 35.3); width of head at base of pectorals 32.7 (32.0; 33.1; 32.6); postorbital length of head 10.6 (9.92; 9.77; 10.3); greatest depth of body 17.0 (18.7; 20.9; 19.3); length of snout 22.6 (23.7; 21.9; 20.6); distance from eye to middorsal tip of bony area of snout 12.6 (13.3; 18.9; 19.1); diameter of eye (fleshy) 5.23 (5.20; 5.98;

6.25); width of preorbital bony space 1.96 (2.60; 8.17; 8.09); width of fleshy interorbital space 15.8 (15.5; 17.1; 15.6); length of ramus of lower jaw 6.70 (6.34; 6.37; 5.33); length of longest spine on interopercle 8.50 (9.76; 7.17; 7.35); distance from eye to bony edge of nostril 3.60 (4.06; 4.98; 3.86); greatest width of lower lip 6.50 (5.53; 5.98; 7.17); length of caudal peduncle (distance from base of last anal ray to base of midcaudal fin rays) 28.9 (26.8; 28.5; 28.1); least depth of caudal peduncle 11.4 (11.2; 12.3; 11.2); length of depressed dorsal 42.5 (40.8; 43.8; 42.3); length of depressed anal 10.6 (10.6; 10.6; 10.8); length of base of dorsal fin 23.7 (22.0; 25.1; 23.9); length of dorsal spine 25.8 (26.2; 30.1; 29.4); length of last dorsal fin ray 20.4 (20.7; 23.3; 19.3); length of adipose spine 8.66 (8.94; 9.16; 8.09); length of pectoral spine 36.3 (33.3; 36.3; 35.1); length of anal spine 8.50 (9.76; 9.56; 9.38); length of pelvic spine 26.5 (26.7; 30.1; 27.6); length of upper ray of caudal fin 26.8 (25.2; 29.1; —); length of lower ray of caudal fin 35.0 (33.7; 36.9; 40.3); distance from snout to origin of dorsal 45.3 (50.4; 46.8; 45.1); distance from snout to adipose 82.5 (84.6; 82.7; 80.5); distance from snout to anal 69.5 (73.2; 70.1; 70.8); distance from snout to insertion of pelvics 49.0 (54.4; 52.0; 49.8).

The following counts were made, respectively: Dorsal rays I, 7 (I, 7; I, 7; I, 7); anal I, 3 (I, 4; I, 4; I, 4); pectoral always I, 6 and pelvic always I, 5; number of scutes in lower lateral series 24 (24; 23; 24); plates from dorsal origin to adipose 5 (5; 5; 5); plates from base of anal to base of midcaudal fin rays 12 (12; 11; 12); plates in front of dorsal fin 4 (4; 4; 4); spines on interopercle 16 (17; 14; 9 and 12); number of tentacles at corner of mouth plus marginal series plus those at corner of mouth 6+8+6 (5+8+6; 4+9+5; 3+7+3); for additional counts see table 18.

Head depressed, snout with the anterior portion fleshy, this area much wider in males than in females; the dermal cirri on adult males multifid, especially those in the Y-shaped group near the middorsal line; the marginal series of cirri developed in females; the preopercular spines are hooked and contained $1\frac{1}{2}$ to 2 times in the interorbital space; the three plates behind the supraoccipital are not divided in the center; depressed dorsal fin reaches a little beyond the base of the long spine of adipose fin; none of the plates keeled; belly naked; breast naked; teeth small, very numerous and bifid; lips papillate; a small barbel at the corners of the mouth; pectoral spines reach to opposite end of first third of pelvic spine; caudal fin on young a little concave, but in adults somewhat convex, the lower lobe longest; posterior margin of dorsal a little convex.

Color.—When alive this species was dark brown to blackish and covered with dull-yellow or light-brown spots; the tips of the rays of the upper and lower lobes of the caudal fin were yellowish orange, as were the tips of the first rays of the dorsal fin. Body and head

everywhere dark brown to blackish with the dorsal surface anteriorly in front of dorsal fin with numerous round pale spots; these spots are oblong and larger on the belly, occurring as far back as the anal fin; on the young the belly is plain blackish; none of the spots join each other; a black spot occurs at base of membrane of dorsal fin between the spine and first soft ray; all of the fins are very dark, and with four or five bars; tips of first rays of dorsal pale; tips of rays of upper and lower lobes of caudal fin pale; a pale bar across base of caudal fin rays on caudal peduncle; pectoral fins barred, pelvics barred.

Remarks.—This new subspecies is related to *A. triradiatus martini*, new subspecies, but differs in certain counts. It is closer to *A. brevifilis brevifilis* Eigenmann in regard to counts. However, *brevifilis* lacks a black spot at base of dorsal between the spine and first soft ray; in addition, *bodenhameri* does not have faint darker spots about size of eye in front of the dorsal and the belly is not uniform in color as in *brevifilis*.

Named *bodenhameri* in honor of Raymond L. Bodenhamer, of the Lago Petroleum Corporation, who aided me greatly in regard to transportation while I was in Venezuela.

Genus LITHOXUS Eigenmann

Lithoxus EIGENMANN, Mem. Carnegie Mus., vol. 5, 242, pl. 29, figs. 1 to 4, 1912. (Type, *Lithoxus lithoides* Eigenmann.)

LITHOXUS FIMBRIATUS (Steindachner)

Pseudacanthicus (Lithoxus) fimbriatus STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 93, p. 92, pl. 10, figs. 1-3, 1917 (Río Coquenan, tributary to Río Caroní, Venezuela).

This species may be recognized by its barblets around front of snout and around margin of lower lips, along with three teeth on each premaxillary ramus and six [probably a few more] on each ramus of lower jaw. Dorsal I, 7; pectoral I, 5; anal I, 5; pelvic I, 5; lateral scutes 26; 6 plates between dorsal base and adipose fin; 12 from anal base to midcaudal fin base.

Genus PANAQUE Eigenmann and Eigenmann

Panaque EIGENMANN and EIGENMANN, Proc. California Acad. Sci., ser. 2, vol. 2, p. 44, 1889. (Type, *Chaetostomus nigrolineatus* Peters.)

KEY TO THE SPECIES OF PANAQUE FROM VENEZUELA AND FROM THE RÍO CAUCA

1a. Length of spines on interopercle about equal to diameter of eye; several brown stripes on sides of body extending lengthwise; depth $3\frac{1}{2}$, head $2\frac{1}{2}$ in standard length; eye $7\frac{1}{2}$, interorbital $1\frac{1}{2}$, and snout $1\frac{1}{2}$ in head; least depth of caudal peduncle 2 in its length; caudal fin truncate.

Panaque nigrolineatus (Peters)

1b. Length of spines on interopercle $\frac{1}{4}$ to $\frac{2}{3}$ length of head except in young; no lengthwise dark brown stripes on body, color uniformly grayish.

- 2a. Evertible spines on adults on interopercle about $\frac{1}{3}$ length of head; depth $4\frac{1}{2}$, head $2\frac{3}{4}$ in standard length; eye 9, interorbital space 2, and snout $1\frac{1}{2}$ in head; least depth of caudal peduncle 3 to $3\frac{1}{4}$ in its length; plates not carinate anteriorly.....**Panaque gibbosus** (Steindachner)³⁰
- 2b. Evertible spines on interopercle $\frac{1}{2}$ to $\frac{1}{4}$ length of head in adults; depth $3\frac{3}{4}$ to 4, head $2\frac{1}{2}$ to $2\frac{1}{2}$ in standard length; eye $10\frac{1}{4}$ to 12, interorbital $1\frac{1}{4}$ to $1\frac{1}{10}$, and snout $1\frac{1}{2}$ to $1\frac{1}{2}$ in length of head; least depth of caudal peduncle $2\frac{1}{2}$ to $2\frac{1}{2}$ in its length; base of dorsal fin a little longer than length of caudal peduncle; plates strongly carinate on body.

Panaque suttoni, new species

PANAQUE NIGROLINEATUS (Peters)

PANAQUE

Chaetostomus nigrolineatus PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 471 (Calabozo, Venezuela).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 44, p. 7, 1882 (Orinoco River, at Ciudad Bolívar).—RÖHL, Fauna descriptiva de Venezuela, p. 377, fig. 188, 1942 (Orinoco).

PANAQUE SUTTONI, new species

PANAQUE

PLATE 10, B

Holotype.—U.S.N.M. No. 121033, a specimen 280 mm. in standard length, taken by Leonard P. Schultz on March 2, 1942, in the Río Negro below the mouth of the Río Yasa, Maracaibo Basin.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121075, 1 specimen, 53 mm. in standard length, taken along with the holotype and bearing the same data; U.S.N.M. No. 121035, 3 specimens, 197, 265, and 31 mm. in standard length, from the Río Motatán, at the bridge 22 km. north of Motatán, Maracaibo Basin, March 17, 1942; U.S.N.M. No. 121034, a specimen 224 mm., same data.

Description.—Based on the holotype and three paratypes. All measurements are expressed in hundredths of the standard length, those for the holotype first, followed by those for the paratypes in parentheses (the Río Negro specimens are given first), respectively. Standard length (in mm.) 280 (224; 197; 265); total length (in mm.) 373 (—; 275; 350).

Length of head from tip of snout to rear edge of temporal plate 41.0 (42.0; 42.2; 40.0); length of head from tip of snout to posterior edge of supraoccipital plate 41.4 (42.8; 42.6; 40.4); tip of snout to upper edge of gill opening 24.6 (28.6; 26.4; 26.4); width of head at

³⁰ *Chaetostomus cochliodon* (sive *gibbosus*) Steindachner, Sitzb. Akad. Wiss. Wien, vol. 80, p. (60), 185, 1879 (Río Cauca). Not from Maracaibo Basin, but closely related to the form collected in that basin and described as new.

coracoids or in front of base of pectoral spine 35.7 (33.9; 33.8; 33.2); greatest depth of body 25.7 (27.2; 25.4; 25.7); length of snout 28.6 (30.3; 29.5; 27.6); width of fleshy interorbital space 23.4 (22.8; 22.3; 21.5); diameter of eye 3.93 (3.57; 4.06; 3.77); postorbital length of head 10.9 (11.2; 10.4; 10.2); length of longest spine on interopercle 27.5 (29.0; 26.9; 30.4); length of caudal peduncle or the distance from base of last anal ray to base of middle caudal fin rays 25.7 (25.4; 26.8; 28.3); least depth of caudal peduncle 9.82 (10.3; 10.2; 10.2); length of base of dorsal fin 26.4 (25.9; 25.4; 25.7); length of bony dorsal spine 29.1 (26.3; 27.2; 27.6); length of bony pectoral spine 36.4 (37.9; 38.1; 35.5); length of anal spine 16.8 (15.6; 15.2; 15.1); length of pelvic spine 26.1 (25.9; 25.9; 24.5); length of upper ray of caudal fin 30.4 (regenerating on holotype) (43.3; 42.2; 36.8); length of lower ray of caudal 35.4 (—; 35.0; 33.6); length of shortest midcaudal rays 22.8 (22.3; 20.3; 21.5); distance from snout to origin of dorsal fin 47.5 (51.3; 51.8; 49.0); snout to origin of adipose fin 83.2 (82.1; 84.3; 84.5); snout to origin of anal fin 70.3 (68.7; 69.0; 68.7).

The following counts were made, respectively: Dorsal rays always I,7; anal rays always I,4; pectorals always I,6; pelvics always I,5; teeth in ramus of upper jaw then of lower jaw on one side 8-9 (8-8; 8-8; 8-9); number of plates in lower lateral series 25 (25; 26; 25); pores in lateral line 25 (25; 26; 25); plates from base of anal fin to midbase of caudal 13 (13; 13; 12); plates from anal base to origin of adipose 6 (5; 5; 6); always three plates before dorsal fin.

Front of head depressed, contour from eyes forward almost straight, the supraoccipital arched but no median keel posteriorly; flattish shelf from eye to nostrils, the space between nostrils convex, this continuing to tip of snout; eye in rear two-thirds length of head; the posterior margin of the supraoccipital plate is gently convex, all of the scutes from head posteriorly are carinate with one to three or four prominent spines; spines on interopercle long, with the tips hooked outward, and the longest spine reaching to middle of second plate of lower lateral series; pectoral spine long, heavy, with numerous long spines on its dorsal surface posteriorly; the pectoral spine reaches a little beyond the middle of the pelvic spine and the latter reaches almost to opposite rear base of anal fin; caudal peduncle a little compressed, its least depth about $2\frac{1}{2}$ in its length; origin of anal fin a little behind a vertical through rear base of dorsal fin; belly and underside of head completely covered over with rough platelets; no naked area at tip of snout; intestine much coiled; upper ray of caudal fin elongate on the two smaller paratypes, extending considerably behind the other rays.

Color.—Uniformly grayish; peritoneum dusky. My 31-mm. specimen has the basal two-thirds of the paired fins black, and the tips of these fins white; the posterior margin of dorsal is white, a narrow white bar across caudal peduncle, middle of caudal fin white then some black blotches; the tips of the rays are white.

Remarks.—This new species is closely related to *Panaque gibbosus* (Steindachner) but differs in having a more robust body. The greatest depth at origin of dorsal fin is contained $3\frac{3}{4}$ to 4 in the standard length, and the least depth of the caudal peduncle is $2\frac{1}{2}$ to $2\frac{3}{4}$ in its length in *P. suttoni*, but in *P. gibbosus* it is $4\frac{1}{2}$ and 3 to $3\frac{1}{4}$, respectively. Other differences are given in the key.

Named *suttoni* in honor of Dr. and Mrs. Frederick A. Sutton, who were very kind to me while I stayed at the camp of the Lago Petroleum Corporation in Maracaibo.

Genus COCHLIODON Heckel

Cochliodon HECKEL, in Günther, Catalogue of fishes in the British Museum, vol. 5, pp. 231, 238, 1864. (Type, *Hypostomus cochliodon* Kner.)

Cheiridodus EIGENMANN, Mem. Carnegie Mus., vol. 9, No. 1, p. 70, 1922. (Type, *Plecostomus hondae* Regan.)

Eigenmann in describing the genus *Cheiridodus* separated it from *Cochliodon* by the presence of a "small lobe on the outer edge of the base of each tooth." I am able to find such a lobe on small specimens up to a standard length of about 60 mm. from the Maracaibo Basin, but the little lobe disappears with age and the tooth wears down until it becomes cup-shaped. It is possible that *Cheiridodus hondae* (Regan) is very close to *Cochliodon plecostomoides* Eigenmann, neither of which I have seen. The relationship of these two genera needs investigation.

KEY TO THE SPECIES OF COCHLIODON REPORTED FROM VENEZUELA

- 1a. Usually 7 or 8 strongly cup-shaped teeth on ramus of each jaw.
Cochliodon cochliodon (Kner)
- 1b. From 11 to 16 spoon-shaped teeth on ramus of each jaw.
- 2a. Teeth 11 or 12 on each ramus; depth 4.5, head 3.1, in standard length; eye 8.5 in head; least depth of caudal peduncle 3 in its length.
Cochliodon plecostomoides Eigenmann
- 2b. Teeth 13 to 16 on each ramus of jaws. — *Cochliodon pospisili*, new species

COCHLIODON COCHLIODON (Kner)

PANAQUE

Hypostomus cochliodon KNER, Denkschr. Akad. Wiss. Wien, vol. 7, p. 265, pl. 2, fig. 1, 1854 (Río Cujaba).

Plecostomus cochliodon PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Río Apure, Venezuela).

COCHLIODON PLECIOSOMOIDES Eigenmann

Cochliodon pleciostomoides EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 7, 1920 (Río Bue, Maracay, Venezuela) (*nomen nudum*); Mem. Carnegie Mus., vol. 9, No. 1, p. 225, pl. 11, fig. 1, 2, 3, 1922 (type from Quebrada Cramalote, Villavicencio, Colombia; Río Bue at Maracay, Valencia Basin).

COCHLIODON POSPISILI, new species

PLATE 11, C, D

Cheiridodus hondae MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 100, 1942 (Río Menay, 35 km. north of Trujillo, Motatán system, Venezuela).

Holotype.—U.S.N.M. No. 121003, a specimen 66.6 mm. in standard length, taken by Leonard P. Schultz on February 21, 1942, in the Río Palmar near Totuma about 100 km. southwest of Maracaibo.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121010, 13 specimens, 25.2 to 66 mm. in standard length, taken with the holotype and bearing the same data; U.S.N.M. No. 121008, 24 specimens, 15 to 62.6 mm. from the Río Machango about 20 km. above the bridge south of Lagunillas, Maracaibo Basin, March 21, 1942; U.S.N.M. No. 121006, a specimen 14 mm. long from the Río Machango at the bridge, March 16, 1942; U.S.N.M. No. 121009, a specimen 27 mm. in length taken March 6, 1942, in the Río Palmar at the bridge 70 km. southwest of Maracaibo; U.S.N.M. No. 121005, one fish 36.6 mm. in standard length, taken March 25, 1942, in the Río Motatán, 4 km. above Motatán; U.S.N.M. No. 121011, 11 specimens, 21 to 35 mm. long, taken on March 24, 1942, in the Río Motatán, 8 km. below Motatán; U.S.N.M. No. 121007, 46 specimens, 16 to 47 mm., from the Río Motatán at bridge 22 km. north of Motatán, March 17, 1942. All localities in the Maracaibo Basin. In addition, U.S.N.M. No. 121004, 6 specimens, 15 to 19 mm. in standard length that I am not certain are this species because of their small size. They were collected in the Río Socuy 3 km. above its mouth on February 24, 1942.

Description.—Based on the holotype and the numerous paratypes listed above. All measurements are expressed in hundredths of the standard length, those for the holotype first, followed by those for the paratypes in parentheses. Standard length (in mm.) 66.6 (62.6; 56.6); total length (in mm.) 101.6 (95.6; 83.7).

Length of head from tip of snout to rear edge of temporal plate 34.7 (32.8; 36.7); length of head from tip of snout to posterior edge of supraoccipital plate 34.5 (35.6; 37.1); tip of snout to upper edge of gill opening 26.0 (25.9; 26.8); width of head at coracoids or in front of base of pectorals 29.3 (29.7; 29.2); greatest depth of body 22.8 (24.1; 21.2); length of snout 21.9 (20.8; 23.7); width of fleshy inter-orbital space 16.5 (17.4; 17.3); diameter of eye 6.16 (6.70; 6.39); postorbital length of head 9.31 (10.4; 10.8); length of caudal peduncle (distance from base of last anal ray to base of midcaudal fin rays)

32.3 (31.3; 30.2); least depth of caudal peduncle 9.76 (9.26; 9.36); length of base of dorsal fin 25.5 (27.8; 26.7); length of bony dorsal spine 33.9 (36.7; 36.7); length of bony pectoral spine 30.3 (33.7; 32.0); length of anal spine 14.0 (—; 15.0); length of bony pelvic spine 29.3 (29.2; 28.4); length of upper ray of caudal fin 47.4 (—; 45.0); length of lower ray of caudal fin 51.1 (53.2; —); length of shortest midcaudal rays 23.7 (24.4; 24.6); distance from snout to origin of dorsal fin 42.1 (42.8; 44.5); snout to origin of adipose 79.6 (80.0; 83.2); snout to origin of anal 64.7 (64.2; 65.6).

The following counts were made, respectively. Dorsal rays always I, 7; anal always I, 4; pectoral always I, 6; and pelvic I, 5; teeth in ramus of upper jaw on one side 15 (16; 15); and ramus of lower jaw 16 (15; 16); number of scutes in lower lateral series 28 (28; 28); pores in lateral line 29 (29; 29); plates from dorsal to origin of adipose fin 7 (8; 7); plates from last ray of anal to base of midcaudal fin rays 15 (15; 14); always three plates in front of dorsal fin.

Head somewhat depressed, its contour from supraoccipital forward almost straight; supraoccipital convex or arched, the posterior tip extending backward into the plate; the area of the interorbital space above eyes flattish, but the middle two-thirds, convex; the series of lateral plates above and below the lateral line carinate the other scutes on body weakly carinate; no spines on opercle or interopercle; depressed dorsal fin reaching almost to origin of adipose; pectoral spine about one-third the way out the pelvic spine, the latter reaching a little beyond middle of anal fin; belly covered with small platelets, the area of breast in front of bases of pectorals mostly naked (this may become plated on adults however); dorsal fin truncate; caudal fin deeply forked, the lower lobe with the longest ray, although this is variable; caudal peduncle slender, about $\frac{3}{4}$ in its length; intestine much coiled, peritoneum blackish.

Color.—Brownish everywhere, with numerous blackish spots nearly the size of the pupil, except on head where they are very small and more numerous; these large spots occur on fins and on the belly.

Remarks.—This new species is closely related to *Cochliodon plecostomoides* Eigenmann and *Plecostomus hondae* Regan but differs in the number of teeth. *C. pospisili* has 13 to 16 teeth on each ramus of the jaws and *plecostomoides* and *hondae* only 9 to 12.

Named *pospisili* for Frank J. Pospisil, of the Lago Petroleum Corporation, who made it possible for me to collect fishes in the Rio Machango and also in the Andes of Venezuela.

Genus LASIANCISTRUS Regan

Lasiancistrus REGAN, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 224, 1904.

(Type, *Chaetostomus heteracanthus* Günther.)

KEY TO THE SPECIES OF LASIANCISTRUS REPORTED FROM VENEZUELA

1a. Lower lobe of caudal fin blackish; posterior margin of caudal fin pale.

Lasiancistrus mystacinus (Kner)

1b. Caudal fin barred and without a pale edge posteriorly.

Lasiancistrus maracaiboensis, new species

LASIANCISTRUS MYSTACINUS (Kner)

Ancistrus mystacinus KNER, Denkschr. Akad. Wiss. Wien, vol. 7, p. 276, 1854 (Caracas, Venezuela) (ref. copied).—REGAN, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 238, 1904 (Caracas).

Hemiancistrus mystacinus EIGENMANN and EIGENMANN, Occ. Papers California Acad. Sci., vol. 1, p. 420, 1890 (Caracas).

Lasiancistrus mystacinus EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 7, 1920 (no specimens collected).

Chaetostomus mystacinus GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 244, 1864 (Caracas).

LASIANCISTRUS MARACAIBOENSIS, new species

PLATE 11, A, B

Because certain characters are not mentioned in the descriptions of species referred to this genus, it has been difficult, if not impossible, to come to definite conclusions as to the exact differences between this new species and those supposed to be closely related to it. If material were available for examination of each species, I would be more satisfied, but the war prohibits the sending of specimens at present; it is thought best, therefore, to describe this form as a new species, and later, when the genus is revised, the validity of this new species and of others can be determined.

Holotype.—U.S.N.M. No. 121038, a specimen 119 mm. in standard length (the largest one collected) taken by Leonard P. Schultz in the Río Socuy, 3 km. above its mouth on February 24, 1942.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121049, 8 specimens, 65.6 to 111 mm. in standard length, taken along with the holotype and bearing the same data; U.S.N.M. No. 121043, 2 specimens, 37.3 and 46 mm., taken March 2, 1942, in the Río Negro below the mouth of Río Yasa, Maracaibo Basin; U.S.N.M. No. 121039, 17 specimens, 23.5 to 73 mm., taken February 21, 1942, in the Río Palmar near Totuna, about 100 km. west of Maracaibo; U.S.N.M. No. 121041, 2 specimens, 27.5 and 66.5 mm., taken March 6, 1942, in the Río Palmar at the bridge 70 km. southwest of Maracaibo; U.S.N.M. No. 121046, 1 specimen, 20 mm., collected March 21, 1942, in a creek close by a hot spring tributary to Río Machango, about 20 km. above the bridge south of Lagunillas; U.S.N.M. No. 121044, 3 specimens, 33.5 to 41 mm., taken March 21, 1942, in the Río Machango 20 km. above the bridge south of Lagunillas; U.S.N.M. No. 121048, 34 specimens, 26.5 to 92 mm. collected March 25, 1942, in the Río Motatán, 4 km. above Motatán, Maracaibo Basin;

U.S.N.M. No. 121047, 85 specimens, 14.5 to 49 mm., collected March 24, 1942, in the Río Motatán, 8 km. below Motatán; U. S. N.M. No. 121045, 91 specimens, 14.5 to 70 mm., taken March 17, 1942, in the Río Motatán, at the bridge 22 km. north of Motatán; U.S.N.M. No. 121040, 49 specimens, 14.4 to 73 mm., collected March 24, 1942, in the Río Jimelles, 12 km. east of Motatán, tributary of Río Motatán; U.S.N.M. No. 121050, 11 specimens, 24.2 to 90.5 mm., taken March 20, 1942, in the Río San Pedro, a tributary of the Río Motatán, at the bridge south of Mene Grande; U.S.N.M. No. 121042, 36 specimens 18.5 to 70 mm., collected March 17–20, 1942, in the Río San Juan near the bridge south of Mene Grande, tributary of Río Motatán.

Description.—Based on the holotype and paratypes listed above. Detailed measurements are expressed in hundredths of the standard length, those for the holotype first, followed by those for the paratypes in parentheses, respectively. Standard length (in mm.) 119 (92; 80.7; 62.5; 45.6); total length 156 (122.8; 99; 86.3; 63.6) mm.

Length of head from tip of snout to rear edge of temporal plate 40.7 (38.3; 37.5; 38.4; 38.1); length from tip of snout to posterior tip of supraoccipital 38.7; (37.8; 37.3; 37.9; 38.6); width of head at base of pectoral spine 33.2 (29.8; 31.2; 32.3; 31.1); postorbital length of head 14.2 (12.3; 12.4; 12.0; 12.1); greatest depth of body 19.9 (14.9; 18.6; 17.1; 15.3); length of snout 22.7 (23.9; 22.3; 23.0; 21.9); width of fleshy interorbital space 18.1 (16.4; 17.3; 16.8; 17.1); distance from eye to bony edge of nostril 6.80 (5.10; 5.95; 5.60; 5.92); longest spine of interopercle 13.9 (11.4; 15.5; 13.6; 10.3); diameter of eye 5.46 (5.10; 5.08; 5.76; 6.58); length of ramus of lower jaw 5.12 (5.87; 4.83; 6.72; 6.68); greatest width of lower lip 5.55 (5.87; 5.70; 6.72; 6.58); length of caudal peduncle (distance from base of last anal ray to base of midcaudal fin rays 27.5 (28.5; 29.2; 29.6; 27.2); least depth of caudal peduncle 10.1 (10.0; 9.82; 10.1; 9.42); length of depressed dorsal fin 36.9 (37.1; 35.0; 35.2; 36.2); length of anal fin 13.0 (12.5; 12.4; 13.9; 12.1); length of base of dorsal fin 21.8 (20.8; 20.4; 21.0; 20.6); length of dorsal spine 26.0 (27.2; 26.0; 24.3; 26.3); length of adipose spine 7.56 (9.13; 8.18; 7.36; 9.65); length of pectoral spine 33.8 (36.5 31.7; 33.1; 30.7); length of pelvic spine 25.6 (26.4; 26.0; 27.2; 26.5); length of anal spine 11.7 (11.5; 10.2; 11.7; 9.42); length of upper ray of caudal fin 29.5 (30.5; 30.5; 30.4; 33.3); length of lower ray of caudal fin — (34.1; 36.0; 35.2; 36.0); distance from snout to origin of dorsal fin 46.7 (46.2; 45.6; 48.0; 45.2); snout to origin of adipose fin 84.0 (81.2; 81.8; 82.7; 85.6); snout to origin of anal fin 70.3 (67.0; 68.2; 70.7; 70.2); snout to insertion of pelvic fin 48.5 (47.8; 49.2; 48.3; 49.4).

The following counts were made, respectively: Dorsal rays always I, 7; anal rays always I, 5; pectoral rays always I, 6, and pelvic I, 5; number of plates in lower lateral series 25 (24; 24; 24; 24); plates

from base of anal to base of midcaudal fin rays 12 (12; 12; 12; 12); plates in front of dorsal fin 4 (4; 4; 4; 4); plates from dorsal to origin of adipose fin 6 (6; 6; 6; 6); number of spines and bristles on the interopercle about 22+22 (23+14; 20+15; 21+12; 22+18); for additional counts see table 20.

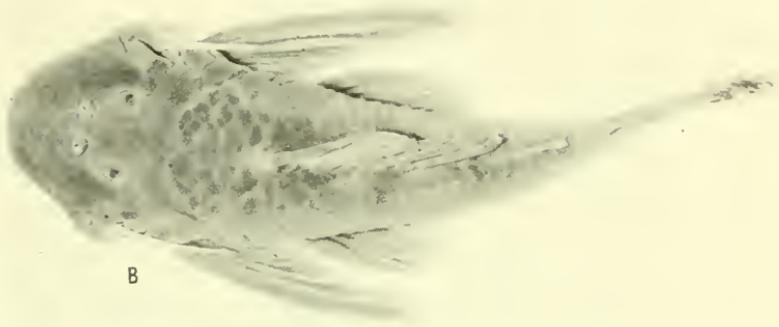
Head depressed, the interorbital flat, a slightly convex ridge on middorsal line of snout; snout prickly all over except a small naked area near tip; rarely absent in large adults; width of head at base of pectorals equal to snout and $1\frac{1}{4}$ to $1\frac{3}{4}$ eye diameters; the depressed dorsal extends to origin of adipose or falls short of it by one plate; caudal fin very deeply forked; the shortest middle rays of young one-half length of lower caudal fin ray, which is longest; posterior margin of dorsal fin slightly convex; belly naked to origin of anal fin; pectoral spines extending about one-third the way along the pelvic spines, a little longer in males than in females; barbel at corners of mouth, shorter than pupil; posterior margin of lower lip finely papillate and without lappets; length of bony ramus of lower jaw $2\frac{1}{2}$ in interorbital space; the interopercle has a rosette of about 20 to 25 spines, and around the outer anterior margin of these there are usually 10 to 20 long hairlike bristles; each spine and bristle is enclosed basally in a thick dermal sheath that may be expanded distally to enclose the entire spine except its tip; the interopercular spines can be folded down and most of them under the opercle; bristles do not appear to be present in the young, and the number of bristles increases with size; teeth in jaws bifid, very small and numerous; plates on body not keeled, but they are covered with tiny spinules; the first ray of all the fins is enlarged and covered with spinules; intestine coiled.

Color.—The general color is grayish, or brownish to blackish brown, with the upper and lower surfaces everywhere with faint pale spots, smaller on the head than posteriorly; these pale spots are absent in the young and sometimes rather obscure in certain adults; no black spots along base of dorsal fin; all fins, except anal and adipose, are barred, the ground color of the fins dark, with the pale spots on the fin rays and not in the membranes between the rays; the number of bars on the fins increases with age, varying from three or four to about six or seven. In some of the smaller specimens there are four or five obscure darkish saddles across the back, one in front of dorsal, the second through front of dorsal fin, third behind base of dorsal, fourth in front of adipose fin and the last under rear of adipose fin; these saddles more or less join to form a dark streak along midsides; lateral line pores white.

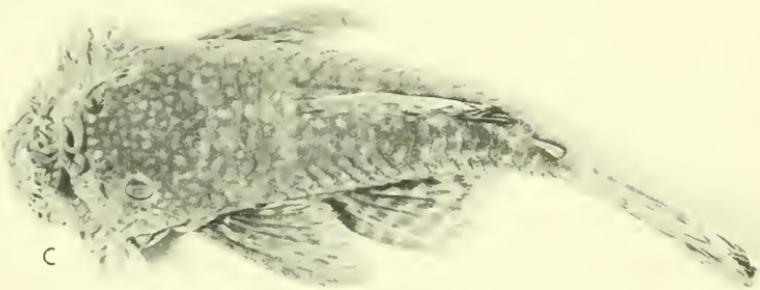
Remarks.—This new species can be distinguished from all other species with I,5 anal rays referred to the genus *Lasiancistrus* by its numerous (20 to 25) spines on the interopercle, except from *L. mystacinus* Kner, *L. caucanus* Eigenmann, *L. mayoloi* Eigenmann, and *L.*



A



B

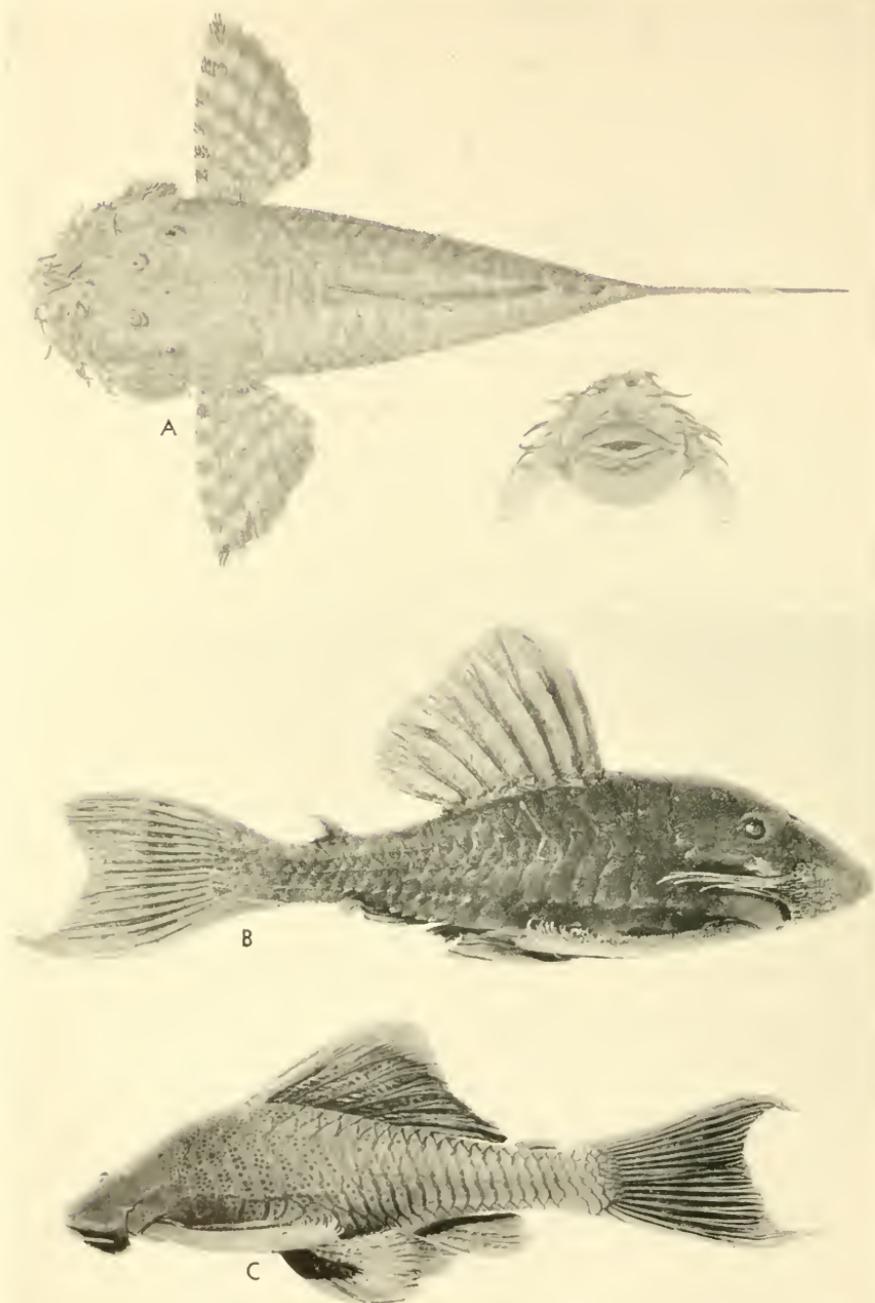


C

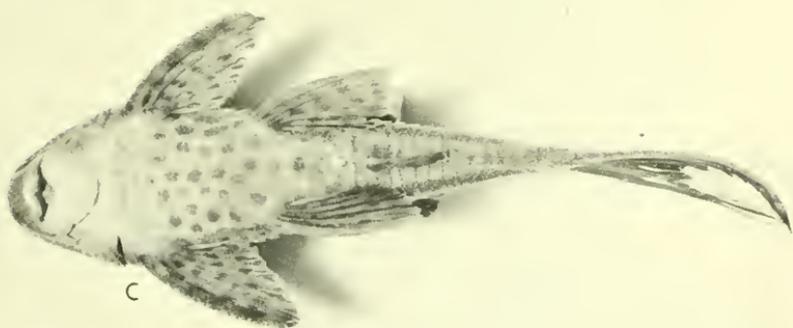
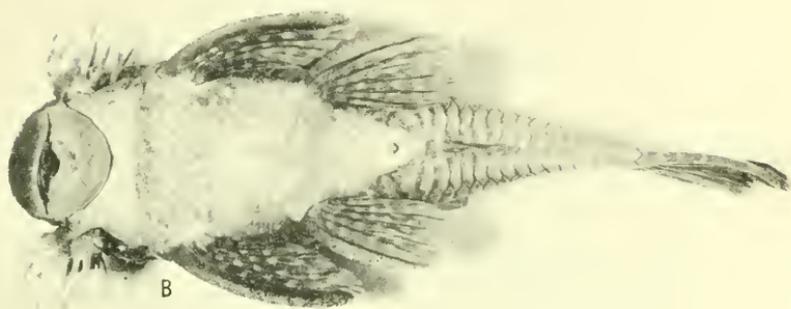


D

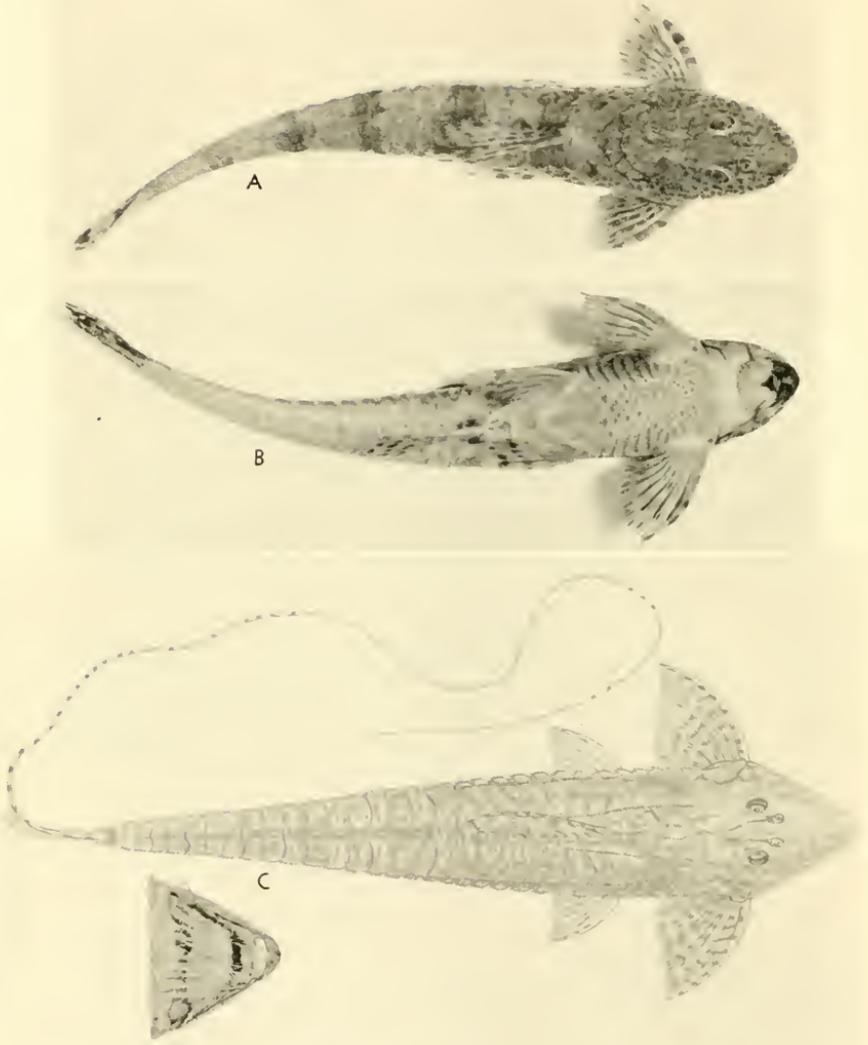
A, B, *Pseudancistrus pediculatus cobrensis*, new subspecies: Holotype (U.S.N.M. No. 121036), 78.6 mm. in standard length; C, D, *Ancistrus triradiatus martini*, new subspecies: Holotype (U.S.N.M. No. 121064), 81.5 mm. Photographs.



A, *Ancistrus brevifilis bodenhameri*, new subspecies: Holotype (U.S.N.M. No. 121066), 61.2 mm. in standard length; B, *Panaque suttoni*, new species: Holotype (U.S.N.M. No. 121033), 280 mm.; C, *Hemiancistrus maracaiboensis*, new species: Holotype (U.S.N.M. No. 121012), 285 mm. A, drawing; B and C, photographs.



A, B, *Lasiancistrus maracaiboensis*, new species: Holotype (U.S.N.M. No. 121038), 119 mm. in standard length; C, D, *Cochliodon pospisili*, new species: Holotype (U.S.N.M. No. 121003), 66.6 mm. Photographs.



A, B, *Loricaria uracantha rupestre*, new subspecies: Holotype (U.S.N.M. No. 121102), 79 mm. in standard length; C, *L. variegata venezuelae*, new subspecies: Holotype (U.S.N.M. No. 121108), 161 mm. A, B, photographs; C, drawing.

planiceps (Meek and Hildebrand). *L. mystacinus* has the lower lobe of the caudal blackish, but in *L. maracaiboensis* the lower lobe of the caudal is the same as rest of the fin, barred and without a pale posterior edge; *L. caucanus* has only 10 or 11 plates from the anal to the caudal fin base, 7 plates from dorsal to adipose origin, while the new species has 12 or 13 and 5 or 6, respectively; *L. planiceps* has seven scutes from dorsal to adipose, and pale spots on the membranes between the rays of the dorsal, while in *maracaiboensis* there are five or six plates and no pale spots on the membranes of any of the fins, the pale spots occurring on the rays instead; *L. mayoloi* appears to be closely related to *maracaiboensis* in regard to number of spines and plates, but the new species has the lateral line pores conspicuously white not shown on drawings or mentioned in descriptions of *mayoloi* or any other species of *Lasiancistrus*.

Named *maracaiboensis* for the basin in which it was taken in many localities.

TABLE 20.—Counts recorded for species of *Lasiancistrus*

Species	Number of fin rays		Number of plates															
	Dorsal	Anal	In lower lateral series				From dorsal fin to origin of adipose fin				From anal to midbase of caudal fin							
			1, 7	1, 5	24	25	26	27	5	6	7	8	10	11	12	13		
<i>caucanus</i>	1	1			1	1					1			1				
<i>mayoloi</i>	1	1	1	1						1							1	
<i>planiceps</i>	1	1	1	1							1					1	1	
<i>mystacinus</i>	1	1	1								1						1	
<i>maracaiboensis</i> ...	13	13	28		12					3	34						32	6

Genus HEMIANCISTRUS Bleeker

Hemiancistrus BLEEKER, Nederl. Tijdschr. Dierk., vol. 1, p. 78, 1863. (Type *Ancistrus medians* Kner.)

HEMIANCISTRUS MARACAIBOENSIS, new species

CAJALO

PLATE 10, C

Holotype.—U.S.N.M. No. 121012, a specimen, 285 mm. in standard length, collected by Leonard P. Schultz near the mouth of the Río Concha in Lago Maracaibo on May 2, 1942.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121014, a specimen 200 mm. in standard length, from an isolated muddy pool

of the Río San Ignacio, 25 km. south of Rosario, Maracaibo Basin, on February 26, 1942; U.S.N.M. No. 121013, 2 specimens, 85.7 and 210 mm., from a caño, half a mile west of Sinamaica, Maracaibo Basin, March 11, 1942.

The holotype and paratypes when captured were all living on muddy bottoms and in shallow water.

Description.—Based on the holotype and three paratypes. Detailed measurements and counts are presented in table 21.

Bony ramus of upper and lower jaws about equal in length, the teeth bifid, the inner lobe much the largest, teeth numbering about 27 to 32 above and 26 to 31 below; barbel at corner of mouth $1\frac{1}{2}$ to $2\frac{1}{4}$ in the interorbital space; supraoccipital with a rounded keel in the middorsal line posteriorly and bounded posteriorly by a single median plate in the adult, but in the small specimen this plate has not yet fused in the middorsal line to form a single plate; the next dorsal plate is double, but the first plate in front of the dorsal fin origin is a single plate with expanded wings; interorbital space convex, rims of orbits dorsally a little elevated, especially so in the young; snout with prickles to its tip and no naked area present; breast and belly with platelets, rough in the young; the interopercle is movable, but the spine on it is not concealed by the opercle; interopercle and opercle not so freely movable as in other related genera; most of the plates of the body are keeled, especially in the young, these plates becoming smoother with age; body robust, its greatest depth at origin of dorsal, 3.8 to 4.0 in the standard length, width of body at coracoids 3.0 to 3.4 and head 2.9 to 3.3; ramus of lower jaw 3.0 to 3.6 in interorbital space; eye 4.0 to 6.9, in snout, and 7 to 12 times in the head; the least depth of the caudal peduncle is contained 2.4 to 3.3 in its length; the pectoral spine, very spiny in the adults, reaches past middle of the pelvic spine; the depressed dorsal fin on the adult does not quite reach the origin of the dorsal, falling short by one plate, but in the young it reaches to opposite the base of the caudal fin; the caudal fin with outer upper and lower rays exerted is less deeply forked in the large specimens; the depressed anal fin reaches to opposite the middle of the adipose; in the small specimen a keel extends backward from upper part of eye, but in the adult the ridges on the head are obsolete; the interopercle has one spine, hooked at its tip, and several very short small points or spines around it, but on the young the hooked spine is undeveloped.

Color.—Ground color of body brownish to blackish, the upper parts of head with very numerous small black spots, larger in the young; sides of body anteriorly with numerous larger black spots, these absent on the caudal peduncle; but present on the belly and undersides of the head; in the young the spots are much larger and less

numerous; all the fins except the caudal with rows of black spots, those on the dorsal membranes in two rows and numbering about 10 to 12, in the young but 9; caudal fin plain blackish, anus white; peritoneum more or less dusky.

Named *maracaiboensis* in reference to the Maracaibo Basin, where the species was collected.

TABLE 21.—Measurements, expressed in hundredths of the standard length, and counts made on four specimens of *Hemiancistrus maracaiboensis*

Character	Paratype	Paratype	Paratype	Holotype
Standard length (in mm.)	85.7	210	200	285
Total length (in mm.)	139	322	295	425
Head—tip of snout to posterior edge temporal plate	36.7	31.2	32.7	31.2
Greatest depth	26.3	25.1	24.8	26.9
Length of snout	20.5	17.9	18.0	19.9
Width of interorbital space	16.5	13.9	13.5	12.3
Diameter of eye	5.25	3.29	3.25	2.63
Postorbital length of head	11.1	10.5	10.8	10.3
Tip of snout to rear of supraoccipital	36.9	31.4	31.3	30.5
Distance nostril to eye	4.20	4.29	3.85	4.25
Length of maxillary barbel	5.95	7.62	6.75	6.84
Length of ramus of lower jaw (bony)	4.67	3.82	4.50	4.21
Width of head at coracoids	33.3	29.8	30.8	30.2
Least depth of caudal peduncle	10.8	10.1	11.4	10.6
Length of caudal peduncle	30.6	33.4	28.5	28.9
Length of dorsal spine		36.8	38.1	37.2
Length of anal spine	22.2	20.0	19.8	18.6
Length of pectoral spine	38.5	37.2	36.6	39.3
Length of adipose spine	7.59	7.14	7.40	7.26
Length of pelvic spine	33.3	28.1	30.0	28.6
Length of depressed dorsal	68.8	47.4	49.8	50.5
Length of depressed anal	23.9	20.0	20.8	21.9
Distance from snout to origin of dorsal	43.4	40.1	43.7	40.0
Distance from snout to origin of adipose	82.9	84.8	87.5	86.0
Distance from snout to origin of anal	64.4	65.7	68.0	67.0
Length of longest interopercular spine		0.95	3.80	2.63
Length of base of dorsal	35.2	32.1	31.7	33.0
Length of longest upper ray of caudal	64.8		47.9	44.8
Length of longest lower ray of caudal		50.2	47.5	47.5
Length of shortest middle ray of caudal	23.8	24.2	20.8	29.3
Dorsal rays	I, 7	I, 7	I, 7	I, 7
Anal rays	I, 4	I, 4	I, 4	I, 4
Pelvic rays	I, 5	I, 5	I, 5	I, 5
Pectoral rays	I, 6	I, 6	I, 6	I, 6
Number of plates in lower lateral series	26	26	26	26
Number of plates anal base to caudal fin base	13	13	13	13
Number of plates dorsal to adipose	7	7	7	7
Number of plates before dorsal	3	3	3	3
Number of pores in the lateral line	27	27	27	27
Number of teeth in jaws	27/26	30/28	32/31	30/28

Remarks.—Considerable uncertainty as to the limits of some of the species of *Hemiancistrus* already described for northern South America makes it difficult to distinguish the species. It appears from my material and that figured by Eigenmann that in some characters the species referred to this genus must vary considerably with age, such

as fusion in the middorsal line of the plate behind the supraoccipital to form a single plate in large specimens; the dorsal fin becomes less high and when depressed does not extend so far back in the adults as in those less than 100 mm. in standard length; the spines on the interopercle and distal part of the pectoral spine develop with age, while the spiny keels on the plates of head and body are reduced with age, almost obsolete on the head. *H. maracaiboensis* differs from the following species in northern South America: *H. landoni* Eigenmann, *H. annectens* (Regan), *H. holostictus* Regan, *H. wilsoni* Eigenmann, *H. schomburgkii* (Günther), and *H. braueri* Eigenmann, in a more robust body and head, depth 3.8 to 4.0 instead of 4.75 to 8 times in the species listed above. The single short hooked spine on the interopercle among other characters helps to distinguish this species. *H. megacephalus* (Günther) has a smooth lower surface on body, rough in the new species.

Genus HYPOSTOMUS Lacepède

Hypostomus LACEPÈDE, Histoire naturelle des poissons, vol. 5, p. 144, 1803.
(Type, *Hypostomus guacari* Lacepède = *Loricaria plecostomus* Linnaeus.)

KEY TO GENUS HYPOSTOMUS, AFTER EIGENMANN (1912)

- 1a. Supraoccipital bone bordered posteriorly by a single nuchal plate; plates along sides 25 or 26; ramus of lower jaw 3 times in interorbital space.
Hypostomus plecostomus (Linnaeus)
- 1b. Supraoccipital bone bordered posteriorly by a median plate and 1 or 2 or more at each side; plates along lower sides 28 to 30.
- 2a. Caudal peduncle normally formed, scutes of fourth series not strongly angulated; ramus of lower jaw 2.8 to 3.2 in interorbital space.
Hypostomus watwata Hancock
- 2b. Caudal peduncle broad and flat below, scutes of fourth series strongly angulated; ramus of lower jaw 3 to 4 in interorbital space.
Hypostomus emarginatus Cuvier and Valenciennes

HYPOSTOMUS PLECASTOMUS (Linnaeus)

PANAQUE

- Acipenser plecostomus* LINNAEUS, Systema naturae, ed. 10, p. 258, 1758 (ref. copied).
- Plecostomus guacari* LACEPÈDE, REGAN, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 206, 1904 (River Amazon, Guiana, Venezuela, Trinidad); Proc. Zool. Soc. London, 1906, vol. 1, p. 389 (Paraguay to Venezuela, Trinidad).
- Plecostomus bicirrhosus* GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 231, 1864 (Venezuela).
- Plecostomus plecostomus* (Linnaeus) RIBEIRO, Arch. Mus. Nac. Rio de Janeiro, vol. 16, No. 4, p. 47, 1911 (Venezuela).—EIGENMANN, Indiana Univ. Studies, vol. 7, p. 44, 1920 (Concejo, Río Tuy, and Río Tiquirito; Isla del Buro; Maracay, Río Bue; Venezuela).—PEARSE, Univ. Wisconsin Studies, No. 1, p. 23, 1920 (Isla del Buro, Lago Valencia, Venezuela).—EIGENMANN, Mem. Carnegie Mus., vol. 9, No. 1, p. 223, 1922 (Lago Valencia, Río Tuy, Venezuela).—RIBEIRO, Rev. Mus. Paulista, vol. 10, p. 713, 1918 (Río Cabriale, Venezuela).

HYPOSTOMUS WATWATA Hancock

ARMADILLO DE RÍO

- Hypostomus watwata* HANCOCK, Zool. Journ., vol. 4, p. 245, 1828 (Georgetown) (ref. copied).
- Hypostomus plecostomus* (not of Linnaeus) CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 15, p. 489, 1840 (Laguna de Maracaibo).
- Plecostomus verres* (Valenciennes) REGAN, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 209, 1904 (Venezuela, Guiana, Marajo Island).—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 436, 1911 (Pedernales, Venezuela).
- Plecostomus watwata* (Hancock) FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 408, 1931 (Caño Guanoco; Yarapa River at Yarapa; stream at La Soledad, Yarapa; Punta Tigre, at mouth St. Juan River, Venezuela).

Collections made by Leonard P. Schultz in the Maracaibo Basin of Venezuela in 1942:

U.S.N.M. No. 121019, Río Apón, about 35 km. south of Rosario, February 26, 1 specimen, 405 mm.

U.S.N.M. No. 121020, Río Socuy, about 3 km. above mouth, February 24, 3 specimens, 204, 232, and 450 mm.

U.S.N.M. No. 121297, 7 larvae with yolk sac may belong to this species, from Río Socuy. Same data.

U.S.N.M. No. 121021, Río Negro, below mouth of Río Yasa, 75 km. south of Rosario, March 2, 1 specimen, 365 mm.

U.S.N.M. No. 121022, Ciénaga del Guanavana, 10 km. north of Sinamaica, March 11, 1 specimen, 490 mm.

U.S.N.M. No. 121023, Río Palmar at bridge 70 km. southwest of Maracaibo, March 6, 3 specimens, 15 to 37 mm.

U.S.N.M. No. 121024, Río Socuy, 3 km. above mouth, February 24, 9 specimens, 14.5 to 40 mm.

U.S.N.M. No. 121025, Ciénaga del Guanavana, about 10 km. north of Sinamaica, March 11, 11 specimens, 14 to 16 mm.

U.S.N.M. No. 121026, Río Motatán, 8 km. below Motatán, March 24, 3 specimens, 15 to 18 mm.

U.S.N.M. No. 121027, Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21, 9 specimens, 29 to 60 mm. and one 225 mm.

U.S.N.M. No. 121028, Río Apón about 35 km. south of Rosario, February 26, 24 specimens, 14.5 to 59.5 mm.

U.S.N.M. No. 121029, Río Motatán at bridge 22 km. north of Motatán, March 17, 60 specimens, 19 to 67 mm.

U.S.N.M. No. 121030, Lago Maracaibo, 1 km. off Pueblo Viejo, April 7-9, 1 specimen, 188 mm.

U.S.N.M. No. 121031, Lago Maracaibo, near mouth of Río Concha, May 2, 2 specimens, 181 and 290 mm.

U.S.N.M. No. 121032, caño half a mile west of Sinamaica, March 11, 9 specimens, 53 to 177 mm.

This species is one of the commonest fishes in the lowland waters of the Maracaibo Basin and occurs in the market at Maracaibo in large numbers on certain days. It is taken most frequently over muddy bottoms of swamps and of the rivers as well as in Lago Maracaibo. The measurements in table 22 indicate the general change in shape of the body with age.

TABLE 22.—Measurements and counts made on 5 specimens of *Plecostomus watwata* Hancock from the Maracaibo Basin

Characters	1	2	3	4	5
Standard length (In mm.)	73	171	181	290	450
Depth in standard length	5½	5	5½	6	7¼
Head in standard length	2½	3¼	3¼	3¼	3¾
Width head in standard length	3½	3½	3¾	4½	4¾
Width head in its length	1¼	1¾	1¾	1¼	1¼
Snout in head	1¾	1½	2	1½	1½
Eye in head	5¼	7½	8½	9	11½
Interorbital in head	2½	2½	2½	2½	2½
Ramus lower jaw in interorbital	2½	3	3½	2¾	3¼
Depth caudal peduncle in its length	3½	4	3¾	5	5¾
Scutes in lower lateral series	28	28	28	28	28
Scutes dorsal to adipose fin	7	8	7	7	8
Scutes anal to caudal fin base	15	15	15	15	15
Number of teeth	2½ ₈	2½ ₆	2½ ₈	2½ ₃	3½ ₂

There is considerable variation in the fusion of the plates bordering the supraoccipital; in the young the plate at the apex of the supraoccipital is in two parts, but on the large specimens 300 to nearly 490 mm. these plates appear to be fused into a single plate.

When alive, this species is yellowish brown, with numerous black spots all over its body and fins.

HYPOSTOMUS EMARGINATUS Cuvier and Valenciennes

PANAQUE

Hypostomus emarginatus CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 15, p. 500, 1840 (Brazil).

Plecostomus emarginatus REGAN, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 210, 1904 (Brazil to Colombia).—RIBEIRO, Arch. Mus. Nac. Rio de Janeiro, vol. 16, No. 4 p. 42, pl. 24, fig. 1, 1911 (Venezuela).

Plecostomus villarsii LÜTKEN, Vid. Medd. Naturh. Foren. Kjøbenhavn, pts. 12–16, p. 211, 1874 (Caracas, Venezuela).—EIGENMANN and EIGENMANN, Occ. Pap. California Acad. Sci., vol. 1, p. 408, 1890 (Caracas).

Plecostomus horridus PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 471 (Cala-boza, Venezuela).

Genus LORICARIA Linnaeus

Loricaria LINNAEUS, Systema naturae, ed. 10, p. 307, 1758. (Type, *Loricaria dura* Linnaeus=*Loricaria cataphracta* Linnaeus.)

KEY TO THE SPECIES OF LORICARIA¹¹ REPORTED FROM VENEZUELA

- 1a. Upper lip narrow with a single row of barbels around its margin, and without or with not more than a single row of rudimentary papillae between row of barbels and rami of upper jaw, the latter protrusible and bearing 7 to 13 small bilobed teeth; barbel at corner of mouth not reaching gill opening.

¹¹ Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 153, 1899, reports *Loricaria maculata* Bloch from the Apure River. Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 15, p. 479, 1840 (Orinoco), and Günther, Catalogue of the fishes in the British Museum, vol. 5, p. 260, 1864, both mention *Loricaria brunnea* from the Orinoco. I have not included these species in the key because of the uncertainty of just what forms they might be.

2a. Barbels in front of rami of upper jaw not larger or stouter than those at each side of rami; plates in front of dorsal smooth or with traces of low ridges, but not sharply keeled; belly covered with plates, even on those specimens only 40 mm. in standard length; two black blotches at each side of a pale median area on upper lips or underside of snout; a blackish blotch near base of barbel at corner of mouth, then a pale area forward; preanal plate bounded anteriorly with 3 plates; tip of snout with a small naked area.

3a. Three plates across belly between fourth ventrolateral plates in front of insertion of pelvics; 15 or 16 + 14 or 15 plates in lower lateral series along sides.....*Loricaria magdalenae* Steindachner

3b. Five to seven, usually six, plates on belly between fourth ventrolateral plates in front of pelvic insertions; 13 to 17 + 12 to 16 plates along sides of body.....(*Loricaria uracantha* Kner and Steindachner)

4a. Plates anteriorly along midsides with the two keels widely spaced numbering 12 to 17 (usually 14 or 15), and posterior plates with the keels close together numbering 12 to 16 (usually 14); barbels on margin of lower lip usually 17 to 22; width of body at anal origin in length of caudal peduncle 3.2 to 5.5 (usually 3.9 to 5.2), the males are broader and shorter; no black pigment on naked area of body at front base of anal fin (Río Chagres, Panama).

Loricaria uracantha uracantha Kner and Steindachner

4b. Plates anteriorly along midsides with the keels widely spaced numbering 15 to 17 (usually 16), and posterior plates with the keels close together numbering 12 to 14 (usually 13 or 14); barbels along margin of lower lip numbering 13 or 20 (usually 15 to 19); width of body at anal origin 3.1 to 4.0 (usually 3.2 to 3.7); along each side of anterior part of base of anal fin occurs black pigment areas on the naked area of the body except in certain small specimens (Maracaibo Basin).....*Loricaria uracantha rupestre*, new subspecies

2b. Four enlarged fleshy barbels in front of rami of upper jaw, a few times longer than those at each side; plates along sides 18 to 21 + 9 to 13; about 21 to 30 barbels along margin of lower lip; plates in front of dorsal keeled; membrane between thick portions of lower lip and whitish barbel at corner of mouth, blackish, rest of lower lips whitish; spiny ray of pelvics produced beyond tips of branched rays.

Loricaria filamentosa Steindachner

1b. Upper lip wider, with 2 or more well-developed rows of elongate barbels and papillae in front of mouth; all plates in front of dorsal keeled.

5a. Lower lip with short tentacles and lower lip with barbels, those along rear margin reaching to gill opening and one at corner of lip reaching past gill opening; front of mouth inside rami of upper jaw with a pair of median tentacles followed by a pair of lateral ones.

6a. Belly plated, about 6 plates across belly, between fourth ventrolateral plates in front of pelvic insertion; none of barbels along margin of lower lip bearing numerous short tentacles; plates along sides 18 to 20 + 13 to 16.....*Loricaria cataphracta* Linnaeus

6b. Belly with a median series of plates, each side of which is a naked area; 13 to 16 barbels along rear margin of lower lip that bear several papillae and short tentacles; plates along sides 13 to 16 + 15 to 19.

(*Loricaria variegata* Steindachner)

7a. First two plates along front of base of dorsal with serrated keels and occasionally the third plate having a low keel, all ending in small

spines; width of plate through origin of anal fin contained 3.2 to 3.4 in adults and 3.8 times in young in distance from anal fin base to caudal fin base; keels on dorsal surface anteriorly all with small serrations; underside of body white. (Maracaibo Basin.)

Loricaria variegata venezuelae, new subspecies

- 7b. Only first plate at each side of front of base of dorsal fin with a keel, second plate having an obsolete smooth keel only rarely; width of body at origin of anal fin contained 3.8 to 4.1 in adults and nearly 5 times in young in distance from base of anal fin to base of caudal fin; keels on dorsal surface anteriorly lower and smoother; underside of body posteriorly with brown splotches.

Loricaria variegata variegata Steindachner

- 5b. Lower lip with papillae and a fringe of short barbels along its posterior margin; none of barbels or tentacles reaching gill opening; inside of mouth with short papillae not much longer than papillae on lower lips; plates usually 18 to 21 + 10 to 13.

(*Loricaria gymnogaster* Eigenmann and Eigenmann)

- 8a. Widely spaced keels on lateral plates anteriorly numbering 19 to 21 (usually 20) and those plates posteriorly on sides of caudal peduncle with keels all close together numbering 10 to 13 (usually 11). (Maracaibo Basin)---*Loricaria gymnogaster lagoichthys*, new subspecies
- 8b. Widely spaced keels on lateral plates anteriorly 18 or 19 (usually 18) and keels uniformly close together posteriorly about 12 or 13 (usually 13).

Loricaria gymnogaster gymnogaster Eigenmann and Vance

LORICARIA MAGDALENAE Steindachner

Loricaria magdalena STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 39, p. 74, 1878; vol. 41, pl. 7, figs. 2, 2a, 3; 3a, 3b, 1879 (Río Magdalena).

Two of Eigenmann's specimens of *L. jubata* from Istimina, Colombia (U.S.N.M. No. 79242), do not appear to agree in the number of plates across the midventral region of the belly as indicated by him in his key (Mem. Carnegie Mus., vol. 9, p. 88, 1922) for this species. There is not enough material available to enable me to work out the relationships between *jubata*, *magdalena*, and the form in the Maracaibo Basin, but from the material at hand the Maracaibo form appears to be a little more robust, and perhaps when an adequate study is made this will be considered as a distinct subspecies.

The following collections were made by Leonard P. Schultz in the Maracaibo Basin of Venezuela in 1942:

U.S.N.M. No. 121113, 8 specimens, 57 to 116 mm. in standard length, from a caño half a mile west of Sinamaica, March 11.

U.S.N.M. No. 121114, 7 specimens, 54 to 203 mm., from the Río San Ignacio in a pool left by drying up of river during dry season, about 20 km. south of Rosario, February 26.

U.S.N.M. No. 121117, a specimen 42.5 mm., taken in the Río Machango at the bridge south of Lagunillas, March 16.

U.S.N.M. No. 121116, a specimen 47 mm., from the Río San Juan, 12 km. south of Rosario, Estado de Zulia, February 26.

U.S.N.M. No. 121115, a specimen 78 mm. from Lago Tulé, about 80 km. west of Maracaibo, 5 km. from Río Socuy, March 1.

LORICARIA URACANTHA RUPESTRE, new subspecies

PLATE 12, A, B

Holotype.—U.S.N.M. No. 121102, a male specimen 79 mm. in standard length, taken by Leonard P. Schultz, March 20, 1942, in the Río San Pedro at the bridge south of Mene Grande, Motatán system, Maracaibo Basin.

Paratypes (all taken by L. P. Schultz).—U.S.N.M. No. 121104, 39 specimens, 45 to 85 mm. in standard length, taken along with the holotype and bearing the same data; U.S.N.M. No. 121105, 67 specimens, 27 to 91 mm., collected March 17–20, 1942, in the Río San Juan above the bridge south of Mene Grande, Motatán system; U.S.N.M. No. 121103, 4 specimens, 20 to 78 mm., collected March 25, 1942, from the Río Motatán, 4 km. above Motatán; U.S.N.M. No. 121106, 3 specimens, 38 to 90 mm., taken April 1, 1942, in the Río Táchira 7 km. north of San Antonio, Catatumbo system, Maracaibo Basin; U.S.N.M. No. 121107, 2 specimens, 24 and 28 mm., taken March 24, 1942, in the Río Motatán 8 km. below Motatán.

The above listed specimens were taken in rapidly to slow flowing water among small stones and rubble; none was seen over muddy bottom.

Description.—Based on the holotype and paratypes listed above. In table 24 are recorded certain measurements for the holotype and two paratypes, as well as for a specimen of *Loricaria uracantha uracantha* from the Río Chagres, Panama.

The following counts were made on the holotype and paratypes, respectively: Dorsal rays I, 7, I, 7, I, 7; anal I, 5; I, 5; I, 5; pectoral always I, 6; pelvic always I, 5; caudal fin rays always $i+10+i$; plates along mid sides 17+13; 15+14; 16+12; plates from last ray of anal fin (including the plate in which last ray occurs) to base of caudal fin 18; 17; 17; teeth in ramus of upper jaw 8; 8; 9; and in lower jaw 9; 10; 9; barbels 20; 16; 20; 6 or 7 plates across middle of belly between the fourth plates in front of pelvic fin base.

Body greatly depressed, covered all over with bony plates, those along sides with keels that end in a spine; supraoccipital with a pair of low keels diverging posteriorly; next two median plates behind supraoccipital with a pair of low keels, but the plate in front of the origin of the dorsal fin without keels; orbital rims a little elevated, the interorbital space concave, area between nostrils convex, this convexity extending to tip of snout; eye with a notch posteriorly; adult males with bristles along checks and on top of head and body from between eyes to second plate in front of dorsal fin; all fins rather short, the upper ray of caudal fin filamentous, this about half standard length on some specimens; upper surface of pectoral rays of males spiny; first ray of each fin a little produced except on adult males;

lips papillate, but the papillae are larger and fewer than in other species and usually with tiny papillae between the large ones; barbel at corner of mouth not nearly reaching to gill opening; margin of lower lip with barbels, but the upper lip has only papillae, about 20 to 30, along its outer margin; tip of snout with a small naked area; usually six or seven plates across middle of belly between the fourth plate in front of pelvics; preanal plate bordered by three plates; axil of pectoral naked; pectorals reach to base of pelvics, and the latter a little beyond the origin of the anal; pelvics inserted under origin of dorsal; depressed dorsal $1\frac{1}{2}$ to $2\frac{1}{2}$ times in snout to anus (dorsal longer in females than males); ovaries of adult females contain numerous large eggs about 2 mm. in diameter.

TABLE 24.—Measurements in hundredths of the standard length, for two subspecies of *Loricaria uracantha*

Characters	<i>rupestre</i>		<i>uracantha</i>	
	Río San Pedro	Río San Juan	Río Táchira	Río Chagres, Panama
	Holotype	Paratype		
Standard length (in mm.).....	79	75.4	87.9	91.7
Length head to tip supraorbital.....	22.5	22.1	22.1	20.9
Length head to end of opercle.....	16.6	16.6	16.5	17.3
Length head to end of post-temporal plate.....	22.9	22.7	21.6	21.3
Width of head at base of pectorals.....	16.6	16.6	17.3	15.5
Length of snout.....	11.0	10.9	10.2	11.0
Diameter of eye (not including notch).....	4.18	3.71	3.47	3.49
Least width of bony interorbital.....	5.57	5.70	5.12	5.45
Greatest depth of body.....	9.75	11.5	9.67	8.18
Width of body at anal origin.....	12.0	13.3	12.3	11.0
Postorbital length of head.....	8.23	8.09	8.08	7.09
Least depth of caudal peduncle.....	1.52	1.59	1.36	1.53
Least width of caudal peduncle.....	2.66	2.78	2.50	3.16
Length of caudal peduncle.....	49.4	48.4	48.2	50.8
Length of last ray of pectoral.....	8.23	8.36	9.67	8.40
Length of last ray of pelvic.....	11.4	10.2	11.6	8.62
Length of last ray of anal.....	11.0	12.6	11.0	9.16
Length of last ray of dorsal.....	8.86	8.62	9.33	8.29
Length of spine of dorsal.....	22.9	21.9	22.8	18.7
Length of spine of anal.....	20.0	20.6	20.5	15.8
Length of spine of pelvic.....	17.3	18.8	18.2	15.0
Length of spine of pectoral.....	19.1	20.6	19.3	16.9
Tip of snout to origin of dorsal.....	33.5	34.0	34.6	30.9
Tip of snout to origin of anal.....	47.0	47.4	48.4	44.2
Tip of snout to insertion of pelvic.....	32.2	32.6	33.9	30.8
Tip of snout to insertion of pectoral.....	17.1	17.2	16.2	17.7
Distance from anus to anal origin.....	8.10	8.49	8.99	8.18
Length of upper ray of caudal fin.....	50.6	46.4	-----	-----

Color.—Brownish above, yellowish or pale below; five black bars across dorsal surface, the first through front of dorsal fin base, the second under tips of depressed dorsal fin, then three on caudal peduncle; base of branched rays of caudal fin blackish; all fins barred;

black blotch on body on upper base of pelvic fins; one or two black blotches on naked area of body at each side of front of anal fin, sometimes lacking in young specimens; often black pigment areas on under sides of lateral plates; black blotch around bases of last dorsal rays; blackish blotch in middle of first plate in front of dorsal fin; peritoneum dusky.

Remarks.—This new subspecies differs from *L. uracantha uracantha* Kner and Steindachner in having a wider body, a shorter caudal peduncle^s (see table 24 and key), the plates along midsides with keels widely spaced numbering 15 to 17 (average 16), and the plates with keels approximated numbering 12 to 14 (usually 13 or 14) instead of 13 to 17 (average 14 or 15) and 12 to 16 (usually 14 or 15), respectively. The black spots each side of anal fin base on naked area at front of anal are lacking in *L. uracantha uracantha*.

Named *rupestre* in reference to its habitat among rocks and stones on the stream bottom.

LORICARIA FILAMENTOSA Steindachner

ARMADILLO MACHETE

Loricaria filamentosa STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 39, p. 45, pl. 9, 1878 (Magdalena River).

Loricaria fimbriata EIGENMANN and VANCE, Indiana Univ. Studies, No. 16, p. 12, 1912 (Boca de Certegui).—MEEK and HILDEBRAND, Publ. Field Mus. Nat. Hist., zool. ser., vol. 10, No. 15, p. 260, 1916 (Río Capeti, tributary to Río Tuyra).

Loricaria filamentosa latiura EIGENMANN and VANCE, Indiana Univ. Studies, No. 16, p. 13, 1912 (Boca de Certegui, Colombia).—MEEK and HILDEBRAND, Publ. Field Mus. Nat. Hist., zool. ser., vol. 10, No. 15, p. 257, 1916.

Loricaria tuyrensis MEEK and HILDEBRAND, Publ. Field Mus. Nat. Hist., zool. ser., vol. 10, No. 8, p. 81, 1913 (Tuyra Basin).

After examining a series of paratypes of the species described by Eigenmann and Vance, Meek and Hildebrand, and the figure by Steindachner, then making comparisons with my material from the Maracaibo Basin, I conclude that *L. fimbriata* is the young of this species and has a naked abdomen until it reaches a length of about 100 mm. when the plates begin to form; at a length of 114 mm. (see Eigenmann's fig. 1, pl. 15, in Mem. Carnegie Mus., vol. 9, 1922) some plates have formed along midventral region and at sides. Steindachner's figure of *filamentosa* and Eigenmann's figure 3, plate 15 (*loc. cit.*), of *latiura* represent the abdomen as almost completely plated except an area from the anus to the base of pelvis, this condition being found in specimens about 200 to 250 mm. in standard length. Specimens of larger sizes up to 355 mm. have been described as *tuyrensis* and *latiura*.

The form from the Magdalena system appears to be slenderer than the specimens before me from the Maracaibo Basin. I hesitate to describe these from the Maracaibo Basin as a new subspecies because

I lack comparable sizes from the Magdalena system. However, the greater width of the body through the anal origin on 200-mm. specimens from the Maracaibo Basin is $3\frac{1}{2}$ in the length of the caudal peduncle as compared to 4 to 6 in examples from Panama and the Magdalena regions. It also appears possible that the lateral plates, including the ones close together, average greater in number for the Maracaibo Basin than for Colombia and Panama.

The following collections were made in 1942 by Leonard P. Schultz in the Maracaibo Basin of Venezuela.

U.S.N.M. No. 121085, 6 specimens, 27 to 89 mm. and 246 to 295 mm. in standard length, from a caño half a mile west of Sinamaica, March 11.

U.S.N.M. No. 121084, 3 specimens, 273 to 335 mm., from Río de Los Pajaros, 3 km. above Lago Maracaibo, April 30.

U.S.N.M. No. 121086, a specimen 283 mm. from the Río Agua Caliente, 2 to 3 km. above Lago Maracaibo, May 1.

U.S.N.M. No. 121089, a specimen 89 mm. from the Río Palmar at the bridge 70 km. southwest of Maracaibo, March 6.

U.S.N.M. No. 121088, 9 specimens, 28 to 67 mm., from the Río Negro below mouth of Río Yasa, March 2.

U.S.N.M. No. 121087, 3 specimens, 88 to 244 mm., taken in the Ciénaga del Guanavana, about 10 km. north of Sinamaica, March 11.

U.S.N.M. No. 121090, a specimen, 184 mm. from Lago Tulé about 80 km. west of Maracaibo, 5 km. from the Río Socuy, March 1.

The smaller specimens of this species were taken in the rivers, but the largest specimens came from the slightly brackish waters up the mouths of the Río de Los Pajaros and Río Agua Caliente, as well as the caño west of Sinamaica.

LORICARIA CATAPHRACTA Linnaeus

Loricaria cataphracta LINNAEUS, *Systema naturae*, ed. 10, p. 307, 1758.—PETERS, *Monatsb. Akad. Wiss. Berlin*, 1877, p. 471 (Calabozo, Venezuela).—PELLEGRIN, *Bull. Mus. Hist. Nat. Paris*, vol. 5, p. 158, 1899 (Apure River, Venezuela).

LORICARIA VARIEGATA VENEZUELAE, new subspecies

PLATE 12, C

Holotype.—U.S.N.M. No. 121108, a specimen 161 mm. in standard length, collected by Leonard P. Schultz in the Río Palmar at the bridge about 70 km. southwest of Maracaibo, on March 6, 1942.

Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121109, 50 specimens, 33 to 167 mm. in standard length, collected along with the holotype and bearing the same data; U.S.N.M. No. 121110, 73 specimens, 46 to 170 mm., taken in the Río Socuy 3 km. above its mouth, north of Maracaibo, February 24, 1942; U.S.N.M. No. 121112, 27 specimens, 25 to 143 mm. collected in the Río Apón about 35 km. south of Rosario, Maracaibo Basin, February 26, 1942; U.S.N.M. No. 121108, 8 specimens, 27 to 153 mm., taken in the Río Negro below mouth of Río Yasa, Maracaibo Basin, March 2, 1942.

The above listed specimens occurred mostly over sandy to fine gravelly bottoms in a moderately flowing current.

Description.—Based on the holotype and the paratypes. Detailed measurements were made on two of the types of *Loricaria variegata venezuelae* and on two of *L. v. variegata* and those measurements are recorded in table 25.

The following counts were made: Dorsal rays, I, 7, rarely I, 8; anal and pelvic always I, 5; pectoral always I, 6; caudal fin rays always $i + 10 + i$; teeth are from 4 to 6 on the upper ramus and 6 or 7 on the lower ramus of jaws; there are 3 plates in front of dorsal fin and 19 plates from anal fin to base of caudal fin rays, and usually 14 barbels on the posterior margin of the lower lip between the maxillary barbels at each corner of the mouth.

TABLE 25.—Measurements (expressed in hundredths of the standard length) of two subspecies of *Loricaria variegata*

Characters	<i>venezuelensis</i>		<i>variegata</i>	
	Holotype	Paratype	U.S.N.M. No. 78360	U.S.N.M. No. 79144
Standard length (in mm.)	161	150.5	226.5	230
Length of head to tip of supraoccipital	23.0	22.2	20.4	21.4
Length of head to end of opercle	18.3	18.1	16.1	16.8
Length of head to end of temporal plate	25.2	25.2	22.5	23.5
Width of head at base of pectorals	20.0	19.8	17.5	18.7
Greatest depth of body	10.9	7.24	8.47	7.65
Width of body at plate that crosses anal origin	14.6	14.7	12.7	12.9
Length of snout	12.7	12.7	11.6	11.8
Diameter of eye (not including notch)	3.73	3.65	2.87	2.70
Bony interorbital space (rear of notch)	4.91	4.32	3.66	3.57
Postorbital length of head	9.00	9.10	8.43	8.57
Least depth of caudal peduncle	1.55	1.53	1.46	1.52
Width of caudal peduncle in front of caudal fin	3.42	3.45	3.18	3.26
Length of caudal peduncle	47.9	48.7	50.8	49.0
Length of spine of dorsal fin	20.8	19.6	20.3	17.8
Length of spine of anal fin	15.8	15.6	16.1	16.4
Length of spine of pectoral fin	19.5	17.6	17.3	17.4
Length of spine of pelvic fin	16.5	16.3	16.4	16.2
Length of last ray of pelvic fin	8.38	8.30	7.86	7.78
Length of last ray of pectoral fin	8.72	8.70	8.25	7.48
Length of last ray of anal fin	10.0	11.4	9.93	9.22
Length of last ray of dorsal fin	9.13	8.37	7.24	7.09
Tip of snout to origin of dorsal fin	32.9	33.2	30.4	31.8
Tip of snout to origin of anal fin	46.6	47.8	44.0	46.8
Tip of snout to base of pelvic fin	31.4	31.7	30.0	32.9
Tip of snout to base of pectoral fin	18.6	18.2	15.7	17.2
Distance from center of anus to anal origin	9.07	10.4	9.27	10.2

The body of this species is much depressed throughout its length; its greatest depth at origin of dorsal is about one-half its width at base of pectorals and only twice the width of the interorbital space; the belly is only partially covered with plates; there is a series of plates along the midventral line from anus to over pectoral girdle

where it joins a group extending between the pectoral bases; a series of plates extends from front of pelvics forward to pectoral base, and the space between the midventral series and ventral lateral series is naked; no naked area behind the base of pectorals; the upper and lower lips are filamentous, and their margins have numerous branched barbels, the only place without barbels being a small space on the upper lip in front of the teeth of upper jaw; in the mouth behind teeth of upper jaw are two barbels in the midline with a pair behind them; area around teeth of lower jaw without barbels; usually 14 barbels on margin of lower lip between maxillary barbels, the latter long, extending a little past gill opening; teeth small, a little cupped in shape, with a smaller lobe on their outer side; outer ray of pelvic a little produced, reaching a little past the anal origin; outer ray of pectoral longest and reaching a little past the base of pelvics; first ray of dorsal longer than second, the posterior margin of this fin truncate; middle rays of anal longest, the margin rounded; posterior margin of pectoral a little concave; orbital rims elevated, interorbital space concave, the center of which, however, is convex; supraoccipital with a double keel converging and then diverging a little near rear of that bone; plate in front of dorsal with a single keel, then the next two forward with two keels; gill opening in front of base of pectoral fin; tip of snout bony; this bony snout in front of naked area around mouth is equal to bony area between the nostrils; one or two plates in front of the anus, three series of plates from anus to anal origin.

Color.—Pale or white below, speckled above with darker brown on a lighter brown background; all fins mottled except the anal, which is usually plain white, about 9 to 14 black spots on the first ray of dorsal.

Remarks.—This new subspecies may be distinguished from *Loricaria variegata variegata* by its wider body and by the extra keeled plate along front of dorsal fin. That *variegata* is a more elongate subspecies than *venezuelae* is obvious by comparing the measurements recorded in table 25.

Named *venezuelae* in honor of the country in which it was collected and in recognition of the courtesy shown me while collecting specimens there.

LORICARIA GYMNOGASTER LAGOICHTHYS, new subspecies

PLATE 13

Holotype.—U.S.N.M. No. 121092, a specimen 305 mm. in standard length, collected in the Río Palmar near Totuma, about 100 km. southwest of Maracaibo, by Leonard P. Schultz on February 21, 1942.

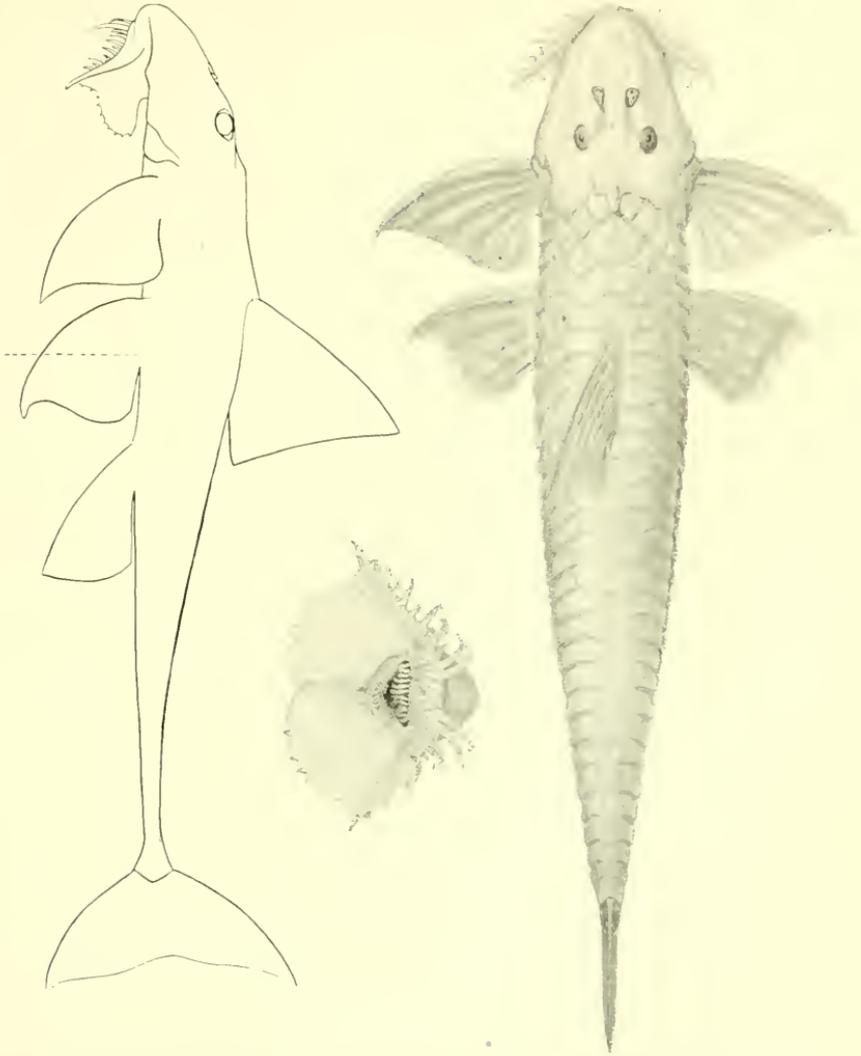
Paratypes (all collected by L. P. Schultz).—U.S.N.M. No. 121096, 18 specimens, 53 to 272 mm. in standard length, collected along with the holotype and bearing the same data; U.S.N.M. No. 121098, 433

specimens, 21 to 138 mm., taken March 17, 1942, in the Río Motatán at the bridge 22 km. north of Motatán; U.S.N.M. No. 121097, 43 specimens, 53 to 260 mm., collected February 24, 1942, in the Río Socuy 3 km. above its mouth; U.S.N.M. No. 121100, 3 specimens, 62 to 139 mm., taken March 2, 1942, in the Río Negro below mouth of Río Yasa; U.S.N.M. No. 121101, 13 specimens, 22 to 139 mm., taken March 6, 1942, in the Río Palmar at the bridge 70 km. southwest of Maracaibo; U.S.N.M. No. 121094, 15 specimens, 57 to 100 mm., collected March 24, 1942, in the Río Jimelles 12 km. east of Motatán, tributary of the Río Motatán; U.S.N.M. No. 121095, 41 specimens, 19 to 81.5 mm., collected March 24, 1942, in the Río Motatán, 8 km. below Motatán; U.S.N.M. No. 121099, 4 paratypes, 67 to 105 mm., taken February 26, 1942, in the Río Apón, about 35 km. south of Rosario, Estado de Zulia; U.S.N.M. No. 121093, 3 specimens, 73 to 122 mm., taken March 11, 1942, in a caño half a mile west of Sinamaica.

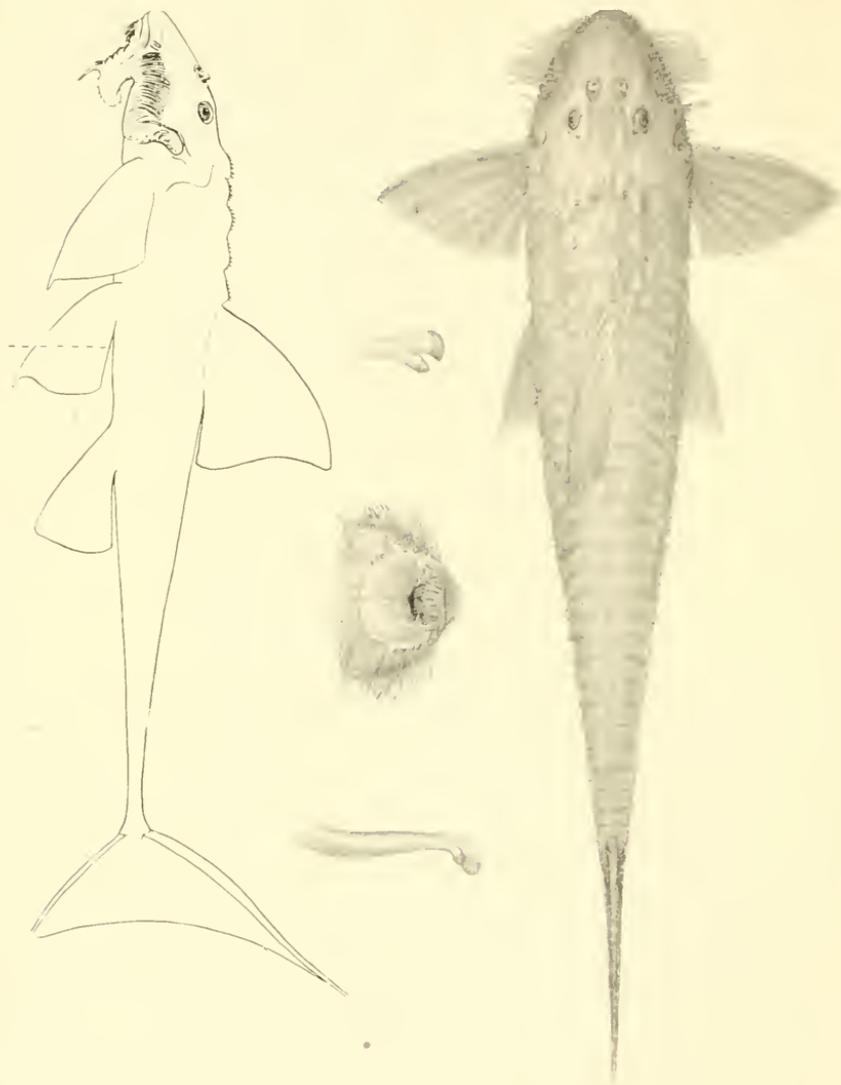
The above-listed specimens occurred mostly over sandy to gravelly bottoms, as well as over firm mud in a moderate current and in quiet water.

TABLE 26.—Measurements (expressed in hundredths of the standard length) of two subspecies of *Loricaria gymnogaster*

Characters	<i>lagoichthys</i>			<i>gymno-</i> <i>gaster</i>
	Holotype	Paratype	Paratype	U.S.N.M. No. 79218
Standard length (in mm.).....	305	139	77.6	80
Length of head to tip of supraoccipital.....	23.9	21.9	24.0	22.5
Length of head to end of opercle.....	20.1	18.1	18.2	17.6
Length of head to end of temporal plate.....	24.4	22.7	24.1	22.4
Width of head at base of pectorals.....	18.6	17.7	18.6	17.7
Greatest depth of body.....	12.2	11.9	11.7	8.87
Width of body at plate through anal origin.....	15.9	14.9	13.0	11.6
Length of snout.....	14.6	12.4	12.4	11.9
Diameter of eye (not including notch).....	3.11	4.68	4.25	3.25
Bony interorbital space (least width).....	5.57	5.11	5.28	5.25
Postorbital length of head.....	8.55	7.05	7.99	7.13
Least depth of caudal peduncle.....	1.80	1.58	1.42	1.50
Width of caudal peduncle in front of caudal fin.....	4.26	3.31	3.22	2.62
Length of caudal peduncle.....	45.1	49.4	47.7	52.7
Length of spine of dorsal fin.....	22.2	22.0	22.9	19.0
Length of spine of anal fin.....	19.5	18.7	19.6	18.1
Length of spine of pectoral fin.....	22.6	21.2	21.9	20.6
Length of spine of pelvic fin.....	23.0	19.9	21.9	22.2
Length of last ray of pelvic fin.....	10.3	3.63	8.61	10.0
Length of last ray of pectoral fin.....	7.87	6.98	7.73	8.88
Length of last ray of anal fin.....	11.4	11.2	10.8	10.0
Length of last ray of dorsal fin.....	8.40	8.64	9.67	8.88
Tip of snout to origin of dorsal fin.....	35.9	32.8	33.3	30.1
Tip of snout to origin of anal fin.....	51.0	45.3	46.5	43.2
Tip of snout to origin of pectoral fin.....	19.9	17.6	19.1	16.9
Tip of snout to origin of pelvic fin.....	34.5	31.4	31.2	30.1
Distance from center of anus to anal origin.....	10.8	9.72	10.3	8.25



Loricaria gymnogaster lagoichthys, new subspecies: Holotype (U.S.N.M. No. 121092), 305 mm. in standard length. Drawing.



Spatuloricaria phelpsi, new genus and species: Holotype (U.S.N.M. No. 121121), 338 mm. in standard length. Drawing.

In addition to the paratypes, I refer with some uncertainty U.S.N.M. No. 121091, a specimen 275 mm. from Lago Maracaibo 1 km. off Pueblo Viejo, caught by L. P. Schultz in a gill net, April 7-9, 1942, but before it was removed crabs ate most of the underside of the head, thus rendering identification almost impossible.

Description.—Based on the holotype and the paratypes listed above. Detailed measurements were made on the holotype and two paratypes and on one paratype of *L. gymnogaster gymnogaster* from Girardot, Colombia. These data are expressed in hundredths of the standard length and recorded in table 26.

The following counts were made: Dorsal rays always I, 7; both anal and pelvic always I, 5; pectoral I, 6; caudal fin rays $i+10+i$; plates along sides 18 to 21+10 to 13 totaling 30 to 32; plates from anal fin base to base of caudal fin (counting as first the plate containing last anal ray) 17 or 18; teeth 3 to 5 on ramus of upper jaw and 4 or 5 on ramus of lower jaw; barbels on margin of lower lip 24 to 32 usually about 26 to 28.

The body is greatly depressed throughout its length, and the greatest depth occurs at origin of dorsal fin, about 8 or 9 times and greatest width at base of pectorals about 5 to $5\frac{1}{2}$ times, all in standard length; there is a shallow notch at rear of orbit; the interorbital space is concave, the rims of the orbits are elevated; the nostrils lie more or less in a depression, the space between them convex and extending to the tip of the snout as a ridge; tip of supraoccipital with a serrated keel, then a pair of small keeled plates, followed by two median plates, each with two keels, the plate in front of the dorsal with one keel; all the plates along lower sides of body keeled, these keels spiny; temporal plate with a low, spiny keel, followed by six keeled plates, the last the base of the fourth branched ray of dorsal fin; belly naked in young, but in specimens 150 to 200 mm. small platelets begin to form in front of the anus and along the sides of the belly; in large adults 275 to 305 mm. in length the belly is partially covered with tiny platelets along its sides and between the bases of the pectoral fins; a space behind pectoral fin naked; the teeth are bilobed, the outer lobe is small and sharp pointed, and the inner lobe elongate with a rounded tip; the lips have a fringe of barbels; the lower lip is papillate, and its rear margin with 24 to 32 barbels; the maxillary barbel, also papillate, does not quite reach to the gill opening; the upper lip has numerous papillate barbels, the longest ones at front of lip equal to greatest diameter of the eye; at each inner corner of the lips is a pair of elongate barbels; two median barbels between the rami of upper jaws, and a pair of lateral barbels

inside of front of mouth; first ray of all fins longest, the pelvics and pectorals lanceolate; posterior margin of dorsal concave; intestine coiled.

Color.—Pale brownish to brownish with more or less evident bars in front of dorsal fin, then five distinct blackish bars, first through base of dorsal, second under tips of depressed dorsal fin, then three on caudal peduncle; base of caudal fin with a black bar and distal three-fourths of that fin more or less coarsely barred in young, but whole fin evenly dark colored in large specimens; undersides pale yellowish; pelvic fins with blackish blotches or pigment in the middle third; pectorals dark in their distal two-thirds; all the fins are more or less darkish in the large adults; peritoneum pale.

SPATULORICARIA, new genus

This new genus of the subfamily Loricarinae is a *Loricaria* with spoon-shaped teeth (spatula) just as *Cochliodon* is a *Plecostomus* with spoon-shaped teeth. However, the teeth of *Spatuloricaria* are bilobed, and each lobe is spoon-shaped, the inner lobe several times larger than the outer lobe, all teeth long and slender except expanded tips; at the rear of the eye, dorsally, is a notch, the supraoccipital ends in an elevated, spiny keel behind, on the side of which is a pair of small, keeled plates, followed by two median plates, each with a pair of keels, the next median plate in front of base of first dorsal spine with a single short keel; all the plates along the sides with serrated keels; the first five plates in the series behind the posttemporal are keeled, the last two at sides of base of dorsal fin. The belly is covered with numerous very small platelets, and the young of this species may have naked bellies as in certain species of *Loricaria*, but the belly of the large adult is plated; sides of head with numerous (about 125) stiff setiform bristles longer than width of interorbital space, these bristles not depressible; upper surface of pectorals also spiny; lips papillate, lower with barbels or dermal lappets along its margin, and upper lip with a series of barbels along its anterior margin but in the form of a double row in front of gape of mouth; barbel at corner of mouth not reaching to gill opening; interorbital space concave; space between nostrils convex; snout bony, no naked area near its tip; rear margin of dorsal fin concave, the first rays longest and that of anal rounded; spine of pelvic fins produced a little beyond the soft rays, the similar spine of pelvics and anal about the same length as next branched ray; intestine coiled. The upper ray of caudal fin is elongate and about one-third the standard length; the lower ray is long, too, but shorter than the upper ray.

Named *Spatuloricaria* in reference to the spoon-shaped teeth that separate it from the only genus, *Loricaria*, with which it is closely related.

Genotype.—*Spatuloricaria phelpsi*, new species.

SPATULORICARIA PHELPSI, new species

PLATE 14

Holotype.—U.S.N.M. No. 121121, the only known specimen, 338 mm. in standard length, was collected by Leonard P. Schultz, February 24, 1942, in the Río Socuy 3 km. above its mouth, Maracaibo Basin, Venezuela.

Description.—Based on the holotype, all measurements expressed in hundredths of the standard length, which is 338 mm.

Length of head to tip of supraoccipital 23.3; length of head to end of opercle 18.8; length of head to rear edge of the posttemporal plate 23.8; width of head at base of pectorals 19.5; length of snout 13.1; diameter of eye 3.50; least width of bony interorbital space 5.59; greatest depth of body at origin of dorsal fin 13.6; width of body across anal fin origin 16.7; postorbital (from notch in eye) length of head (to end of posttemporal plate) 8.90; least depth of caudal peduncle 1.80; width of caudal peduncle (third from last plate) 4.88; length of caudal peduncle or distance from base of last anal ray to midbase of caudal fin 4.76; length of last ray of pectoral 9.26; length of last ray of pelvics 10.5; length of last ray of anal 11.9; length of last ray of dorsal 10.4; length of spine of dorsal fin 25.6; length of spine of anal fin 17.9; length of pelvic spine 17.9; length of pectoral spine 20.3; distance from tip of snout to origin of dorsal fin 34.2; tip of snout to origin of anal 48.2; tip of snout to insertion of pelvics 32.6; tip of snout to insertion of pectorals 18.8; distance from anus to anal origin 9.32.

The following counts were made: Dorsal rays I, 7; anal I, 5; pectoral I, 6; pelvic I, 5; caudal $i+10+i$; plates along sides $19+12$, totaling 31; 18 plates behind anal fin base, counting as number one the plate containing last anal ray; teeth $4/5$ and $6/6$ on each ramus of jaws; about 26 barbels on margin of lower lip.

Color in alcohol pale brownish gray, yellowish on lower sides; all fins evenly brownish in color, except the caudal fin which shows some traces of bars; distally the fins are darker in color; peritoneum pale, almost without pigment.

Remarks.—This new genus and species differs from all other members of the related genus *Loricaria* in its spoon-shaped teeth, four to six in number.

Named *phelpsi* in honor of William H. Phelps, Jr., president of the Sociedad Venezolana de Ciencias Naturales of Caracas, a leader in the biological sciences of Venezuela, in appreciation of his aid while I was in Caracas.

Genus FARLOWELLA Eigenmann and Eigenmann

Farlowella EIGENMANN and EIGENMANN, Proc. California Acad. Sci., ser. 2, vol. 2, p. 32, 1889. (Type *Acestra acus* Kner.)

KEY TO THE SPECIES OF FARLOWELLA REPORTED FROM VENEZUELA

(See tables 27 and 28)

- 1a. Produced part of bony snout measured from anterior edge of naked area containing mouth to tip of snout 4 to 4-1/2 times in distance from middle of anal depression (anus) to tip of snout.....*Farlowella acus* (Kner)
- 1b. Produced part of bony snout in front of mouth depression 3.3 to 3.6 times in distance from anus to tip of snout.....*Farlowella vittata* Myers
- 1c. Produced part of bony snout 9.3 to 10 times in distance from anus to tip of snout.....*Farlowella curtirostra* Myers

FARLOWELLA ACUS (Kner)

Acestra acus KNER, Denkschr. Akad. Wiss. Wien, vol. 6, p. 93, pl. 8, fig. 1, 1853 (ref. copied).—GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 261, 1864 (Caracas).

Farlowella acus REGAN, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 304, 1904 (Venezuela).—EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 9, 1920 (El Concejo, Río Tiquirito, Venezuela).—MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 102, 1942 (Río Amaná, 6 km. east of Santa Barbara, Monagas, in the Río Guanipa drainage, Venezuela).—EIGENMANN and EIGENMANN, Occas. Pap. California Acad. Sci., vol. 1, p. 358, 1890 (Caracas, Venezuela).—RIBEIRO, Rev. Mus. Paulista, vol. 10, p. 717, 1918 (Río Cabriale, Venezuela).

FARLOWELLA VITTATA Myers

Farlowella vittata MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 103, fig. 12, 1942 (Río Uribanto, from San Cristobol to the Llanos, Venezuela).

U. S. N. M. No. 121083, Río Guárico and tributaries, between San Sebastián and San Casimiro, Estado de Aragua, Venezuela, L. P. Schultz, G. Zuloaga, Roger Sherman, and William Phelps, Jr., May 12, 1942, 5 specimens.

FARLOWELLA CURTIROSTRA Myers

Farlowella curtirostra MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 102, fig. 11, 1942 (Quebrada Tabor, tributary to Motatán system, 30 km. north of Trujillo, Venezuela).

U. S. N. M. No. 121081, Río San Pedro at bridge, Motatán system, L. P. Schultz, March 20, 1942, 4 specimen, 52.7 to 112.5 mm.

U. S. N. M. No. 121082, Río San Juan at bridge, Motatán system, L. P. Schultz, March 20, 1942, 2 specimens, 49.2 and 87.6 mm.

Genus STURISOMA Swainson

Sturisoma SWAINSON, The natural history and classification of fishes, etc., vol. 1, pp. 333, 335, 337; vol. 2, pp. 189, 304, 1838. (Type, *Loricaria rostrata* Agassiz.)

KEY TO THE SPECIES OF STURISOMA REPORTED FROM VENEZUELA

- 1a. Number of plates along midsides 18+16; head 4½ in standard length; width of head at base of pectorals 1⅔; snout 1⅓; dorsal fin 1⅓; pectoral 1½; pelvics 1¼ in length of head; width of body at anal 6⅓ times in distance from anal to caudal base (Río Meta)....*Sturisoma tenuirostris* (Steindachner)
- 1b. Plates ?+10 to 13 totaling 33 to 37 (according to Regan and to Ribeiro); head 4½ in standard length; width of head 2, snout 1½, eye 8, all in length of head; width of body at anal origin 5 in length of caudal peduncle.

Sturisoma rostrata (Agassiz)

- 1c. Plates 14 or 15+17 to 19; all fins with first rays elongate and filamentous, the upper and lower rays of caudal fin sometimes as long as standard length; produced part of bony snout $10\frac{1}{2}$ to $12\frac{1}{2}$ times in the distance from tip of snout to anus; head 4.9 to 5.2 in standard length; width of head 1.4 to 1.5 and interorbital 2.6 to 2.7 in head; width of body at anal origin $6\frac{1}{2}$ times in distance from anal base to caudal fin base (Maracaibo Basin).

Sturisoma festivum Myers

TABLE 27.—Detailed measurements of two specimens of *Sturisoma festivum* and a specimen of *Farlowella curtirostra*, expressed in hundredths of the standard length

Character	<i>Sturisoma festivum</i>		<i>Farlowella curtirostra</i>
Standard length (in mm.)	96.0	104.1	112.5
Head (tip of snout to end of opercle)	16.0	16.9	17.3
Head (tip of snout to rear supraoccipital)	18.7	19.8	20.4
Greatest depth	9.7	11.6	4.89
Snout (eye to tip of snout)	11.5	12.6	13.7
Interorbital space (fleshy)	6.56	7.24	5.06
Diameter of eye	2.92	2.90	1.78
Eye to rear edge of post-temporal plate	5.42	5.90	5.06
Length of caudal peduncle	60.9	58.0	53.3
Least depth of caudal peduncle	1.15	1.16	0.98
Least width of caudal peduncle	2.50	2.61	1.33
Width of head at base of pectorals	12.5	13.0	7.91
Tip snout to anus	31.8	34.1	36.2
Anus to anal origin	3.65	4.03	7.20
Length oral depression (to rear edge naked area)	8.96	10.2	3.44
Distance supraoccipital to dorsal	9.15	10.1	21.9
Length ramus upper jaw		2.70	1.78
Length ramus lower jaw		2.41	1.69
Length longest first ray of pectoral	31.8	30.4	12.0
Length longest first ray of pelvic	19.5	19.0	7.82
Length longest first ray of dorsal	36.2	34.9	14.2
Length longest first ray of anal	30.7	28.5	13.1
Tip of snout to origin of dorsal	27.3	30.1	42.3
Tip of snout to origin of anal	35.4	38.2	43.6
Tip of snout to insertion of pectorals	16.1	17.1	17.1
Tip of snout to insertion of pelvics	26.5	28.6	30.5

TABLE 28.—Counts made on species of *Sturisoma* and *Farlowella*

Species	Number of fin rays						Number of teeth in ramus of jaws								Number of plates along sides to base of caudal fin					
	Dorsal		An-al	Pelvic		Upper				Lower				32	33	34	35	36	37	
	I, 6	I, 7	I, 5	I, 4	I, 5	20	25	30	35	15	20	25	30							
						24	29	34	39	19	24	29	34							
<i>Sturisoma festivum</i>		3	3		3			1	2			1	2	1	3					
<i>Farlowella:</i>																				
<i>curtirostra</i>	4	1	5	2	4	3				3								2		2
<i>vittata</i>	3		3		3			1				1						1		

STURISOMA TENUIROSTRIS (Steindachner)

Oxyloricaria tenuirostris STEINDACHNER, Anz. Akad. Wiss. Wien, vol. 47, p. 410, 1910 (Río Meta, Venezuela).

Steindachner gives an abbreviated description of this species, and I have included in the key for *festivum* the same characters even though they may not be very diagnostic.

STURISOMA ROSTRATA (Agassiz)

Loricaria rostrata AGASSIZ, in Spix, Selecta genera et species piscium . . . Brasiliam . . ., vol. 5, pl. 3, fig. 1, 2, 1829.—PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 471 (Calabozo, Venezuela).—EIGENMANN and EIGENMANN, Occ. Papers California Acad. Sci., vol. 1, p. 366, 1890 (Calabozo)

STURISOMA FESTIVUM Myers

Sturisoma festivum MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 100, figs. 8–10, 1942 (Río Monay, 35 km. north of Trujilla, Motatán system, Venezuela).

Collections from the Maracaibo basin, Venezuela, made by Leonard P. Schultz in 1942:

U.S.N.M. No. 121079, Río Motatán, 8 km. below Motatán, March 24, 3 specimens, 29.1 to 44.3 mm.

U.S.N.M. No. 121078, Río Jimelles, 12 km. east of Motatán, Motatán system, March 24, 2 specimens, 35.7 and 103.5 mm.

U.S.N.M. No. 121077, Río Negro below mouth of Río Yasa, March 2, 3 specimens, 83.5 to 104.1 mm.

U.S.N.M. No. 121076, Río Apón, about 35 km. south of Rosario, February 26, 1 specimen, 50.5 mm.

U.S.N.M. No. 121080, Río Motatán at bridge 22 km. north of Motatán, March 17, 5 specimens, 45 to 128 mm.

Genus HYPOPTOPOMA Günther

Hypoptopoma GÜNTHER, Proc. Zool. Soc. London, 1868, p. 234. (Type, *H. thoracatum* Günther.)

HYPOPTOPOMA THORACATUM Günther

Hypoptopoma thoracatum GÜNTHER, Proc. Zool. Soc. London, 1868, p. 234, fig. 2.—PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 471 (Calabozo, Venezuela).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 41, p. 47, 1879 (Amazon River at mouth of Río Negro, Calabozo, Venezuela).

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REVISIONS OF TWO GENERA OF CHALCID-FLIES BELONGING TO THE FAMILY EUPELMIDAE FROM NORTH AND SOUTH AMERICA

By A. B. GAHAN

THE family Eupelmidae contains some of the most interesting forms to be found in the Chalcidoidea. Only a comparatively small number of the species belonging to the group have yet been described notwithstanding the fact that many of them are associated, either as primary or secondary parasites, with important insect pests of agriculture. The two genera *Arachnophaga* and *Encyrtaspis* each contain species associated with such pests and therefore are of some economic interest, although it is probable that they are secondary parasites oftener than primary ones and hence oftener harmful than beneficial.

Family EUPELMIDAE

Genus ARACHNOPHAGA Ashmead

Arachnophaga ASHMEAD, Proc. Ent. Soc. Washington, vol. 4, pp. 9, 10, 18, 1896.

Arachnophaga can be distinguished from *Encyrtaspis* Ashmead only by the fact that the female does not have a tuft or pencil of long black hairs on the middle of the scutellum and that the hind tibia, although more or less strongly compressed, is not so broad as in *Encyrtaspis* and its posterior margin never has a white border. Males of the two genera are apparently indistinguishable. It is also very similar to *Anastatus* Motschulsky, differing principally in that the head as viewed from in front is somewhat more elongate; the anterior extremity of the frons forms a more or less distinct, often

cariniform ledge from the lower extremities of the eyes to the antennal fossae; the eyes are usually pubescent; the scutellum is broadly rounded posteriorly, moderately convex dorsally, and finely sculptured; the tergites, except the fifth, are not emarginate at apex; and the ovipositor is always distinctly exerted. It differs from *Anastatoidea* Gahan by having the scrobes never margined above, the ocelli in an obtuse triangle, the frons not narrow, the frontal ledge from the antennal fossae to the eyes present, the scutellum broader and a little more convex and with finer sculpture, the hind tibia somewhat compressed but never expanded into a broad flange on the posterior margin, and the posterior basitarsus not strongly compressed.

The eyes are more or less convergent above; frons not narrow; lateral ocelli farther from each other than from the front ocellus; antennal scrobes shallow, confluent, and not sharply margined; antennae broadly separated at base, 13-jointed, and inserted below a line connecting the lower eye margins; parapsidal grooves deep; axillae separated; propodeum deeply emarginate medially; marginal vein two to four times as long as stigmal vein, postmarginal vein usually less than twice as long as stigmal; forewing in large part fuscous, with or without a hyaline band; front femora distinctly thickened toward apex; middle tarsus thickened basally and with a double row of short, stiff spines on the ventral side of basal segments 1 to 3; hind tibia either slender or strongly compressed and moderately broad, with two apical spurs.

The male is similar to the male of *Anastatus* but may be distinguished by its somewhat longer and slenderer scape, by the short antennal club, which is obliquely truncate from base to apex, by the shallow and flat scrobal cavity, by the usually pubescent eyes, by the slightly longer head as viewed from in front, and by the incomplete or less distinctly impressed parapsidal grooves.

Genotype, *Eupelmus piceus* Howard.

KEY TO THE KNOWN SPECIES OF ARACHNOPHAGA ASHMEAD

- | | |
|---|---------------------------|
| 1. Females..... | 2 |
| Males..... | 14 |
| 2. Forewing in large part strongly infuscated, but hyaline at base and with a distinct crossband beyond and just touching apex of stigmal vein, this crossband distinctly angled and connected with hyaline basal area by a broad medium longitudinal stripe, crossband and median stripe clothed with whitish cilia, infuscated portion of wing with dark cilia; posterior femur a little thicker beyond than before middle; costal cell densely ciliated at apex..... | 1. <i>albolinea</i> Gahan |
| Forewing infuscated but without a definite hyaline crossband and without a median hyaline stripe..... | 3 |

3. Apex of costal cell densely ciliated distad of point where submarginal vein begins to curve toward anterior margin of wing; frontal ledge not cariniform; vertex forming an abrupt sharp angle with occiput; lateral ocellus less than twice its own diameter in front of occipital truncation..... 4
- Apex of costal cell bare except for a row of slender, straight hairs on ventral surface adjacent to curve in submarginal vein; frontal ledge cariniform; vertex not forming an abrupt, sharp angle with occiput but declining posteriorly for a short distance before reaching occipital truncation; lateral ocellus two or more times its own diameter in front of occipital truncation..... 8
4. Mesoscutum nearly uniformly densely punctate, dull; base of forewing behind submarginal vein densely ciliated except for a narrow area along posterior margin and sometimes a narrow subtriangular area adjacent to submarginal vein basad of point where vein begins to curve; hind femur slightly narrowed beyond middle and without a marginal flange on its ventral margin..... 5
- Mesoscutum with concave posterior portion and scapulae less strongly sculptured than prescutum; base of forewing behind straight portion of submarginal vein bare except on a narrow streak or area extending obliquely distad from basal angle of wing nearly to reach densely ciliated median portion; hind femur broader beyond than before its middle and with a distinct, narrow flange on apical one-third of its ventral margin..... 6
5. Mesoscutum, axillae, and scutellum clothed with long, coarse, whitish hairs; forewing behind and adjacent to submarginal vein with a narrow subtriangular area bare or nearly bare; general color dull black
2. *hirtibasis*, new species
- Mesoscutum and axillae clothed with short, pale hairs; scutellum with numerous black bristles; forewing without a bare area behind and adjacent to submarginal vein; general color dark brownish testaceous varied with black..... 3. *longiceps* (Brues)
6. Infuscated medial area of forewing with a strong yellowish or golden tint; general color of head and thorax pale yellowish testaceous, only middle of mesoscutum and middle of mesosternum blackish..... 7
- Infuscated medial area of forewing blackish, without a strong yellowish or golden tint; general color darker, mesoscutum at least mostly blackish..... 4. *costalis*, new species
7. Length 4.5 mm. Posterior ocellus distinctly more than its own diameter in front of the sharp occipital margin..... 5. *aureicorpus* (Girault)
- Length 2.75 mm. Posterior ocellus about its own diameter in front of occipital margin..... 6. *nocua*, new species
8. Mesoscutum nearly uniformly densely punctate over its whole surface, concave posterior portion and scapulae about as strongly sculptured as prescutum..... 9
- Mesoscutum with concave posterior portion perfectly smooth and polished, or, if weakly sculptured, sculpture obviously weaker than that of prescutum..... 10
9. Mostly black or piecous; anterior femur distinctly broadened beyond middle; scutellum nearly as broad as long; mesoscutum and scutellum conspicuously hairy, hairs moderately long; posterior tibia compressed and broad; prothorax conical but fully twice as broad as long.... 7. *opaca*, new species
- Mostly testaceous, mesoscutum always brownish and abdomen always more or less brownish apically; anterior femur only slightly broadened; scutellum nearly twice as long as broad; mesoscutum and scutellum less conspicu-

- ously hairy, hairs very short; posterior tibia compressed but not broad; prothorax conical and about as long as broad----- 8. *scutata*, new species
10. Head and thorax black or brownish black, more or less faintly tinged with metallic green, sutures around base of wings, scutellum basally, axillae dorsally, and pleura sometimes diluted with reddish----- 11
Head reddish testaceous; thorax variable but usually reddish testaceous, mesoscutum sometimes more or less tinted with metallic green posteriorly; only one species with thorax extensively marked with dark brown or blackish----- 12
11. Marginal vein about twice as long as stigmal vein; lateral ocellus a little more than its own diameter from eye margin; frons obviously sculptured but weakly so; concave posterior portion of mesoscutum smooth and polished; eyes bare or very nearly so----- 9. *picea* (Howard)
Marginal vein obviously a little more than twice as long as stigmal vein; lateral ocellus not more than its own diameter from eye margin; frons dull, with very distinct reticulate sculpture; concave posterior portion of mesoscutum weakly sculptured; eyes distinctly pilose
10. *frontalis*, new species
12. Frons above scrobicular depression perfectly smooth and polished; mesoscutum uniformly testaceous or with only faint metallic reflections posteriorly; forewing with infuscated area clothed with pale yellowish, scale-like hairs on anterior portion, hairs on a little less than posterior half of its width darker----- 13
Frons above scrobicular depression not perfectly smooth, weakly reticulated; concave posterior portion of mesoscutum dark with metallic green reflections, prescutum and inner faces of scapulae also usually dark metallic; anterior half of mesopleuron usually dark brown with weak metallic reflections; forewing with infuscated portion uniformly dark except for a narrow proximal border, which is paler----- 11. *aldrichi*, new species
13. Concave posterior portion of mesoscutum nearly bare, with only a few weak and inconspicuous hairs scattered over surface; scape reaching level of vertex; hypopygium extending very nearly to apex of abdomen
12. *ferruginea*, new species
Concave posterior portion of mesoscutum clothed with conspicuous, short, silvery hairs; scape not quite reaching level of front ocellus; hypopygium attaining approximately apical one-fourth of abdomen
13. *abstrusa*, new species
14. Thorax beneath at least partly yellowish testaceous; head also usually more or less marked with yellowish----- 16
Thorax not yellowish beneath; head without yellowish markings except sometimes narrowly around mouth----- 15
15. Head and thorax densely and closely punctate, dull black with little or no metallic tinge; hind femur broad, hind tibia also compressed and moderately broad----- 7. *opaca*, new species
Head and thorax densely punctate but punctures shallower, with a distinct metallic tinge especially on face and frons; hind femur and tibia not so broad----- 9. *picea* (Howard)
16. Posterior ocelli about diameter of an ocellus in front of occipital truncation ----- 17
Posterior ocelli about twice diameter of an ocellus in front of occipital truncation ----- 18
17. Basal cell of forewing uniformly ciliated; whole dorsum of thorax dull dark green and mesopleuron and metapleuron more or less infuscated or aene-

- ous; head largely yellowish but with vertex, broad lateral margins of frons, occiput below neck, and posterior margins of temples greenish; legs brownish..... 3. *longiceps* (Brues)
- Basal cell of forewing outlined by cilia but otherwise mostly bare; dorsum of thorax medially dull green, pronotum laterally, broad lateral margins of mesoscutum, declivous portion of axillae, perpendicular sides of scutellum, pleura, legs including coxae, and head except vertex and lateral margins of frons orange-yellow..... 6. *nocua*, new species
18. Whole head, except narrowly around the mouth, dull black with a purplish tinge; dorsum of thorax mostly black with a purplish tinge
10. *frontalis*, new species
- Head mostly pale orange-yellow with more or less of vertex and frons greenish or brassy; dorsum of thorax bronzy or metallic green medially.. 19
19. Dorsum of thorax almost entirely dark bronzy; vertex and frons brassy
8. *scutata*, new species
- Dorsum of thorax with broad lateral margins orange yellowish, median portion of mesoscutum and scutellum metallic green; head with only a transverse area on the vertex greenish..... 13. *abstrusa*, new species

1. ARACHNOPHAGA ALBOLINEA Gahan

Arachnophaga albolinca GAHAN, Mem. Soc. Cubana Hist. Nat., vol. 8, p. 125, 1934.

This species is easily distinguished from all other known species of the genus by the hyaline crossband and median stripe on the forewing. The types are said to have been reared from puparia of *Argyrophyllax albincisa* Wiedemann that had parasitized the pyralid *Lamprosema indicata* Fabricius infesting lima beans in Cuba.

2. ARACHNOPHAGA HIRTIBASIS, new species

This species is very similar to *longiceps* (Brues) but is distinguished immediately by the much longer and more conspicuous hairs on the mesoscutum and by the much darker color.

Female.—Length 3.6 mm. General color black, very slightly tinged with metallic on vertex, pleura, apex of scutellum, and dorsum of abdomen; face below antennae, cheeks mesad of malar groove, posterior orbits narrowly, antennal grooves, and scape testaceous; legs dark brownish varied with testaceous, the anterior pair usually somewhat lighter than the others and the posterior femora slightly tinged with metallic; antennal pedicel, basal two or three segments of funicle, and the club dark brown to blackish, apical four or five funicular segments yellowish; forewing from base to beginning of curve in submarginal vein hyaline, from that point to apex of stigmal vein dark fuscous, and beyond apex of stigmal vein subfuscous; posterior wing hyaline; abdomen black with dorsum basally tinged with testaceous; ovipositor sheaths pale yellowish.

Head, viewed from in front, about as long as broad, slightly narrowed below; cheeks nearly straight; eyes converging above, sparsely pubescent; frons equal to about one-third the width of head; scrobe

shallow, immargined, extending more than half the distance between antennal fossae and front ocellus; frontal ledge very distinct but not cariniform; malar furrow distinct; ocellar triangle obtuse; ocellular line very slightly shorter than diameter of an ocellus; posterior ocellus a little more than its own diameter in front of the sharp posterior margin of vertex; head in dorsal view thin at vertex and rather deeply concave, the vertex and occiput forming a sharp angle; whole head with fine, strong, ruguloso-punctate sculpture and clothed with pale hairs which are longest along the inner eye margins. Antenna long, slightly clavate; scape subcylindrical, slightly curved and extending above level of anterior ocellus; pedicel nearly three times as long as broad; ring joint quadrate; first funicular segment a little longer than pedicel, nearly four times as long as broad; seventh funicular segment subquadrate; club a little longer than two preceding segments combined.

Thorax rather short and robust; pronotum rather short and strongly sculptured; mesoscutum uniformly and unusually strongly sculptured, only the crest of the very short carinae at the posterior end of scapulae shining; parapsidal grooves and depression at posterior middle of mesoscutum deep; scutellum and axillae also strongly sculptured; whole of mesoscutum, scutellum, and axillae covered with unusually conspicuous, long, pale hairs; mesosternum and anterior half of mesopleuron shagreened and clothed with short, pale hairs. posterior half of mesopleuron finely striated and bare; propodeum with shallow reticulate sculpture and hairy only at lateral margins. Anterior femur swollen, broadest very near apex, the apical truncation rounded, less oblique than usual; calcarium of middle tibia strong, about two-thirds as long as basitarsus; posterior femur distinctly narrower beyond than before the middle; posterior tibia strongly compressed, very nearly as broad as femur, its posterior margin with a fringe of moderately long hairs. Forewing about two and one-third times as long as broad; costal cell densely ciliated in apical angle and weakly ciliated basad of middle, with a bare area between; area behind straight portion of submarginal vein for the most part strongly ciliated but with a narrow, subtriangular area adjacent to the vein and a rather broad strip along the posterior margin bare; discal cilia on dark medial portion of wing coarser than those on basal and apical portions. Abdomen about as long and as broad as thorax, strongly sculptured; ovipositor exerted about half length of abdomen.

Type locality.—Rio de Janeiro, Brazil.

Type.—U.S.N.M. No. 56648.

Remarks.—Described from four females reared from *Brassolis astyra* Godart at Rio de Janeiro, Brazil, in 1931, by C. Camargo.

3. ARACHNOPHAGA LONGICEPS (Brues), new combination

Anastatus longiceps BRUES, Wisconsin Nat. Hist. Soc. Bull. 5, p. 108, 1907.

The female agrees very closely with the description of *hirtibasis* on another page of this paper but may be distinguished at once by the shorter and less conspicuous hirsute covering of the mesonotum, by the uniform ciliation of the basal area of the forewing behind the submarginal vein, and by the fact that the head and thorax are mostly brownish testaceous, the abdomen mostly blackish but marked with testaceous basally above and on the sides.

Male.—Length 2.5 mm. Vertex, frons above and laterad of scrobe, area between antennal fossae, and posterior portion of temples and cheeks dark green or tinted with green; scrobal depression, face below antennae, cheeks adjacent to malar furrow, posterior orbits narrowly, and upper part of occiput yellowish testaceous; apices of mandibles and the rest of mouthparts more or less fuscous; antennal scape testaceous, flagellum dark brown to blackish; thorax above dull greenish black with the region around base of wings more or less yellowish; thorax beneath largely yellowish, the mesopleura, mesosternum, and metapleura more or less aeneous; propodeum dark brown; legs brownish testaceous with the anterior pair not quite so dark as the posterior pair; wings hyaline, venation yellowish; abdomen brownish black, paler at base above and beneath.

Head viewed from above strongly transverse, shallowly concave behind, almost perpendicularly truncate behind vertex; lateral ocellus very slightly less than its own diameter in front of the sharp posterior margin of head and about half its own diameter from the eye margin; postocellar line twice as long as the line from lateral ocellus to median ocellus; anterior margin of frons not forming a sharp ledge; malar space equal to a little more than half the vertical length of eye; eye distinctly pubescent; antennae inserted distinctly below eyes; scape distinctly though not greatly thickened beyond the middle, attaining the level of anterior ocellus; pedicel a little more than twice as long as broad; ring joint broader than long; first funicular segment about as long as pedicel, and about twice as long as broad; last segment of funicle subquadrate; club a little longer than two preceding funicular segments, obliquely truncate. Mesoscutum convex, with fine, close sculpture; parapsidal grooves complete but shallow; scutellum a little more finely sculptured than mesoscutum; axillae narrowly separated and sculptured dorsally about like mesoscutum; propodeum with shallow but distinct reticulate sculpture and a delicate median carina, bare medially, densely hairy at posterior lateral angles. Anterior femur distinctly swollen; basitarsus of middle leg not at all thickened, the calcarium moderately thick and about two-thirds as long as basitarsus; posterior femur moderately broad, and

about as broad before as beyond the middle; posterior tibia slightly compressed, not so broad as femur. Forewing with costal cell ciliated throughout its whole length, the hairs in apical angle longer and more numerous than in rest of cell; area behind submarginal vein nearly uniformly ciliated except along the posterior margin; surface of wing distad of point where submarginal vein begins to curve toward margin uniformly ciliated; marginal vein about twice as long as postmarginal and a little over twice as long as stigmal. Abdomen nearly as long as thorax but narrower, parallel-sided, smooth at base above and weakly sculptured elsewhere, with a very short, ringlike, and smooth petiole.

Originally described by Brues from a single female taken at Brownsville, Tex., and deposited in the Brooklyn Museum but now in the United States National Museum collection. Besides the type the national collection now possesses 30 females and 7 males reared at Brownsville, November 21, 1938, by O. D. Deputy, from a chrysalis of *Papilio* sp.

4. ARACHNOPHAGA COSTALIS, new species

Agrees very closely with the description of *nocua* and may prove to be only a host variant of that species. It apparently differs from that species only by being much larger, by having the black bristles on the scutellum somewhat more numerous, by having four instead of three short, stiff spines on the outer apical margin of the middle tibia, by having the antenna proportionally somewhat longer, by having a distinctly more conspicuous though narrow flange on the apical one-third of the ventral margin of the posterior femur, and by being more extensively marked with black or dark brown.

Female.—Length 4.4 mm. Color varying to some extent but mostly brownish black with some metallic reflections. Holotype brownish black; face below antennae, mandibles except their apices, palpi, occiput, and temples testaceous; a median stripe on frons starting at median ocellus and embracing the whole scrobicular cavity and a narrow longitudinal stripe along upper part of each inner orbit dark reddish testaceous with brassy tints in some lights; vertex and frons, except as indicated, blackish with some metallic greenish reflections; cheeks and lower part of temples brownish testaceous. Antennal scape testaceous, flagellum black. Pronotum yellowish testaceous; mesoscutum brownish black with its anterior lateral angles dark testaceous; scutellum dark brownish, slightly paler toward base; propodeum brownish with weak metallic reflections; pleura testaceous mixed with brownish; mesosternum with a broad black longitudinal stripe down the middle. Anterior legs entirely testaceous; middle and posterior legs also testaceous but tinged with brownish, the posterior tibiae especially dark. Forewing hyaline from base to begin-

ning of curve in submarginal vein, dark fuscous from that point to apex of stigmal vein, and subfuscous from there to apex. Abdomen mostly dark brown with apex of first tergite, all of second, and most of third paler on dorsum.

Malar groove distinct; malar space equal to about one-third length of eye; ocellular line a little shorter than the diameter of an ocellus; posterior ocellus about one and one-half times its own diameter in front of occipital margin; antennae long, weakly clavate; scape very nearly reaching anterior ocellus; pedicel two and one-half times as long as broad at apex; ring joint very nearly as long as broad; fourth segment of antenna about three times as long as broad; following segments successively a little shorter, the tenth approximately one-third longer than broad; club somewhat longer than two preceding segments combined, obliquely truncate. Mesonotal scapulae and medio-posterior portion of mesoscutum with sculpture only slightly less distinct than that of prescutum; scutellum with approximately 50 black bristles of varying lengths; propodeum behind the spiracles obviously but weakly reticulated, spiracles elliptical and large.

Forewing nearly three and a half times as long as broad, marginal vein nearly four times as long as stigmal; postmarginal vein about a half longer than stigmal; costal cell finely ciliated on approximately the basal half, entirely bare medially, its apex beyond the point where submarginal vein starts to curve toward anterior margin of wing densely ciliated; area behind submarginal vein basad of curve in vein bare except for a moderately broad streak of rather coarse cilia running obliquely distocaudad from the basal angle of wing, this streak broadest basally, tapering distad, and terminating before reaching the heavily ciliated discal area of wing; surface of wing distad of curve in submarginal closely ciliated.

Middle tibia with four or five short, blunt spines on outer apical margin; posterior femur a little broader beyond than before the middle, with a very distinct though narrow flange on a little more than one-third its ventral margin apically; posterior tibia strongly compressed, about as broad as femur.

Abdomen as long as head and thorax combined, a little narrower than thorax; ovipositor sheaths exerted about one-third length of abdomen.

Two paratypes from Maryland agree in nearly every particular with the holotype except that one of these is slightly darker in color, the posterior legs being almost entirely brownish black.

Male.—Unknown.

Type locality.—Moorestown, N. J.

Type.—U. S. N. M. No. 56649.

Remarks.—Described from three females. The holotype was reared in 1931 at the Oriental Fruit Moth Laboratory, Moorestown, N. J., from the cocoon of a *Macrocentrus* infesting *Grapholitha molesta* (Busck) and recorded as specimen No. 564. A second female, reared at the same laboratory in 1933 as specimen 1504, apparently emerged from a pupa of *G. molesta* taken at Berlin, Md. One female was reared by H. S. McConnell, of the Maryland Agricultural Experiment Station, from a cocoon of *Macrocentrus* infesting *G. molesta* taken at Salisbury, Md., in 1929.

5. ARACHNOPHAGA AUREICORPUS (Girault)

Anastatus aureicorpus GIRAULT, Ann. Ent. Soc. Amer., vol. 9, p. 299, 1916.

In color this species is almost exactly like *nocua* and can be distinguished only by its much larger size, by the more numerous bristles on the scutellum (approximately 50), and by the fact that the posterior ocelli are placed distinctly more than the diameter of an ocellus in front of the sharp angle formed by vertex with occiput. Also extremely similar to *costalis*, from which it differs mainly in that the heavily infuscated medial area of forewing is yellowish (golden in some lights) instead of blackish; the head, thorax, abdomen, and legs are mostly pale yellow with only the prescutum, concave posterior portion of mesoscutum, middle of mesosternum, and to some extent the vertex and frons blackish with slight metallic reflections. In the type the scutellum is entirely yellow, but in two specimens from South Carolina it is weakly tinged with metallic apically.

Described by Girault from one female specimen reared by Carl Hartman, at Austin, Tex., from what Girault said appeared to be a syrphid puparium. The alleged puparium, however, is a lepidopterous pupa and, according to Carl Heinrich, is that of some species of *Lycanidae*. Besides the type, the national collection contains two females from Greer, S. C., taken September 18, 1930, by J. O. Rowell.

6. ARACHNOPHAGA NOCUA, new species

Female.—Length 2.75 mm. Color yellowish testaceous, only the ocellar triangle, medioposterior depressed portion of mesoscutum, and middle of mesosternum dark brownish or blackish; antennal flagellum and scape brownish testaceous, and club blackish; forewing hyaline from base to beginning of curve in submarginal vein, strongly fuscous from there to apex of stigmal vein, and subhyaline at apex with an irregular transverse band just distad of stigmal vein slightly paler, the coloration of different areas due to differently colored cilia, those on infuscated median portion giving to that area a distinctly yellowish tinge in some lights while on the obscure, transverse, pale band

the cilia are whitish; posterior wing hyaline; legs uniformly yellowish testaceous; ovipositor yellow.

Head, viewed from in front, as long as broad, rounded above, narrower below; cheeks slightly rounded, nearly straight; eyes rather large, slightly converging toward vertex, sparsely pilose; frons equal in width to a little more than one-third width of head; scrobe shallow, immargined, extending approximately half the distance between antennal fossae and anterior ocellus; ventral margin of frons laterad of antennal fossa more or less abruptly truncate and forming an oblique ridge extending from ventral margin of eye to base of antenna; malar groove complete but very fine and obscured by sculpture; ocelli in an obtuse triangle; ocellocular line equal to diameter of a lateral ocellus; entire head with nearly uniform, fine, shallow, reticulate-punctate sculpture; lateral margins of frons clothed with long whitish hairs; vertex and middle of frons with much shorter and sparser hairs; head, in dorsal view, thin anteroposteriorly; occiput slightly concave and forming with vertex a sharply abrupt angle. Antenna slender, weakly clavate; scape not quite attaining front ocellus, cylindrical; pedicel about two and one-half times as long as broad; ring joint twice as broad as long; first funicular segment a little shorter than pedicel, fully twice as long as thick; second and third segments each about equal in length to first; following funicular segments successively decreasing in length, the seventh subquadrate; club obliquely truncate, nearly as long as the three preceding funicular segments.

Thorax, when in natural position, approximately twice as long as broad; prothorax conical, short; mesoscutum a little longer than broad; parapsidal grooves deep and broad; prescutum with fine, shallow, reticulate-punctate sculpture; scapulae and the depressed medio-posterior portion of mesoscutum very weakly sculptured; whole mesoscutum sparsely clothed with very short, inconspicuous hairs; scutellum finely sculptured, opaque, with about 30 black bristles of varying lengths scattered over the disk; axillae sculptured like scutellum, each with several short black bristles; propodeum deeply emarginate, almost reduced to a transverse line medially, the lateral lobes practically smooth; propodeal spiracles conspicuous and nearly circular.

Forewing very nearly thrice as long as broad; marginal vein about three times as long as stigmal vein; postmarginal vein a little longer than stigmal; costal cell in large part bare but with some weak cilia on the basal one-third and with apical area in front of the curved portion of submarginal vein densely clothed with coarse blackish cilia; area behind the straight portion of submarginal vein mostly bare but with a few irregularly placed cilia in the proximal angle and extending in a narrow streak a short distance distad near the posterior

margin of wing; whole surface of wing distad of the upward curve in submarginal vein densely ciliated; marginal cilia very short.

Anterior femur distinctly swollen, broadest between middle and apex; anterior tibia moderately stout and shorter than femur; middle tibia with three short, blunt spines on outer apical margin, the calcarium a little shorter than basitarsus; basitarsus and two following tarsal segments of middle legs each with a double row of stiff spines beneath; posterior coxa densely clothed with short white pile; posterior femur moderately broad, a little broader beyond than before the middle, and with its apical one-third weakly margined beneath by a very narrow flange; hind tibia strongly compressed, not quite so broad as femur, its posterior margin sharp; basal segment of posterior tarsus about as long as two following segments combined.

Abdomen as long as thorax and slightly narrower, weakly sculptured, its apex rounded; ovipositor sheaths exerted about one-third the length of abdomen.

Male.—Length 2.1 mm. Color in large part testaceous, the vertex, broad stripe along inner orbits, mesoscutum except broad lateral margins, entire scutellum, and dorsal angles of axillae dark metallic green or aeneous; frons medially, cheeks, most of propodeum, and mesosternum more or less tinged with metallic or brassy; dorsum of abdomen, except at base and apex, dark brown; antennal flagellum blackish; legs concolorous with sides of thorax, only the hind legs sometimes a little brownish; wings hyaline. Pubescence pale, short, and moderately dense on dorsum of thorax, longer on inner orbits and propodeum.

Head strongly transverse, broadly but not deeply concave behind, almost perpendicularly truncate behind vertex; lateral ocellus a little less than its diameter in front of sharp posterior margin of head and about equally distant from the eye margin; ocellar triangle obtuse, the postocellar line about twice as long as line from lateral ocellus to front ocellus; anterior margin of frons not forming a sharp ledge at its junction with malar space but with a trace of this ledge; malar space equal to about half the vertical length of eye; eye weakly pubescent; antenna inserted below a line connecting lower extremities of eyes; scape cylindrical, not quite attaining level of front ocellus; pedicel about twice as long as broad; ring joint transverse; first funicular segment about as long as pedicel; last funicular segment subquadrate; club a little longer than two preceding segments combined, obliquely truncate. Mesoscutum convex, with fine reticulate-punctate sculpture above, more weakly reticulated laterally; parapsidal grooves traceable but not deeply impressed; scutellum convex, with very fine reticulate-punctate sculpture giving an almost granular appearance; axillae narrowly separated, the dorsal portion with sculpture like that

on middle of mesoscutum, the declivous portion nearly smooth; propodeum faintly reticulated, shining, with a delicate median carina and with the extreme lateral margin covered with silvery-white hairs. Anterior femur distinctly but not greatly thickened; basitarsus of middle leg only slightly thickened, the calcarium about three-fourths as long as basitarsus and moderately stout; posterior femur broad, not more slender beyond than before the middle; posterior tibia strongly compressed, a little narrower than the femur and tapering from near middle toward base; two calcaria very distinct. Forewing with the costal cell mostly ciliated; area behind submarginal vein with some rather coarse cilia marking the obsolete basal and median veins and a few similar hairs irregularly placed within the median cell; beyond point where submarginal vein begins to curve toward wing margin nearly uniformly ciliated; marginal vein a little more than twice as long as stigmal, postmarginal approximately three-fourths length of marginal. Abdomen about as long as thorax but much narrower; first tergite smooth, the following tergites weakly reticulated.

Type locality.—Brownsville, Tex.

Type.—U.S.N.M. No. 56650.

Remarks.—Described from 1 female (holotype) and 19 males reared by T. C. Barber, in May 1933, as secondary parasites of *Estigmene acraea* Drury, the actual host in this case probably having been *Apanteles* sp.

7. ARACHNOPHAGA OPACA, new species

Similar in most respects to *picea* but distinguishable at once by the more strongly and more uniformly sculptured mesoscutum.

Female.—Length 3 mm. General color dull black; pronotum laterally and head behind the eyes usually tinted with metallic green; propodeum smooth with strong metallic reflections; pleura, legs, and base of abdomen brownish black; scape yellowish testaceous, flagellum brownish black; forewing hyaline at base, fuscous behind the marginal vein, and subhyaline apically; hind wing hyaline; ovipositor sheaths yellowish.

Head viewed from in front about as broad as high; cheek nearly straight; malar space equal to about two-thirds the length of eye; eyes sparsely pilose, converging above, the frons equal in width to about two-fifths the width of head; scrobal depression broad, shallow, and poorly delimited; frontal ledge forming a sharp carina from lower extremity of eye to antennal fossa; ocelli in an obtuse triangle; ocellocular line equal to very slightly more than the diameter of an ocellus; head in dorsal view thin anteroposteriorly; occiput concave; angle formed by occiput and vertex rounded, not sharp; whole head with unusually strong and nearly uniform sculpture and

clothed with long whitish hairs which are particularly conspicuous on the frons and behind the eyes. Antenna weakly clavate; scape reaching level of anterior ocellus, cylindrical, and slightly curved; pedicel two and one-half to three times as long as thick; ring joint a little longer than broad; first funicular segment about as long and as broad as pedicel, following segments gradually decreasing in length and increasing in thickness, the seventh funicular segment a little broader than long; club about as long as three preceding segments combined, not thicker than last funicular segment, obliquely truncate at apex.

Prothorax short, conical, strongly sculptured; mesoscutum longer than broad, uniformly and strongly sculptured, and rather densely clothed with moderately long whitish hairs; concave medio-posterior portion of mesoscutum as strongly sculptured as prescutum; parapsidal grooves deeply impressed; scutellum a little longer than broad, nearly circular, strongly sculptured, and more sparsely clothed with longer hairs; axillae sculptured like scutellum; propodeum deeply triangularly emarginate medially, its surface smooth, polished, and bare except for a dense row of white hairs along the lateral margin; metanotum with a rounded flangelike elevation medially just behind apex of scutellum; mesosternum and mesopleuron strongly sculptured, clothed with short, whitish hairs except that the posterior half of mesopleuron is bare.

Forewing a little more than two and one-half times as long as broad; marginal vein not over twice as long as stigmal vein; post-marginal vein a little longer than stigmal; costal cell mostly bare, but with some weak discal cilia basally and with about 8 to 10 rather long hairs arranged in an irregular row on the under surface of wing near the apex of cell and adjacent to the curved portion of submarginal veins; area of wing behind straight portion of submarginal vein bare except for a few very weak cilia in the basal angle; rest of wing surface densely ciliated; marginal cilia very short.

Anterior femur broad, broadest between middle and apex; anterior tibia slightly thickened and about equal to femur in length; middle tibia with four short, blunt spines on its apical margin; calcarium of middle tibia about two-thirds as long as basitarsus; hind femur somewhat broader basad than distad of its middle and without a carinate ventral margin; hind tibia compressed, about as broad as femur, its posterior margin sharp and with a fringe of rather coarse, pale hairs.

Abdomen ovate, about as long and as broad as thorax, strongly sculptured and hairy except first and second segments, which are dorsally bare and practically smooth; hypopygium extending to approximately the apical third of abdomen; ovipositor exerted approximately one-fourth the length of abdomen.

Male.—Length 1.9 mm. Dull black; scape and mouth parts testaceous; pedicel and flagellum brownish black; legs brownish black, the apices of tibiae very narrowly and basal three joints of middle and hind tarsi pale yellowish; propodeum with metallic greenish reflections; wings hyaline; abdomen more or less brownish black. Pubescence pale, shorter and less conspicuous than in female.

Head strongly transverse, broadly concave behind, the angle formed by vertex and occiput slightly rounded; lateral ocellus nearly or quite twice its own diameter in front of occipital margin and about its own diameter from eye margin; ocellar triangle strongly obtuse; anterior margin of frons slightly angulated but not forming a sharp carina from antennal fossa to lower margin of eye; malar space equal to more than half the vertical length of eye; eye pubescent; antennal scape obviously somewhat swollen, thickest beyond the middle; pedicel about twice as long as thick; ring joint broader than long; first funicular segment a little shorter than pedicel, seventh about as broad as long; club apparently solid, obliquely truncate, not thicker than last funicular segment, and nearly equal in length to three preceding segments. Entire head densely sculptured and with short pubescence. Mesoscutum convex, densely punctate, dull, clothed with short pubescence; parapsidal grooves barely indicated; scutellum convex, sculptured like mesoscutum; axillae with same sculpture as mesoscutum; propodeum practically smooth, without definite folds or carinae, bare except at lateral margins; spiracles round and rather large. Anterior femur rather broad, tibia slightly thickened; middle tibial spur moderately stout and about two-thirds as long as basitarsus; posterior femur compressed and about three times as long as broad, evenly elliptical in outline; posterior tibia also compressed but only about half as broad as femur. Forewing with marginal vein about one and one-half times as long as stigmal vein and usually somewhat shorter than postmarginal vein. Abdomen about as long as thorax but narrower, rather weakly reticulately sculptured.

Type locality.—Pedro Miguel, Canal Zone, Panama.

Type.—U. S. N. M. No. 56651.

Remarks.—Described from 30 females (1 holotype) and 14 males (1 allotype) reared from egg masses of an unidentified spider collected by H. Dietz and sent in for identification by James Zetek.

8. ARACHNOPHAGA SCUTATA, new species

Similar to *opaca* in sculpture but easily distinguished from that species by color as well as by other characters. Resembling *ferruginea* in color but differing markedly in sculpture.

Female.—Length 3 mm. General color testaceous; mesoscutum brownish and abdomen mostly dark brown; propodeum shining; scape

testaceous, flagellum blackish; legs concolorous with thorax; forewing hyaline at base and apex, distinctly infuscated behind marginal vein; hind wing hyaline; abdomen testaceous at base, dark brown to blackish on apical half or more; ovipositor sheaths testaceous.

Head viewed from in front as long as broad; cheek nearly straight in profile; malar furrow distinct, malar space equal to more than half vertical length of eye; eyes inconspicuously pilose, converging above; frons constituting a little more than one-third the total width of head; scrobes shallow, poorly delimited; frontal ledge sharply cariniform; ocellar triangle obtuse; ocellocular line about equal to diameter of lateral ocellus; head in dorsal view transverse; occiput slightly concave; vertex not abruptly truncate behind, forming with occiput a slightly rounded angle; lateral ocellus placed fully three times its own diameter in front of occipital margin; whole head strongly reticulate punctate; pubescence of head pale and rather short except on lower part of frons along eye margins, where the hairs are longer; antenna long, slightly clavate; scape cylindrical, slightly curved, reaching to front ocellus; pedicel about two and one-half times as long as broad; ring joint very slightly longer than broad; first funicular segment equal to pedicel, seventh funicular segment very slightly longer than broad; club obscurely 3-segmented, obliquely truncate, very slightly thicker than last segment of funicle and not quite equal in length to three preceding funicular segments combined.

Pronotum conical, about as long as broad, strongly sculptured; mesoscutum about a half longer than broad, finely and almost uniformly punctate, dull, deeply concave behind the prescutum, the concave portion sculptured about like the rest; parapsidal grooves deep; prescutum a little longer than the concave area behind it; scapulae sharply cariniform for a short distance posteriorly; scutellum very nearly twice as long as broad, finely reticulate punctate, dull, with many short, brownish hairs scattered over its surface; axillae sculptured like scutellum; mesopleuron finely reticulated and clothed with whitish pubescence anteriorly, approximately the posterior half finely longitudinally striated and bare; propodeum deeply emarginate medially; metanotum with a subtriangular, translucent, flangelike elevation medially adjacent to apex of scutellum.

Forewing nearly or quite three times as long as broad; marginal vein fully twice as long as stigmal vein; postmarginal longer than stigmal; costal cell mostly bare but with some weak cilia basally and with a row of about 7 or 8 moderately long, straight hairs on the under surface of wing near the apex of cell adjacent to the curve in submarginal vein; area behind the straight portion of submarginal vein mostly ciliated but with the cilia sparse distad of middle; infuscated middle portion of wing clothed with short, flattened, scalelike hairs; area distad of stigmal vein with normal cilia.

Anterior femur only slightly swollen; middle tibia with four short, stiff spines on its apical margin; calcarium of middle tibiae two-thirds as long as basitarsus; posterior femur and tibia both slender, only very slightly compressed, the femur slightly narrower beyond than before the middle.

Abdomen about as long and as broad as thorax, ovate, rounded at apex, distinctly sculptured, and clothed with short, pale hairs except the first and second segments dorsally, which are apparently smooth and bare; hypopygium extending about to middle of abdomen; ovipositor exerted one-third to one-half the length of abdomen.

Male.—Length 2.2 mm. Head mostly testaceous, the vertex dull blackish with a slight greenish tinge, and the frons tinted with coppery; scape testaceous, flagellum brownish black. Dorsum of thorax mostly dull greenish black, the scapulae anteriorly and laterally, sclerites adjacent to bases of wings, and whole underside of thorax testaceous, the mesosternum and mesopleura with mixed brownish and metallic tints; propodeum with strong metallic green and coppery reflections; legs including all coxae testaceous, more or less mixed with brownish and with some metallic reflections on middle and hind coxae. Wings hyaline. Abdomen mostly dark with metallic reflections, basally more or less testaceous.

Agreeing structurally with the description of the male of *opaca* except in the following particulars: Scape a little less obviously thickened; pedicel no longer than first funicular segment; propodeum with shallow reticulate sculpture, shining; propodeal spiracles distinct but not large; femur of anterior legs very slightly enlarged, tibia scarcely at all thickened; middle tibial spur fully three-fourths as long as basitarsus and moderately stout; posterior femur about five times as long as broad; posterior tibia weakly compressed and about two-thirds as broad as femur. Marginal vein of forewing twice the length of stigmal vein and as long as postmarginal. Abdomen a little shorter and narrower than thorax.

Type locality.—Urbana, Ill.

Type.—U.S.N.M. No. 56652.

Remarks.—Described from 7 females (1 holotype) and 6 males (1 allotype) reared from the egg sac of an unidentified spider, February 19, 1922, by A. O. Weese.

9. ARACHNOPHAGA PICEA (Howard)

Eupelmus piccus HOWARD, Proc. Ent. Soc. Washington, vol. 2, p. 296, 1892.

Arachnophaga picea ASHMEAD, Proc. Ent. Soc. Washington, vol. 4, p. 18, 1896.

Female.—Length 2–2.75 mm. General color brownish black; scape, mandibles, clypeal area, and thoracic sutures around bases of wings

more or less testaceous; legs brownish testaceous to dark brown or nearly black; forewing with a dark fuscous cloud behind marginal vein and embracing its whole width, hyaline basally, and subhyaline apically beyond apex of stigmal vein; abdomen blackish.

Head with cheeks rounded; frons about two-fifths as broad at its narrowest point as the greatest width of head; malar space equal to more than half the height of eye and with numerous coarse bristles studding its surface; ocelli in a low triangle; ocellular line a little longer than the diameter of an ocellus; frons shining, more weakly sculptured than the rest of head. Scape not quite reaching level of front ocellus; ring joint subquadrate. Prescutum extending distinctly beyond middle of mesoscutum; concave posterior portion of mesoscutum perfectly smooth, polished, and very nearly bare; propodeum smooth and entirely bare, the elevated flange at middle of metanotum distinct. Anterior femur broadest beyond middle, with some weak bristles on the obliquely truncated apical margin; posterior femur not thickened, a little broader before than beyond the middle, and with a very delicate carina on approximately the apical half of its ventral margin.

Forewing about two and one-half times as long as broad; marginal vein about twice as long as stigmal vein and one-third longer than postmarginal; costal cell mostly bare but with a few cilia basally and a single short row of about six hairs on the under surface near where submarginal vein begins to curve toward margin of wing; area behind submarginal vein basad of beginning of curve entirely bare; clouded portion of wing densely clothed with short, flattened, scalelike hairs, the remainder of wing densely covered with normal cilia.

Abdomen about as long and as broad as thorax; basal two segments dorsally shining and nearly smooth, remainder of abdomen with distinct sculpture and less shining; hypopygium reaching a point approximately one-third the length of abdomen before its apex; ovipositor sheaths exerted about one-third the length of abdomen.

Male.—Length 1.8–2.25 mm. Black, more or less distinctly tinged with metallic green or bronze; face and pleura sometimes brownish; legs concolorous with sides of thorax, tinted with metallic; anterior tarsi dark; intermediate and posterior tarsi white with two apical segments brownish; wings hyaline, venation brownish; abdomen uniformly black with slight metallic tints.

Lateral ocellus about its own diameter from eye margin; malar space equal to more than half the eye height; scape slightly thickened beyond middle and not reaching front ocellus; pedicel about twice as long as broad; ring joint broader than long; first funicular segment approximately as long as pedicel but distinctly thicker, about one and a half times as long as thick; last funicular segment subquadrate;

club nearly equal to three preceding segments together. Whole head with distinct sculpture, which is slightly shallower on frons than elsewhere; propodeum smooth and bare except for a few moderately long hairs laterad of spiracle. Marginal vein not more than twice as long as stigmal vein and no longer than postmarginal vein; base of forewing a little more sparsely ciliated than outer portion, with a bare area along the posterior margin.

Other characters in both sexes as described for *frontalis*, new species.

Redescribed from the types and many specimens of both sexes reared from spider egg sacs collected at Los Angeles, Santa Ana, Riverside, and Orange, Calif., and at Tempe, Ariz.

10. ARACHNOPHAGA FRONTALIS, new species

Very similar to *picea* (Howard) but may be distinguished by the characters given in the key.

Female.—Length 4.4 mm. Color mostly blackish; oral region, prepectus, tegulae, sutures about base of wings, scutellum, and legs reddish testaceous to dark brown; mesopleuron dark reddish varying to brownish black; palpi black; antennal scape pale testaceous, flagellum black; abdomen mostly black but mixed with some reddish basally; ovipositor sheaths uniformly yellowish testaceous; base of forewing including entire costal cell hyaline, except for a slight fuscous stain in basal angle; wing medially with a dark-fuscous band embracing its whole width from a little proximad of base of marginal vein to apex of stigmal vein, the apical portion of wing subfuscous; hind wing entirely hyaline.

Head, viewed from in front, as long as broad, narrower below than above; cheeks nearly straight; eyes converging dorsally; frons equal in width to approximately one-third the greatest width of head; scrobes very shallow, poorly defined; frontal ledge extending from antennal fossa to lower eye margin sharply cariniform; malar space equal to a little less than half the length of eye; malar furrow delicate but complete; ocelli in an obtuse triangle; ocellocular line equal to very nearly the diameter of an ocellus: head, in dorsal view, thin anteroposteriorly; vertex not abruptly truncate behind, forming with occiput a slightly rounded angle; whole head strongly reticulate-punctate: frons dull, clothed with pale hairs, which are somewhat longer along the lateral margins than on median portion; cheeks with numerous rather coarse blackish hairs. Antenna long; scape cylindrical, slightly curved, reaching to level of front ocellus; pedicel about two and a half times as long as broad; ring joint longer than broad; first funicular segment about equal to pedicel, following segments successively a little shorter, the seventh funicular segment sub-

quadrate; club very slightly thicker than funicle, obliquely truncate at apex, and slightly longer than two preceding segments combined.

Mesoscutum much longer than broad, deeply concave posteriorly; parapsidal grooves deep; prescutum extending a little beyond middle of mesoscutum, very finely sculptured, opaque; scapulae anteriorly sculptured like prescutum, posteriorly a little less strongly sculptured and compressed into sharp cariniform ridges for about one-third their length; concave posterior portion of mesoscutum somewhat shining but with distinct shallow sculpture and with pubescence similar to that on rest of mesoscutum; scutellum sculptured about like prescutum, with numerous erect black bristles evenly distributed over its surface; axillae sculptured like scutellum; propodeum very faintly reticulated, shining and bare except for a row of hairs along the lateral and posterior margins, the elevated flange at middle of metanotum distinct; mesopleuron finely reticulated anteriorly, its posterior half very finely longitudinally striated.

Forewing a little less than three times as long as broad; marginal vein slightly more than twice as long as stigmal vein; postmarginal longer than stigmal; costal cell with weak ciliation basally, a little more than apical half entirely bare except for a conspicuous and more or less double row of long, straight hairs on under surface near the point where submarginal vein begins to curve; area behind submarginal vein and basad of beginning of curve in that vein bare except for a few weak cilia in basal angle; whole width of wing between beginning of upward curve in submarginal vein and apex of stigmal vein densely clothed with flattened, scalelike cilia; beyond apex of stigmal vein about as densely ciliated as behind marginal vein, hairs slender, not scalelike; hind wing more weakly ciliated than forewing.

Anterior femur broad, obliquely truncate apically, with about four moderately strong, black bristles on the oblique part of margin; middle tibia with five short, blunt, spines on outer apical margin; posterior femur narrower beyond than before the middle, without a marginal flange; posterior tibia compressed but not especially broad, its margin with a fringe of short, pale hairs.

Abdomen about as long and as broad as thorax, distinctly sculptured all over but with the first, second, and third tergites dorsally more shining than rest of abdomen; ovipositor sheaths exerted one-fourth to one-third the length of abdomen.

Male.—Length 2.5 mm. Head black with a slight purplish tinge on vertex, the clypeal region yellowish; scape yellow; flagellum black; apices of mandibles brownish; thorax above mostly black with a slight purplish tinge, the lateral margins of mesoscutum and perpendicular sides of axillae and scutellum pale orange yellow; pleura yellow mixed with fuscous on mesopleura and metapleura; mesosternum

blackish; anterior legs including their coxae yellow; middle legs brownish yellow; posterior legs dark brownish with aeneous reflections, the apices of their coxae yellowish; wings hyaline; abdomen black with the short petiole and base of following tergite yellow.

Structurally similar to *longiceps* but with head not perpendicularly truncate behind; lateral ocellus about twice its own diameter in front of occipital margin and not more than half its diameter from eye margin; distance between lateral ocelli a little less than twice the distance from lateral ocellus to anterior ocellus; malar space equal to about half the height of eye; scape subcylindrical, not thickened, and not quite attaining level of front ocellus; pedicel more than twice as long as thick; ring joint short; first funicular segment a little shorter than pedicel, last segment about as broad as long; club about as long as two preceding segments. Whole head with nearly uniform, close, fine, and shallow punctate sculpture.

Pronotum short, conical; mesoscutum a little broader than long, narrowing and rounded anteriorly; parapsidal grooves traceable but very shallow; axillae narrowly separated; scutellum moderately convex, a little shorter than mesoscutum, rounded at apex; propodeum less than half as long as scutellum, without carinae or grooves, bare medially but densely hairy laterad of spiracles. Dorsum of thorax sculptured like head, and clothed with short pubescence; pleura more weakly sculptured and more shining. Marginal vein of forewing a little more than twice as long as stigmal vein and a little longer than postmarginal; base of wing nearly uniformly ciliated but more sparsely so than remainder of surface. Anterior femur slightly enlarged, straight above, nearly evenly rounded beneath; hind femur moderately broad, straight beneath, evenly rounded above; hind tibia compressed, not so broad as femur. Abdomen nearly as long as thorax, and a little narrower, elongate-elliptical in outline, and very weakly reticulated.

Type locality.—Beverly, N. J.

Type.—U. S. N. M. No. 56653.

Remarks.—Described from 32 females and 1 male. Twenty-four of these specimens were received from the Oriental Fruit Moth Laboratory, at Moorestown, N. J., and of this number 20 are labeled as having been reared from *Grapholitha molesta* (Busck). It is evident, however, that at least 8 of these were not primary parasites of the fruit moth, since cocoons of *Macrocentrus* from which they had obviously emerged were pinned with the specimens. It is possible that in some instances the species was actually a primary parasite of *Grapholitha*. Localities represented in the Oriental Fruit Moth material were Beverly, Masonville, Moorestown, Parry, Evesboro, and Burlington, N. J. The 4 other specimens received from the Moorestown Laboratory bear the following data: 1 from Farmington, Conn.,

reared in 1933 from *Macrocentrus* sp.; 1 from Moorestown, N. J., reared January 2, 1932, from the egg cluster of an unidentified spider; 1 from Staunton, Va., reared in 1932 from a chrysopid cocoon; and 1 from Broadway, Va., reared August 17, 1932, from an unidentified ichneumonid cocoon. Other paratypes include 1 from Greer, S. C., collected September 20, 1930, by J. O. Rowell; 1 from Clemson, S. C., taken August 29, 1932, by W. C. Nettles; 2 females from Tucson, Ariz., reared from the creosote bagworm, *Thyridopteryx meadii* (Edwards), by R. H. Crandall, January 12, 1939; and 4 females and a single male (allotype) said to have been reared from *Anarsia lineatella* Zeller, at Brigham, Utah, August 25, 1942, by C. J. Sorenson.

11. ARACHNOPHAGA ALDRICHI, new species

Female.—Length 3.1 mm. Agrees with *abstrusa* except in the following particulars: Frons above scrobicular depression faintly reticulated, not perfectly smooth and polished; flagellum black, scape testaceous; pronotum dorsally, concave posterior portion of mesoscutum, inner faces of scapulae, usually the greater part of prescutum, dorsal portion of axillae, more or less of scutellum apically, mesopleuron anteriorly, mesosternum, propodeum, and metapleuron dark brownish with some metallic greenish reflections; legs varying from mostly dark testaceous to dark brown, the intermediate tarsus pale, except at apex, and the posterior tarsus more or less pale with the basal and apical segments dark; forewing strongly infuscated across middle, the infuscated area dark with a narrow band of paler cilia along its proximal border; posterior wing hyaline; abdomen black with a broad base more or less brownish testaceous; ovipositor exerted half the length of abdomen and testaceous. Readily distinguished from *picea* by the longer marginal vein, which is more than three times as long as stigmal and by the markedly lighter color, especially of the head. Distinguished from *frontalis* by the less strongly sculptured frons, by the longer ovipositor, by the bare eyes, and by the more extensive testaceous coloration.

Male unknown.

Type locality.—Chesapeake Beach, Md.

Type.—U.S.N.M. No. 56654.

Remarks.—The species is named in honor of the late Dr. J. M. Aldrich, who collected the holotype on June 2, 1933, at Chesapeake Beach, Md. Six paratypes, some of which are now imperfect specimens, were collected at Hagerstown, Md., July 7, 1914, by J. A. Hyslop, and bear the number P135. Other paratypes are 1 from Cranford, N. J., collected August 5, 1926, by F. M. Schott; 1 from Sherborn, Mass., swept June 10, 1934, by C. A. Frost; and 1 from Mississippi State College, Miss., taken in a cage containing cotton squares, August 25, 1934, by P. M. Gilmer.

12. ARACHNOPIHAGA FERRUGINEA, new species

This species differs from *picea* chiefly in color, in the scape extending to or a little above the anterior ocellus, and in the longer hypopygium.

Female.—Length 3.5 mm. Antennal pedicel and flagellum dark brown; palpi black; mandibular teeth dark brown; abdomen beyond first segment black; head, thorax, legs, and base of abdomen nearly uniformly ferruginous, the propodeum and posterior coxae dark brown; tegula concolorous with thorax, its apex dark brownish; forewing hyaline basally to near apex of submarginal vein; strongly infuscated from that point to stigmal vein and across the whole width of wing, subfuscous from stigmal knob to apex; hind wing entirely hyaline; ovipositor reddish testaceous, sometimes more or less fuscous at base and apex.

Frons above the shallow scrobal depression smooth and polished; rest of head finely sculptured, the sculpture strongest on sides of face and on cheeks; malar space longer than half the height of eye and without bristles; antennal scape reaching to or a little beyond anterior ocellus; pedicel about twice as long as broad; ring joint subquadrate; first funicular segment very slightly longer than pedicel, about twice as long as broad; seventh segment of funicle subquadrate; club as long as three preceding joints combined, not broader than last funicular segment, and obliquely truncate. Prescutum finely and densely punctate, extending distinctly beyond middle of mesoscutum; scapula anteriorly sculptured like prescutum, posteriorly smooth and compressed into a sharp ridge; concave posterior portion of mesoscutum perfectly smooth and polished and very nearly bare of pubescence; scutellum sculptured like prescutum, with a few stiff hairs scattered over its surface; axillae dorsally sculptured like scutellum and with a very few inconspicuous, short, silvery hairs; propodeum smooth, polished, and bare except for a very few fine hairs at the extreme posterior lateral angles; metanotum medially with the flange-like elevation behind apex of scutellum rounded dorsally.

Forewing with costal cell bare except for a more or less double row of long straight hairs on ventral surface near point where submarginal vein begins to curve toward anterior margin of wing; base of wing behind submarginal vein entirely bare proximad of beginning of curve in submarginal vein; distad of that point densely ciliated, the cilia on fuscous portion of wing scalelike, elsewhere normal. Anterior femur distinctly thickened, obliquely truncate apically beneath, and without conspicuous bristles on the oblique apical margin; middle tibia with four short, stiff spines on its apical margin; posterior femur very slightly thickened, narrower beyond than before its middle, and without a carinate ventral margin; posterior tibia compressed, broad-

est near apex, where it is nearly as broad as femur, its posterior margin with a loose fringe of whitish hairs.

Abdomen not quite so long as thorax, with shallow reticulate sculpture, the first tergite practically smooth; hypopygium extending nearly to apex of abdomen; ovipositor exerted about half the length of abdomen.

Male unknown.

Type locality.—Arlington, Va.

Type.—U.S.N.M. No. 56655.

Remarks.—Described from 27 females labeled as having been reared in May 1884 from eggs of "*Epeira globosa* Keyserling," now called *Araneus pegnia* Walckenaer.

13. ARACHNOPHAGA ABSTRUSA, new species

Female.—Length 2.70 mm. Differs from *ferruginea* by being somewhat smaller, a little more slender, and very slightly paler in color, by the scape not quite reaching the level of anterior ocellus, by the posterior concave portion of the mesoscutum as well as the dorsal surface of the axillae bearing a moderately dense and conspicuous covering of silvery-white pubescence, by the tegula being unicolorous throughout and somewhat paler than mesoscutum, by the anterior femur being only very slightly thickened, by the infuscated area of forewing being distinctly paler on anterior half of wing than on posterior half, by the abdomen being for the most part concolorous with the thorax, its apex usually more or less brownish, and by the hypopygium being apparently a little farther from the apex of abdomen. In other respects the female agrees with the description of *ferruginea*.

Male.—Head mostly pale ferruginous but with a transverse area on vertex encompassing the ocelli dark metallic green; mesoscutum except broad lateral margins, scutellum dorsally, and dorsal angles of axillae metallic green; remainder of thorax, propodeum, and all legs pale ferruginous; wings hyaline; abdomen missing.

Antennal scape about five times as long as thick; pedicel nearly twice as long as thick; ring joint transverse, small; first funicular segment about one and one-half times as long as broad, thicker than pedicel; seventh funicular segment subquadrate; club not so long as three preceding segments. Head weakly sculptured except on vertex, where the sculpture is fine and distinct; frons not entirely smooth but the sculpture very weak; metallic green area on dorsum of thorax distinctly finely sculptured, remainder of thorax more weakly sculptured; propodeum practically smooth, without carinae or folds, and with the posterior lateral angles densely hairy; forewing with costal cell and basal area sparsely ciliated, the ciliation on remainder of wing uniform

but not dense; marginal vein about two and one-half times as long as stigmal vein; postmarginal about twice as long as stigmal.

Type locality.—San Diego, Tex.

Type.—U. S. N. M. No. 56656.

Remarks.—Described from 5 females (1 holotype) and 1 male labeled as having issued in May 1895 from *Cyrtarachne* sp., collected at San Diego, Tex. Two of the female paratypes and the lone male are badly broken and incomplete.

Genus ENCYRTASPIS Ashmead

Encyrtaspis ASHMEAD, Mem. Carnegie Mus., vol. 1, pp. 290, 492, 1904.—GAHAN, Proc. U. S. Nat. Mus., vol. 71, art. 4, p. 9, 1927.

This genus is closely related to *Arachnophaga* Ashmead but may be separated by the characters indicated in the discussion of that genus. It is also close to *Tineobius* Ashmead but differs by having a distinct tuft of long, stiff bristles on the scutellum, the ocelli in an obtuse instead of an acute triangle, the frons not especially narrow, the vertex without a conspicuous patch of long, stiff bristles behind the ocelli, and the postmarginal vein equal to or only slightly longer than the stigmal vein.

I published a full description of the genus together with a key to the three then known species in the above cited reference. In the present paper three additional species are added, two by transfer from other genera and one a new species.

The only species of which the male has been described is *semirufus* Gahan.

KEY TO THE KNOWN SPECIES OF ENCYRTASPIS ASHMEAD

FEMALES

1. Exserted portion of ovipositor longer than head, thorax, and abdomen combined and with a broad, pale band near apex; hypopygium extending a little beyond apex of last dorsal segment of abdomen
 1. *brasiliensis* Ashmead
- Exserted portion of ovipositor shorter and usually without a band; hypopygium not extending beyond apex of last dorsal segment of abdomen..... 2
2. Frons above scrobicular depression finely and densely sculptured, subopaque..... 3
 - Frons above scrobicular depression smooth and polished, with only sparse and very minute hair punctures, or very weakly reticulated and always shining..... 5
3. Ovipositor sheath dark, with a yellowish band before its apex
 2. *proximus* Costa Lima
- Ovipositor sheath unicolorous or at least without a pale band..... 4
4. Antennal scape reaching level of anterior ocellus; posterior one-third of scapulae sharply carinate; hypopygium very nearly attaining apex of abdomen..... 3. *laticeps* (Brues)

- Antennal scape not reaching level of anterior ocellus; scapulae posteriorly carinate only at extreme apex; hypopygium apparently terminating some distance before apex of abdomen..... 4. *adjunctus*, new species
5. Ovipositor exerted the length of abdomen; frons above scrobicular depression with very weak but evident reticulate sculpture; antennal scape attaining level of vertex..... 5. *californicus* (Ashmead)
- Ovipositor exerted approximately two-thirds the length of abdomen; frons above scrobicular depression perfectly smooth except for sparse and very minute hair punctures; antennal scape attaining about level of anterior ocellus..... 6. *semirufus* Gahan

1. *ENCYRTASPIS BRASILIENSIS* Ashmead

Encyrtaspis brasiliensis ASHMEAD, Mem. Carnegie Mus., vol. 1, pp. 290, 492, 1904.

This species, which is the genotype, differs from all other species of the genus by having the ovipositor distinctly a little longer than the body and by having the hypopygium extending distinctly beyond the apex of the last dorsal segment. The frons above the very shallow and poorly delimited scrobicular depression is weakly sculptured and slightly shining. The malar space is approximately half as long as the eyeheight and rounded. The prescutum is about equal in length to the concave posterior portion of the mesoscutum, finely and densely punctate. The concavity is smooth and shining with some pubescence, at least at the bottom. The scapulae are not carinate except for a very short distance at the extreme posterior ends, their outer faces entirely and the inner faces anteriorly with very fine granular sculpture. The scutellum and axillae are likewise very finely sculptured, the scutellum fully twice as long as broad. The mesopleuron is smooth and polished, except for a broad band along the anterior margin, which is densely clothed with silvery pubescence. The propodeum is smooth and bare except for a few weak hairs at its posterior lateral angles. The anterior femur is only slightly thickened, and the hind tibia is compressed but not especially broad.

The head is dark brownish testaceous with a slightly aeneous tinge on frons, and slight bluish reflections behind the eyes. The antennae are yellowish with the club blackish, the pedicel, basal segment of the funicle, and two or three apical segments of the funicle more or less dark brownish. The thorax is brownish testaceous with the dorsum of prothorax and concave posterior portion of mesoscutum with strong violaceous reflections, the prescutum dark with a tinge of metallic green, the scutellum and axillae pale yellowish, the tuft of hairs on scutellum black. The propodeum is dark with greenish reflections. The legs are fuscotestaceous with the hind coxae bright metallic green above, the hind tibia with a narrow white margin posteriorly, the basal three segments of middle tarsus, apex of first segment and all of second and third segments of hind tarsus white. The abdomen

is blackish with its base yellowish, the ovipositor blackish with a broad whitish band before the apex. The forewing is strongly infuscated from base of marginal vein to apex of venation, hyaline at base and apex; posterior wing hyaline.

The only specimen known is the unique female holotype, which was collected at Pernambuco, Brazil, by Albert Koebele and which is now in the United States National Museum.

2. *ENCYRTASPIS PROXIMUS* Costa Lima

Encyrtarpis (sic) *proximus* COSTA LIMA, Arch. Esc. Super. Agr. e Med. Vet. [Nichteroy, Rio de Janeiro], vol. 3, p. 58, 1919.

A female paratype of this species in the United States National Museum collection differs from *brasiliensis* by having the frons densely and finely rugulose, the concave posterior portion of mesoscutum only a little less strongly sculptured than the remainder of mesoscutum, the mesopleuron finely but distinctly sculptured all over and clothed with very short, silvery-white pubescence over approximately the anterior two-thirds of its surface, the anterior femur distinctly broadened, and the hind tibia compressed and distinctly broader than in *brasiliensis*. The paratype has lost its abdomen, but in the original description the ovipositor is said to be about equal in length to the abdomen. The antennal flagellum is entirely black, the scape testaceous. The head is entirely reddish testaceous, and the thorax is in large part of the same color but with the whole mesoscutum (except the lateral margins) and the axillae dull dark aeneous, the mesopleuron metallic greenish anteriorly along its dorsal margin, and the mesosternum blackish. The propodeum is polished piceous, with the apices of the lateral lobes rather densely clothed with whitish pubescence. The legs are fuscotestaceous, with the hind coxae greenish above, the hind tibia dark with a moderately broad white margin posteriorly, the first to fourth segments of the middle tarsus white, the dorsal margin of the hind basitarsus and the three following segments white. The forewing is strongly infuscated from a point a little proximad of the base of marginal vein to the apex of venation, its base and apex hyaline. The hind wing is hyaline. The color of the abdomen is unknown but the ovipositor is said to be dark with a yellowish band before the apex.

Described from a female paratype the abdomen of which is missing. The species is said to be a parasite of *Pectinophora gossypiella* (Saunders) in Brazil.

3. *ENCYRTASPIS LATICEPS* (Brues), new combination

Anastatus laticeps BRUES, Wisconsin Nat. His. Soc. Bull. 5, p. 107, 1907.

This species, the type of which is now in the United States National Museum collection, has a distinct pencil of hairs on the scutellum and

a broadly compressed hind tibia margined with white posteriorly. These characters, together with the shallow scrobicular depression and the strongly exerted ovipositor, place the species in *Encyrtaspis* instead of *Anastatus*.

The densely and finely sculptured frons, sharply carinate posterior, one-fourth of scapula, hypopygium extending very nearly to apex of abdomen, robust and strongly sculptured abdomen, and the unicolorous ovipositor, together with the more or less distinctive coloration, make this species rather easy to recognize. The ovipositor is distinctly a little longer than the abdomen. The eyes are convergent above, the frons at vertex being about equal to one-third the greatest width of head. The scape reaches about to the level of the posterior margin of the anterior ocellus. The mesoscutum is nearly uniformly finely sculptured and covered with silvery-white pubescence. The head and most of the thorax are yellowish testaceous with the mesoscutum except its lateral margins, the mesosternum, the propodeum, and the hind coxae dorsally distinctly dark greenish. The abdomen is mostly black or blackish, with the base more or less testaceous, the ovipositor uniformly yellowish testaceous. The legs are mostly fuscotestaceous, the hind tibia with a moderately broad white margin posteriorly, the middle tarsus (except its apical segment) and segments 2 to 4 of the posterior tarsus white. The antennal scape is testaceous and the flagellum black. The forewing basally is hyaline and bare except for a patch of dark-colored cilia in the proximal angle, medially it is dark fuscous and densely ciliated, while beyond the apex of stigmal vein it is subhyaline and a little less densely ciliated. The posterior wing is entirely hyaline.

Redescribed from two female specimens (one the holotype) in the United States National Museum, collected at Esperanza Ranch, Brownsville, Texas.

4. ENCYRTASPIS ADJUNCTUS, new species

Similar to *laticeps* Brues but somewhat smaller, with the antennal scape shorter, the scapulae apparently carinate only for a very short distance at extreme posterior ends (the mesoscutum in the single specimen before me is somewhat distorted and it is possible that normally the scapulae may be more extensively carinate), the hypopygium not extending so nearly to apex of abdomen, and the color, especially of the head, darker. Also very similar to *proximus* but differing in the unbanded ovipositor sheaths and in the darker color of head and thorax.

Female.—Length 2.6 mm. Head fuscotestaceous, tinged with metallic green behind eyes and on lower part of frons laterad of scrobicular depression; antennal pedicel and flagellum black; scape dark testa-

ceous; face somewhat lighter testaceous than rest of head; apices of mandibles dark brown; palpi fuscotestaceous; vestiture of head white, the hairs along inner orbits longer than on remainder of head, posterior orbits with a dense border of short silvery-white pile along eye margin. Pronotum dorsally, mesoscutum except lateral margins, axillae, most of mesopleura, mesosternum, propodeum, and posterior coxae dorsally blackish with a more or less strong aeneous tinge; prothorax beneath, prepectus, narrow lateral margin of mesoscutum, tegulae, scutellum, mesopleuron posteriorly, anterior and intermediate coxae, and trochanters dark testaceous; all femora and tibiae fuscotestaceous, the posterior tibiae with a moderately broad, white, posterior margin; anterior tarsi fuscous; intermediate tarsi, except apical segment, white; posterior tarsus with dorsal margin of basitarsus and all of second, third, and fourth segments white; basitarsus beneath and apical segment black. Forewing dark fuscous from beginning of curve in submarginal vein to apex of stigmal vein, subhyaline basally and apically; posterior wing hyaline; abdomen brownish black with weak aeneous reflections; ovipositor uniformly testaceous.

Head viewed from in front very slightly higher than broad, slightly narrower below than above; eyes convergent; frons at its narrowest point about equal to one-third the greatest width of head; scrobicular depression shallow, poorly delimited; ocelli in a distinctly obtuse triangle, the lateral ones a little less than their own diameter from the eye margins and fully three times their own diameter in front of the occipital margin. Whole head finely sculptured and subopaque. Antennae inserted below eyes, 13-jointed, weakly clavate; scape subcylindrical, slightly curved, not attaining level of anterior ocellus; pedicel approximately twice as long as broad; ring joint subquadrate; first funicular segment about three times as long as broad, seventh segment subquadrate; club slightly thicker than funicle, indistinctly 3-jointed, obliquely truncate.

Prothorax short, conical, finely sculptured dorsally; mesoscutum very slightly longer than broad; prescutum and scapulae very finely punctate, the posterior median portion of mesoscutum weakly sculptured and not deeply concave, the scapulae apparently very slightly compressed at their posterior ends (the mesoscutum somewhat distorted); scutellum strongly convex, ovate, nearly twice as long as broad, very finely and uniformly sculptured, dull, with a tuft of coarse black bristles medially; axillae sculptured like prescutum, separated by a distance somewhat less than the width of base of an axilla; propodeum deeply semicircularly emarginate, transversely linear medially, the lateral lobes subtriangular and weakly sculptured around the spiracle and apically but polished medially and with the apical one-third pilose; prepectus and tegula finely sculptured, dull; mesopleuron

and mesosternum rather weakly sculptured and nearly uniformly clothed with short silvery pile. Anterior femur moderately thickened, broadest a little before apex; anterior tibia a little shorter than femur and slightly thickened; intermediate femur rather long and somewhat flattened; intermediate tibia as long as femur, with a group of four short spines on its apical margin, the calcarium about half as long as the first tarsal segment, which is slightly thickened and armed beneath with a double row of short spines, as are also the second and third tarsal segments; posterior femur fusiform; posterior tibia as long as femur and trochanter combined, as broad as femur, strongly compressed, slightly slenderer at base than at apex, the two calcaria distinct but both rather short; posterior tarsus rather slender and about equal to tibia in length. Anterior wing very nearly three times as long as broad, for the most part densely ciliated but with a bare transverse band behind the apical half of submarginal vein; marginal vein more than three times as long as stigmal; postmarginal vein subequal to stigmal; posterior wing approximately two-thirds as broad and three-fourths as long as anterior wing.

Abdomen a little longer than thorax, weakly sculptured dorsally, more distinctly sculptured on the sides; hypopygium prominent but not attaining apex of abdomen; ovipositor sheaths about as long as abdomen and scutellum combined.

Type locality.—Montevideo, Uruguay.

Type.—U. S. M. N. No. 56657.

Remarks.—Described from one female specimen said to have been reared from "*Neocoelostoma* material" collected by H. L. Parker at Montevideo, Uruguay, in 1941, under South American Parasite Laboratory No. 791-1.

5. *ENCYRTASPIS CALIFORNICUS* (Ashmead), new combination

Tincobius californicus ASHMEAD, Proc. Ent. Soc., Washington, vol. 4, p. 15, 1896.

This species differs from the genotype of *Tincobius* (*T. citri* Ashmead) by having the ocelli arranged in an obtuse instead of an acute triangle, the frons not especially narrow, the postmarginal vein no longer than the marginal vein, the scutellum with a pencil of long black bristles at its dorsal middle, and the abdominal tergites not incised apically. On the other hand, it possesses all of the essential characteristics of *Encyrtaspis* and is accordingly transferred to that genus.

The species is extremely similar to *Encyrtaspis scmirufus* Gahan, apparently differing from it only by having the frons above the shallow scrobicular depression very weakly reticulated, the antennal scape reaching to the level of the posterior margin of the anterior ocellus or nearly to the level of the vertex, and the ovipositor as long as the

abdomen. In color and sculpture the two species are practically identical.

The female type was collected in Kern County, Calif., by Albert Koebeler. Besides the type, the United States National Museum collection contains a female from Yuba City, Calif., reared from *Anarsia lineatella* Zeller, July 13, 1902, by L. S. Jones and another female from Fort Bayard, N. Mex., reared November 3, 1913, from *Evetria* sp. on *Pinus ponderosa* by Carl Heinrich under Hopk. U. S. No. 12101c.

6. ENCYRTASPIS SEMIRUFUS Gahan

Encyrtaspis semirufus GAHAN, Proc. U. S. Nat. Mus., vol. 71, art. 4, p. 10, 1927.

Encyrtaspis semirufus is extremely close to *californicus* and may possibly prove to be merely an eastern form of the west coast species. The two forms apparently can be distinguished only by the characters mentioned in the foregoing key to species.

The holotype female was reared from a pupa of *Grapholitha molesta* (Busck) taken at Macon, Ga., whereas the allotype, together with two other males and a single female, is said to have been reared at New Orleans from an unknown leaf skeletonizer. Other specimens in the national collection include a paratype taken in Spanish moss at Victoria, Tex.; a series of 7 females reared from *G. molesta* at Clemson College, S. C., by W. C. Nettles; specimens reared from this same host at the Oriental Fruit Moth Laboratory of the Bureau of Entomology and Plant Quarantine, from material collected at Beverly, Masonville, Moorestown, and Burlington, N. J., Olcott, N. Y., and Smithsburg, Md., and 5 specimens said to have parasitized *Laetilia coccidivora* (Comstock) at New Orleans.



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NEW SPECIES OF AMERICAN SCOLYTOID
BEETLES, MOSTLY NEOTROPICALBY M. W. BLACKMAN¹

IN THE following pages 1 new genus and 29 new species of bark-beetles are described, the genus and 3 species from the United States and 26 species from Neotropical countries. Of the latter, 12 species are from Central America, 4 species from the West Indies, 3 species each from Colombia, Bolivia, and Argentina, and 1 species from southern Brazil.

The species here treated do not belong to a single restricted group of the Scolytoidea but represent a number of genera in several more or less distantly related tribes or subfamilies. The groups concerned are Bothrosternini, Camptocerini, Hexacolini, Hylesinini, and Phloeotribini. All drawings for the plates were made by Arthur D. Cushman.

Genus CNESINUS LeConte

The genus *Cnesinus* was described by LeConte, 1868, to include his species *C. strigicollis* from Illinois. Since then about 20 species have been described from Central and South America. Apparently many additional species are still undescribed. In the present paper 8 new species are described.

CNESINUS CUBENSIS, new species

PLATE 15, FIGURES 1, 2

Dark reddish brown; 3.0 mm. long, 2.5 times as long as wide; allied to *strigicollis* LeConte but larger, elytra with setae stronger, and declivity strongly retuse.

¹ Dr. Blackman died on October 12, 1943, while this paper was in press.—EDITOR.

Frons (fig. 2) with eyes moderately separated above, surface piceous, convex and nearly impunctate above; below lighter in shade, concave, with definite, elevated side margins, punctures small, moderately spaced, bearing fine, short, yellow hairs directed dorsad, with a few similar hairs above, at each side near the eyes. Eye large, elongate oval, with inner line broadly, shallowly emarginate, facets rather coarse. Antenna with club fusiform, first two sutures septate.

Pronotum 1.03 times as long as wide, widest near middle, posterior outline bisinuate, posterior lateral angles scarcely rounded; sides nearly straight and very feebly diverging on posterior half, strongly, arcuately narrowed, very broadly rounded in front; surface subopaque, densely punctate-strigate, the strigae often broken up into granules, especially in front; with numerous short, recumbent, yellow-cinereous hairs directed mesad; median line punctured as is rest of pronotum, indicated only by direction of hairs.

Elytra wider than pronotum and 1.66 times as long, 1.55 times as long as wide; sides subparallel on more than anterior two-thirds, moderately rounded behind; surface shining but veiled by vestiture; striae narrow, impressed, strial punctures fine; interspaces wide, somewhat convex, rugulose, finely punctured, with a sparse median row of granules in each interspace, from each of which a stout, erect, brown bristle arises, with numerous, much finer, cinereous, recumbent hairs from finer interspacial punctures. Declivity sloping, strongly sulcate, and retuse; suture and second interspace strongly impressed, forming a deep sulcus; all of interspaces granulate, third interspace forming the summit of the high lateral elevations, with three large toothlike tubercles; vestiture of two kinds as on disk, but both kinds longer and coarser.

Type locality.—Cayamas, Cuba.

Host.—Unknown.

Type material.—Holotype, U.S.N.M. No. 56548.

The holotype was collected by E. A. Schwarz, March 3.

CNESINUS PANAMENSIS, new species

PLATE 15, FIGURES 3, 4

Dark reddish brown; 2.24 mm. long, 2.6 times as long as wide; rather closely allied to *strigicollis* LeConte.

Frons (fig. 4) black, moderately shining, convex above between the moderately approximated eyes (more closely than in *strigicollis*), broadly impressed below, finely and closely punctured at sides, above, and on epistoma, more sparsely elsewhere; with rather stout, moderately long hairs on sides and epistoma and with a few finer hairs in impression. Eye large, elongate ovate, rather coarsely faceted, inner line broadly, shallowly emarginate.

Pronotum 1.13 times as long as wide, widest near middle; posterior outline bisinuate, posterior lateral margins scarcely rounded; sides nearly straight and subparallel on more than posterior half, very broadly rounded in front; surface moderately shining, finely, closely punctate-strigate, median line lacking; hairs stout at sides and near front, nearly lacking on disk.

Elytra wider than pronotum and 1.61 times as long, 1.65 times as long as wide; sides subparallel on anterior two-thirds, broadly rounded behind; surface shining; striae deep, moderately narrow, punctures small, indistinct; interspaces much wider than striae, reticulate, finely punctured, bearing rather numerous short, appressed hairs, with sparse uniseriate rows of small granules, with suberect bristle arising from base of each. Declivity sloping, broadly and shallowly sulcate in sutural area; interspaces narrower and more convex than on disk, uniseriately granulate, with erect bristles more numerous than on disk.

Type locality.—Panama.

Host.—Unknown.

Type material.—Holotype and one paratype, U.S.N.M. No. 56549. The type series was collected by E. A. Schwarz, March 12, 1911.

CNESINUS COGNATUS, new species

PLATE 15, FIGURE 6

Dark reddish brown; 2.2 mm. long, 2.48 times as long as wide; rather closely related to *strigicollis* LeConte, but notably smaller and differing in the character and arrangement of the vestiture.

Frons (fig. 6) piceous-brown, subopaque, convex above between the moderately approximated eyes, bordered below by a transverse carina, with portion ventral to it broadly transversely impressed; punctures fine and close below and at sides, with cinereous, moderately long, stout hairs, those from sides directed dorsomesad. Eye relatively smaller and more elongate oval than in *strigicollis*, facets notably finer, inner line very broadly and shallowly emarginate.

Pronotum 1.05 times as wide as long, widest at middle, posterior outline slightly bisinuate, posterior lateral angles rounded; sides nearly straight and feebly diverging on posterior half, very broadly rounded in front; surface moderately shining, finely, closely punctate-strigate, median line lacking; vestiture of stout, subsquamose hairs at base, sides, and apex, fine, short, and inconspicuous on disk.

Elytra slightly wider than pronotum and 1.75 times as long, 1.61 times as long as wide; sides subparallel on anterior two-thirds, moderately narrowly rounded behind (not so broadly rounded as in *strigicollis*); surface shining through the rather abundant vestiture; striae

deep, moderately narrow, punctures small, rather indistinct; interspaces wider than striae, flat on disk, finely granulate-punctate, with numerous appressed, cinereous hairs of moderate size, the middle row in each interspace slightly longer and more erect at sides and behind; declivity moderately steep, interspaces narrower and somewhat convex, with erect hairs uniseriate and more numerous than on disk.

Type locality.—El Petén, Guatemala.

Host.—Unknown.

Type material.—Holotype, U. S. N. M. No. 56550.

The holotype was collected on April 8, 1922, by H. F. Loomis.

CNESINUS ROBAI, new species

PLATE 15, FIGURE 5

Dark piceous-brown to black; 2.34 mm. long, 3.73 times as long as wide.

Frons (fig. 5) with eyes rather narrowly separated above, its interocular area convex, black, brightly polished, with only a few minute, obsolescent punctures except at sides near eyes, where small, close punctures bear fine, rather short hairs; strongly, transversely impressed below convexity, with a distinct, small callus at each side of median line; epistoma lighter in shade, with numerous reddish-yellow hairs directed dorsad. Eye large, wider than usual, broadly shallowly emarginate, facets coarse. Antenna with club elongate ovate, with sutures transverse, the first two septate.

Pronotum 1.04 times as long as wide, widest near middle; posterior outline bisinuate, posterior lateral angles rounded, sides arcuate and weakly divergent on slightly more than posterior half, then more strongly narrowed, broadly rounded in front; surface dark reddish brown, subshining, densely strigate, subasperate at sides in front; median line narrow, slightly elevated and distinct on posterior half; hairs fine, appressed behind, stouter anteriorly.

Elytra wider than pronotum and 1.91 times as long, 1.82 times as long as wide; sides nearly straight and subparallel on more than anterior half, then gradually arcuately narrowed, with apex moderately broadly rounded; surface subshining, striae narrow, impressed, with small, inconspicuous punctures; interspaces flat, rugulose, finely, irregularly granulate, with fine punctures and a few fine, short hairs irregularly arranged, the median row in each interspace longer and stouter near and on declivity.

Type locality.—Santander Department, Colombia.

Host.—*Coffea arabica*.

Type material.—Holotype and 2 paratypes, U. S. N. M. No. 56551.

The type series was collected at an altitude of 700 to 1,300 meters by R. P. Roba, in whose honor the species is named.

CNESINUS SIMILIS, new species

PLATE 15, FIGURES 7, 8

Male.—Dark piceous-brown; 1.94–2.37 mm. long, holotype 2.2 mm. long, 2.33 times as long as wide; similar to *porcatus* Blandford and *costulatus* Blandford but differing in the shape and in the vestiture of the elytra and especially in the frontal structures.

Frons (fig. 8) somewhat similar to that of *porcatus* but with the eyes closer together above, the transverse carina even more strongly elevated, the triangular area above more flattened and brilliantly shining, the ventral area moderately punctured, with fine, rather short hairs (much finer, shorter, and less abundant than in *porcatus*), the hairy area extending at sides to slightly above the eyes. Eye narrower above than below the shallow emargination, facets moderately coarse. Antenna reddish brown, 7-segmented funicle about as long as scape, its distal segments slightly widened, club 1.8 times as long as wide, first two sutures distinctly septate.

Pronotum 1.03 times as wide as long, posterior outline distinctly bisinuate, posterior lateral angles not rounded, sides nearly straight and subparallel on posterior half, then arcuately narrowed, very broadly rounded in front; surface strigose, with narrow, shining interstices, transversely impressed near front margin, vestiture fine, rather scanty.

Elytra wider than pronotum and 1.69 times as long, 1.48 times as long as wide (stouter and proportionally shorter than in *porcatus*); bases separately rounded, sides nearly straight and subparallel on more than anterior half, then gradually, arcuately narrowed to a slight constriction, moderately rounded at tip; striae rather wide and deep, punctures large on anterior third, small and inconspicuous behind; interspaces of nearly equal width, sulcate on disk and sides, outer wall of sulci higher and wider, with fine punctures and fine, short hairs (smaller and less conspicuous than in *porcatus*); declivity moderately sloping, first interspace obscurely sulcate, the others subcostate, not sulcate, hairs larger and more numerous than on disk but much less numerous and conspicuous than in *porcatus*.

The female is unknown.

Type locality.—Porto Bello, Panama.

Host.—Unknown.

Type material.—Holotype male and 3 male paratypes, U.S.N.M. No. 56552.

The type series was collected by E. A. Schwarz, February 28 and March 1, 1911.

CNESINUS FOVEATUS, new species

PLATE 15, FIGURES 9–11

Piceous-black, with elytra very dark brown; 2.06 mm. long, 2.25 times as long as wide.

Frons (fig. 10) dark brown, feebly shining, convex above, finely, obscurely punctured, with a few fine, short, inconspicuous hairs; median line with a strong carina extending orad to level of eye emarginations; epistoma transversely impressed; with a small, circular callus at each side, below end of carina. Eyes not approximate above, narrowly ovate, inner line shallowly emarginate, facets moderately coarse. Antennal club fusiform, first 2 sutures nearly completely septate.

Pronotum 1.03 times as long as wide, posterior outline weakly bisinuate, posterior lateral angles slightly rounded; sides nearly straight and feebly diverging on posterior half, then arcuately narrowed, feebly constricted, broadly rounded in front; surface moderately shining, impressed just behind anterior margin, finely, shallowly, moderately closely punctate, substrigate; median line very narrow, feebly elevated. Propleura with a rather large fovea (fig. 11) at each side, lined with hairs, above and anterad of fore coxae, as in *Phloeoborus*, etc.

Elytra wider than pronotum and 1.45 times as long, 1.31 times as long as wide, very slightly widest behind middle; bases separately arcuate, humeral callus very small; sides nearly straight on less than anterior three-fourths, very feebly diverging, then strongly narrowed, with apex rather narrowly rounded; surface subopaque; striae moderately impressed, strial punctures obscure, less so at sides; interspaces wide, flat, finely reticulate, minutely punctate, otherwise unmarked on disk; declivity moderately steep, its face somewhat flattened; interspaces narrower than on disk, weakly convex, with numerous small, irregularly arranged granules; disk and sides glabrous, declivity with numerous erect, yellow hairs, becoming uniseriate in each interspace near apex.

Type locality.—Trece Aguas, Guatemala.

Host.—Unknown.

Type material.—Holotype, U. S. N. M. No. 56553.

The holotype was collected by Schwarz and Barber at an altitude of about 900 feet.

CNESINUS SUBSTRIGATUS, new species

Female.—Piceous-black; 2.43 mm. long, 2.93 times as long as wide; allied to *gracilis* Blandford.

Frons convex above, piceous, subopaque, reticulate, with fine punctures; epistoma impressed, interocular area flattened, both finely, rather closely punctured, with short, stout, erect, yellowish hairs nearly concealing surface. Eye rather large, not approximate above, inner line weakly emarginate, facets moderately coarse. Antenna of usual type for genus; club rather pointed ovate, sutures transverse,

the first two each nearly two-thirds septate; segments of funicle considerably wider distally.

Pronotum 1.07 times as long as wide, slightly widest near middle; posterior outline nearly straight, posterior lateral angles rounded, sides nearly straight, very feebly diverging to middle, then arcuately narrowed, very broadly rounded in front; surface feebly shining throughout, feebly, transversely impressed back of anterior margin; with moderately close, rather fine, elongate punctures, not confluent and not strigate; median line extending from base to apex, narrow, feebly elevated; vestiture lacking.

Elytra wider than pronotum and 1.83 times as long, 1.83 times as long as wide; bases rather weakly arcuate; humeral callus evident; sides nearly straight and subparallel for about three-fourths of their length, then narrowed, moderately rounded behind; surface shining; striae narrow, impressed, the first more strongly; striae small, separated by their own diameter; interspaces weakly convex, rugulose, with fine punctures, not uniseriate, hairs few in number and very minute on disk and sides; declivity sloping; striae more deeply impressed than on disk; interspaces narrower, rather strongly convex, finely granulate, each with uniseriate row of erect, yellowish bristles.

The male is unknown.

Type locality.—Santander, Colombia.

Host.—Branches of *Coffea arabica*.

Type material.—Holotype and 2 paratypes, U. S. N. M. No. 56554.

The type series was taken from dry branches of *Coffea arabica*, Santander, Colombia, at an elevation of 700–1,300 meters, by R. P. Roba.

CNESINUS NITIDUS, new species

PLATE 15, FIGURES 12, 13

Male.—Piceous to black, with elytra dark reddish brown; 1.66 mm. to 1.88 mm. long, holotype 1.80 mm. long, 2.33 times as long as wide; pronotum shining, not strigate but with longitudinal punctures.

Frons (fig. 13) strongly convex above, transversely impressed, subconcave below; surface shining, finely, not closely punctured, with rather coarse, semierect hairs from epistoma and at sides above, directed dorsad; epistomal margin with finer hairs, directed orad. Eye long oval, inner line with shallow emargination at some distance above insertion of antennae; facets moderately coarse.

Pronotum nearly exactly as long as wide, posterior outline weakly bisinuate, posterior lateral angles rectangular, sides nearly straight and feebly diverging on posterior half, then arcuately narrowed, feebly constricted, broadly rounded in front; surface brightly shining,

with rather small, elongate punctures, not truly strigate; median line impunctate from base to apex, not elevated; subglabrous.

Elytra wider than pronotum and 1.70 times as long, 1.44 times as long as wide, widest behind middle; bases separately, feebly arcuate; sides nearly straight and feebly divergent on anterior two-thirds, then narrowed, very broadly rounded behind; surface shining; striae impressed, punctures large and conspicuous anteriorly, becoming inconspicuous behind; interspaces wider than striae, slightly convex anteriorly, more strongly convex near declivity, rugulose, with small punctures, becoming finely granulate behind; declivity moderately steep, somewhat flattened in sutural region; anterior half subglabrous, posterior half, including declivity, with conspicuous, yellow-cinereous, erect bristles.

Female.—Very similar to male in most respects; frons similar to male, but with epistomal region much more finely and densely punctured; vestiture similarly disposed but much finer and less conspicuous.

Type locality.—Tampico, Mexico.

Additional localities.—Livingston, Guatemala; Trece Aguas, Guatemala (elevation 900 feet), and Porto Bello, Panama.

Host.—Unknown.

Type material.—Holotype, allotype, and 12 paratypes, U.S.N.M. No. 56555.

The holotype, allotype, and 2 paratypes were taken at Tampico, Mexico, by E. A. Schwarz; 9 paratypes were collected by Barber and Schwarz at Livingston and Trece Aguas, Guatemala; 1 paratype was taken by A. Busck at Porto Bello, Panama.

Genus CAMPTOCERUS Latreille

CAMPTOCERUS BOLIVIAE, new species

PLATE 16, FIGURES 18, 19

Female.—Black, moderately shining; 3.50 mm. long, 2.45 times as long as wide; last two abdominal segments visible beyond end of elytra.

Frons (fig. 19) convex, opaque above eyes; frontal rectangle 1.08 times as wide as long; strongly concave from upper level of eyes to epistoma, surface reticulate, with moderately close, deep punctures bearing fine, rather short hairs; surface with an arcuate elevation on lower frons and epistoma, epistomal lobe short and wide. Eye wider above, the lower end subangulate, facets moderately fine. Antenna with club irregularly ovate, attached to funicle at side of base, with little evidence of suture, except for a faint partial septum.

Pronotum 1.07 times as wide as long, posterior outline weakly bisinuate, with strong beaded margin, posterior lateral angles weakly

rounded; sides with sharply elevated, beaded margin; lateral outline strongly arcuate, considerably narrowed in front of middle, very broadly rounded in front; surface feebly shining, reticula elongated, punctures deep, rather fine, moderately close; glabrous.

Elytra scarcely wider than pronotum and 1.24 times as long, 1.14 times as long as wide; bases nearly straight, sides subparallel on anterior two-fifths, then semicircularly rounded, leaving the last two tergites exposed; surface moderately shining, strongly sculptured; dorsal contour arcuate from base to apex; striae strongly impressed, punctures moderately small, separated by their own diameters on anterior half, very fine and indistinct behind; interspaces wider than striae anteriorly, narrower than striae posteriorly, convex, granulate, distinctly punctured anteriorly, punctures less distinct posteriorly; vestiture entirely lacking, except at extreme sides.

Type locality.—San Borja, Beni, Bolivia.

Host.—Unknown.

Type material.—Holotype and 1 paratype, U. S. N. M. No. 56557.

The type series was collected in August 1925 by G. L. Harrington.

CAMPTOCERUS QUADRIDENS, new species

PLATE 16, FIGURES 14-17

Male.—Dark reddish brown; 3.6 mm. long, 1.96 times as long as wide.

Frons (fig. 15) concave from eye to eye, with frontal rectangle 1.13 times as long as wide; surface subshining, finely, rather closely punctured, with moderate, yellow hairs directed dorsomesad; epistoma separated above by a low, short, transverse carina in median third between bases of antennae, surface shining, median third apparently devoid of punctures, sides finely, closely punctate, with fine hairs, epistomal margin transverse, with short, downwardly directed hairs. Antenna (fig. 16) with scape longer than club or funicle, flattened, club-shaped, with rather long hairs, funicle 7-segmented, segments progressively widened distally, with joints 2-7 bearing long, stout hairs the end of many of which extend beyond the rather small club, which has indistinct sutures, only the first one having a partial septum.

Pronotum 1.18 times as wide as long, posterior outline bisinuate, with a strong, beaded margin, posterior lateral angles scarcely rounded; sides with a sharply elevated, beaded margin, lateral outlines nearly straight and subparallel on more than posterior half, then abruptly narrowed, broadly rounded in front; surface moderately shining, faintly reticulate, with fine, moderately spaced punctures, closer in front; vestiture apparently lacking on disk, with a few moderate hairs on anterior fourth.

Elytra equal in width to pronotum, and 1.26 times as long, 1.08 times as long as wide; bases bisinuate, sides nearly straight and subparallel on anterior half, then gradually, arcuately narrowed, moderately rounded behind; disk short, comprising only about two-fifths of the total length of elytra, surface brightly shining; strial punctures small, in fairly regular rows, striae not impressed; interspaces flat, with a few very minute punctures, apparently glabrous, the first and second interspaces each ending in a tooth extending caudad over the excavated anterior portion of the declivity, that from the first interspace being longer and sharper. Declivity originating in the recess formed by the overhanging posterior edge of the discal portion, sloping, arcuate; strial punctures in imperfect rows; interspaces rugulose, each with a median row of granules, from which arise yellow hairs, long and slender near summit, stouter and spatulate toward apex; posterior lateral border with a rather fine beaded margin.

Type locality.—Panama Canal Zone.

Host.—Unknown.

Type material.—Holotype, U. S. N. M. No. 56556.

The holotype was collected "from felled tree," August 19, 1923, by J. Zetek.

Genus CERATOLEPIS Chapuis

CERATOLEPIS NUBILUS, new species

Male.—Reddish brown, infumated with piceous; 2.14 mm. long, 2.34 times as long as wide; allied to *C. errans* Blandford.

Frons distinctly concave; surface finely, closely punctured, with numerous short, rather stout, light-cinereous hairs, evenly distributed over concavity; epistomal margin strongly incurvate. Eye slightly wider above, lower end not angulate, inner line entire, facets rather large. Antenna similar to that of *errans*.

Pronotum almost exactly as long as wide, posterior outline nearly straight, with distinct, beaded margin, posterior lateral angles rounded; sides arcuate from base to apex, with beaded margin extending four-fifths of distance from base, anterior margin moderately broadly rounded; surface weakly shining, punctures deep, rather close, closer at sides and in front; subglabrous, median line narrowly impunctate behind, not elevated.

Elytra very slightly wider than pronotum and 1.43 times as long, 1.34 times as long as wide; bases weakly arcuate, sides straight and subparallel on anterior two-thirds, moderately narrowly rounded behind; surface moderately shining, strongly sculptured; striae impressed, punctures close and large near base, smaller behind; interspaces much wider than striae, convex, strongly rugose, with uniseriate punctures nearly as large as those of striae on anterior half,

smaller and obscurely granulate behind, without hairs or with a very few minute ones on anterior disk; declivity originating at about middle, gradually, arcuately sloping, interspaces with rounded granules and with short, stout, cinereous hairs.

Type locality.—St. Croix, Virgin Islands.

Host.—Unknown.

Type material.—Holotype, U. S. N. M. No. 56558.

The holotype was collected by H. A. Beatty.

Genus HEXACOLUS Eichhoff

HEXACOLUS SWIETENIAE, new species

PLATE 16, FIGURES 20-24

Male.—Very dark reddish brown, with basal two-thirds of pronotum and a stripe on each elytron lighter reddish brown; 1.93 mm. long, 2.11 times as long as wide; intermediate in size between *Hexacolus cecropii* Schedl and *H. blandfordi* Schedl.

Frons (fig. 23) subimpressed, shining, reticulate, with few very fine punctures and small hairs, surface usually almost entirely hidden by a dense veil of long yellow hairs extending orad from vertex, epistoma impressed at each side, elevated in median line, with moderately long hairs from oral margin. Eye large, elongate, ovate, facets rather fine, inner line feebly sinuate. Antenna (fig. 21) with scape club-shaped, 2.66 times as long as the 6-segmented funicle and slightly longer than the obovate club, which has a half septum on first suture.

Pronotum nearly as long as wide, widest at middle; posterior outline bisinuate, margined toward sides, posterior lateral angles strongly rounded; sides strongly margined for three-fourths of their length, arcuate, weakly behind, strongly anteriorly, very broadly rounded in front; surface shining, very dark reddish brown in front, much lighter behind with darker shade extending farther back in median area; surface with rather strong, low, transverse asperities anteriorly, which become lower and finer on posterior half, where they are reduced to a slightly elevated anterior rim to each fine puncture; interstices finely, distinctly reticulate; vestiture minute and scanty, to be seen only in certain lighting.

Elytra slightly wider than pronotum and 1.36 times as long, 1.21 times as long as wide; bases sinuate, distinctly margined, sides weakly arcuate on anterior two-thirds, then more strongly, arcuately narrowed to the moderately narrow apex, extreme apex emarginate at suture, exposing last abdominal tergum; surface brightly shining, convex, much more strongly behind, appearing glabrous but with minute hairs on interspaces; color dark reddish brown in median area and on extreme sides, with an undefined light-reddish-brown area on disk

at each side; striae finely, closely punctured, the first strongly impressed, second and third weakly impressed, lateral striae not at all impressed, interspaces smooth, scarcely rugulose near base, with a few fine, uniseriate punctures; declivity gradually sloping, suture elevated, first striae impressed as on disk. Last tergum pale yellow, with short, fine hairs.

Female.—Slightly smaller (1.85 mm. long) and slightly slenderer; frons (fig. 24) convex above, transversely impressed between bases of antennae, median line indefinitely elevated, surface subopaque, finely, distinctly reticulate, with sparse, fine, indistinct punctures bearing short, fine, inconspicuous hairs.

Type locality.—Costa Rica.

Host.—Mahogany (hybrid?)

Type material.—Holotype, allotype, and 5 paratypes, U.S.N.M. No. 56559.

The type series was intercepted at the New York Quarantine Station in logs of hybrid (?) mahogany, May 18, 1941.

Two specimens taken from cedar logs from Costa Rica at the same quarantine station are similar in size, proportions, and sculpture, but are nearly uniformly light reddish brown. They are believed to be specimens of the same species that have not yet attained their full coloration.

HEXACOLUS LEVIS, new species

PLATE 16, FIGURE 25

Female.—Dark reddish brown, unicolorous; 2.2 mm. long, 2.33 times as long as wide.

Frons weakly convex above, subopaque, reticulate, with very sparse punctures; impressed between bases of antennae, with a few larger punctures; epistoma shining; hairs very fine, short, and scanty. Eye of moderate size, facets rather small, inner line entire. Antenna notably shorter than in *Hexacolus swieteniae*, new species; scape club-shaped but slenderer, 2.36 times as long as funicle and about twice as long as club, which is nearly as wide as long, without sign of a septum.

Pronotum as long as wide, widest near base, posterior outline very feebly sinuate, feebly margined only near the slightly rounded posterior lateral angles, sides sharply margined from base to middle, weakly arcuately convergent to beyond middle, broadly rounded in front; surface subshining, glabrous, finely, distinctly reticulate, with very fine punctures, sparsely arranged, no granules or asperities present.

Elytra distinctly wider than pronotum and 1.79 times as long, 1.57 times as long as wide; widest near base; base weakly sinuate, margined toward sides; sides nearly straight and subparallel on anterior two-thirds, narrowly rounded behind, extreme tip emarginate at suture,

exposing last tergite; surface shining, finely rugulose, reticulate, strial punctures small, shallow, in definite rows, but striae except first two not impressed; interspaces flat, very finely punctured, with no hairs visible; declivity moderately sloping, unmodified.

The male is unknown.

Type locality.—Paraiso, Panama Canal Zone.

Host.—Unknown.

Type material.—Holotype and 3 paratypes, U.S.N.M. No. 56560.

The type series was collected by E. A. Schwarz, January 26, 1911.

Genus PRIONOSCELES Blandford

PRIONOSCELES INGAE, new species

Female.—Black, shining, with abundant cinereous hairs on elytra; 1.97 mm. long, 1.99 times as long as wide.

Frons convex above, surface feebly shining, reticulate, strongly punctured, with median line indefinitely elevated; below subsemicircularly flattened, with somewhat smaller, less distinct punctures and no sign of a median elevation; epistoma somewhat elevated, with conspicuous tuft of hairs from epistomal margin; frontal hairs sparse and inconspicuous. Eye narrow ovate, inner line entire, facets small. Antenna yellowish red with club infumated with darker coloration; scape club-shaped, funicle shorter than scape, 6-segmented, with distal segments much wider; club oval, with one nearly complete septum.

Pronotum exactly as long as wide, posterior outline bisinuate, distinctly margined throughout, with margin continuing at sides well past middle, posterior lateral angles rounded, sides subparallel and nearly straight (very feebly arcuate) to well past middle, very broadly rounded in front; surface shining; anterior third with low, subconcentric asperities, with a few short, fine hairs; posterior portion subglabrous, finely, moderately sparsely punctured, with interstices reticulate, median line impunctate on basal third.

Elytra notably wider than pronotum and 1.31 times as long, 1.18 times as long as wide; bases slightly sinuate, margined; sides nearly straight and subparallel on anterior two-thirds, very broadly rounded behind; dorsal contour arcuate from base, much more strongly behind middle; surface shining, piceous-black; striae weakly, first and second more strongly impressed, punctures very close, of moderate size; interspaces wide, nearly flat, strongly uniseriately punctured, the punctures being similar in size to those of striae but not so closely placed, surface more roughened and subgranulate behind middle; declivity strongly convex; vestiture of erect, yellow-cinereous bristlelike hairs, moderately abundant throughout but especially so on declivity.

Male.—Similar to female in general habitus, with frons concave,

shining, finely, closely punctured, with conspicuous fine hairs of moderate length.

Type locality.—La Esperanza, Colombia.

Host.—*Inga*.

Type material.—Holotype and 2 paratypes, U.S.N.M. No. 56561.

The short type series was collected September 8, 1935, from *Inga*, by R. P. Roba.

PRIONOSCELES SPADIX, new species

Light reddish brown; 1.97 mm. long, 2.22 times as long as wide; allied to *Prionosceles atratus* Blandford and *P. maurus* Blandford.

Frons strongly convex above, transversely impressed between antennae; surface shining, moderately punctured, with a few small, inconspicuous hairs; epistomal margin thickened, with conspicuous, yellow hairs in median third. Eye elongate, narrow, facets rather small, inner line entire.

Pronotum as wide as long, slightly widest at middle; posterior outline bisinuate, finely margined toward sides, posterior angles strongly rounded; sides finely margined on posterior three-fifths, very feebly arcuate, very broadly rounded in front; surface moderately shining, glabrous, punctate-asperate throughout, much more strongly in anterior third; median line not elevated, punctured.

Elytra very slightly wider than pronotum and 1.23 times as long, 1.19 times as long as wide; bases sinuate, distinctly margined; sides nearly straight and subparallel on anterior five-eighths, then broadly arcuate; surface shining, spadiceous; dorsal contour convex throughout, more strongly on posterior half; striae impressed, the first very strongly impressed, punctures close and moderate in size; interspaces somewhat convex, first interspace narrow on basal fifth and apical two-fifths, other interspaces wide on disk and side, somewhat narrowed on declivity, discal interspaces with fine punctures, becoming uniseriate behind, uniseriately granulate on declivity; anterior half subglabrous, posterior half with fine, short, erect hairs.

Type locality.—Guatemala.

Host.—Mahogany (hybrid?).

Type material.—Holotype, U.S.N.M. No. 56562.

The holotype was taken May 26, 1941, from hybrid (?) mahogany intercepted at quarantine, New York (89860), from Guatemala.

Genus PHLOEOTRIBUS Latreille

The complex of species of the tribe Phloeotribini characterized by having the joints of the antennal club varying from loosely articulated to flabellate have been separated into several genera. The ones we are concerned with at present are *Phloeotribus* Latreille, *Phleoph-*

thorus Wollaston, and *Phthorophloeus* Rey. These, as characterized, seem sufficiently different to be considered as distinct genera, and when the genotypes are compared the same is true. However, when the group as a whole is studied, it is found that there are no sharp lines of demarcation between the species groups. Many species cannot be definitely placed in any of the three categories but possess certain characters of one group and certain other characters of other groups. It would seem that the tribe is still undergoing active evolution and that the species groups present such an unusual intergradation of characters that it seems wise to treat them as a single genus under the oldest generic name, *Phloeotribus*.

Of the five new South American species described in the following pages the first two (*Phloeotribus manni* and *P. argentinae*) belong unmistakably to *Phloeotribus* s. str. Of the other three, *P. boliviae* and *P. harringtoni* cannot be placed definitely in either *Phloeotribus* s. str. or *Phthorophloeus* Rey, as they have some characters of each group. *P. jujuya* agrees with *Phthorophloeus* in some respects and with *Phloeophthorus* Wollaston in others.

PHLOEOTRIBUS MANNI, new species

PLATE 17, FIGURES 26, 27

Female.—Pronotum piceous-black, opaque; elytra reddish brown, opaque; 3.11 mm. long, 1.53 times as long as wide.

Frontal rectangle 1.09 times as long (including epistomal lobe) as wide; frons (fig. 27) convex above, impressed between eyes above the usual transverse, arcuate impression between bases of antennae, transversely impressed on epistoma; surface piceous-brown, closely, rather coarsely punctate, with fine, short, appressed hairs; epistomal margin thickened and liplike, with a large epistomal lobe twice as wide as long, reddish yellow in color with its distal end shallowly emarginate, arising from its posterior distal surface. Eye slightly less than three times as long as wide, wider above middle, with lower half tapering to a very sharp angle. Antennal scape bright reddish brown, slightly longer than club, which is darker and subopaque.

Pronotum 1.19 times as wide as long, widest at base, posterior outline extended in median area, posterior angles scarcely rounded, sides and front margin together nearly evenly semicircular; surface opaque, rather coarsely, densely, moderately shallowly punctured, posterior median area scarcely granulate, anterior area scabrous, sides with broad, low asperities larger and higher at anterior angles; vestiture of fine, short hairs, with a few larger, stouter hairs intermixed at sides and in front.

Elytra wider than pronotum and 1.40 times as long, very broad, 1.03 times as long as wide; anterior margins arcuate, strongly crenu-

late; sides subparallel on about anterior half, very broadly rounded behind; surface opaque; striae narrow, strongly impressed, punctures small, shallow, closely placed; interspaces several times as wide as striae, flat anteriorly, convex on declivity, becoming narrower posteriorly, rugose, with irregularly arranged, lunate asperities anteriorly, becoming uniseriate behind; vestiture of small, short hairs on sides and declivity.

The male is unknown.

Type locality.—Rio Madeira, Brazil.

Additional locality.—Río Beni, Bolivia.

Host.—Unknown.

Type material.—Holotype and 1 paratype, U. S. N. M. No. 56563.

The type was collected by W. M. Mann in 1933 at Rio Madeira, Brazil; paratype by W. M. Mann, Río Beni, Bolivia.

PHLOEOTRIBUS ARGENTINAE, new species

PLATE 17, FIGURES 28-30

Female.—Piceous-black, with anterior margin of pronotum, antennae, and parts of the legs reddish brown; 2.63 mm. long, 1.69 times as long as wide.

Frons (fig. 30) convex above, frontal rectangle 0.92 as long as wide, transversely impressed just above epistomal margin and also between the eyes, with impressions separated by a transverse, slightly arcuate elevation between the bases of antennae, surface subopaque, reticulate, with rather small, shallow punctures; epistomal margin thickened, liplike, extended in median line. Antenna reddish brown, arising from frons one-third of distance between eye and median line; scape long, slender, with a few short hairs; club nearly as long as scape, with rather long, slender lamellae. Eye elliptical, 3.3 times as long as wide, inner margin entire, facets moderate.

Pronotum 1.26 times as wide as long, widest near base, posterior outline strongly bisinuate, posterior angles rounded, sides and front margin evenly subsemicircularly rounded, anterior margin serrate at each side, with median serrations obsolescent; surface opaque, rugose-asperate in front and at sides, median third of posterior disk subgranulate, with large but very shallow, very indistinct, obsolescent punctures; hairs scanty and very inconspicuous, more numerous at sides.

Elytra wider than pronotum and 1.62 times as long, 1.18 times as long as wide; anterior margins arcuate, elevated and crenulate; sides nearly straight and feebly converging on anterior two-thirds, moderately rounded behind; surface convex from base to apex, moderately shining, piceous except near anterior margin; striae deeply impressed, punctures small, indistinct; interspaces two or more times as wide

as striae, nearly flat, lunately asperate anteriorly, becoming uniseriately granulate behind; vestiture on anterior half scanty, sparse and fine, with coarser, longer, yellow setae on posterior half and on sides, becoming more conspicuous on declivity.

Male.—Similar to female in general habitus; frons (fig. 29) concavely impressed, below with a well developed, erect epistomal process arising just above the epistomal margin and having the free end squarely truncate, the sides feebly converging; antennal scape with dense fringe of long yellowish hairs; pronotum with anterior margin equally serrate at center and sides; elytral setae more conspicuous.

Type locality.—El Quemado, Argentina.

Additional locality.—Salta, Argentina.

Host.—Unknown.

Type material.—Holotype, allotype, and 41 paratypes, U. S. N. M. No. 56564.

The type series was collected by G. L. Harrington in 1927–28 in northern Argentina, in the provinces of Jujuy and Salta.

PHLOEOTRIBUS BOLIVIAE, new species

PLATE 17, FIGURES 31, 32

Female.—Head piceous, pronotum very dark reddish brown, elytra reddish brown; 2.17 mm. long, 1.92 times as long as wide.

Frons (fig. 32) convex above, frontal rectangle 0.94 as long as wide, transversely elevated between bases of antennae, surface subshining, reticulate, sparsely, shallowly punctate, with a short, fine, median sulcus just above transverse elevation; below transversely rather broadly impressed on epistoma, with punctures rougher, coarser, and deeper than above; epistomal margin thickened, liplike; piceous above, reddish brown in epistomal impression. Antenna arising from side of frons one-third of distance between eye and median lines, scape and funicle reddish brown, club piceous, about as long as scape. Eye elongate elliptical, not emarginate, facets moderate.

Pronotum 1.25 times as wide as long, widest near base, posterior outline extended in median area, posterior angles rounded, sides strongly arcuate, slightly constricted behind the very broadly rounded front margin, which is without serrations in median area but with small serrations at each side; surface shining, rugose-asperate in front and at sides, with sparse, semierect hairs, rugose-granulate and shallowly punctate in posterior median portion with fine, short hairs.

Elytra wider than pronotum and 1.80 times as long, 1.31 times as long as wide; anterior margins arcuate, elevated and crenulate, sides nearly straight and feebly diverging, moderately rounded behind,

with small serrations; surface shining; striae deep, with rather close, shallow punctures of moderate size; interspaces slightly wider than striae, rugose-asperate, asperities becoming uniseriate posteriorly, hairs stout, erect; declivity with striae and interspaces subequal in width, with hairs as on disk and sides; posterior rim margined and serrate.

Male.—Similar to female in habitus; frons concave below, with epistomal margin narrowly elevated, surface partly concealed by moderate, yellow hairs, transverse elevation between bases of antennae divided in median line by a longitudinal sulcus extending dorsad into a secondary concavity, with moderately long and coarse yellow setae arising from each side and directed toward median line; above secondary concavity with a rather low, hill-like elevation; frontal rectangle 1.14 times as long as wide; antenna arising from nearly halfway between eye and median line; scape with dense brush of long yellow hairs.

Type locality.—Mapiri, Bolivia.

Host.—Unknown.

Type material.—Holotype, allotype, and 1 paratype, U. S. N. M. No. 56565.

The type series was taken by G. L. Harrington in September 1925 at Mapiri, Department of La Paz, Bolivia.

PHLOEOTRIBUS HARRINGTONI, new species

PLATE 17, FIGURES 33, 34

Female.—Piceous-brown, with antennae and legs lighter; 2.31 mm. long, 2.33 times as long as wide.

Frontal rectangle 0.83 as long as wide, including epistomal lobe, which is longer than wide; frons (fig. 34) convex above, transversely impressed on epistoma, elevated between bases of antennae, indefinitely impressed above; surface piceous-brown, subshining, moderately punctured, with moderately short, semierect, cinereous hairs. Eye more than three times as long as wide, with outline fusiform. Antenna inserted at side very near eye; scape and funicle light reddish brown, club darker, with segments more than three times as wide as long.

Pronotum 1.17 times as wide as long, widest near base, posterior outline bisinuate, scarcely extended in median area, posterior angles rounded, sides convergently arcuate to the constriction just behind the broadly rounded anterior margin, which is devoid of serrations; surface moderately shining; median area with close, rather shallow, moderately large punctures, with a few small granules only on anterior third, sides with low, broad asperities distributed from behind the front margin nearly to base; vestiture of rather stout, moderate-

ly long, semierect, yellow setae, at sides directed caudad, setae finer and directed mesad on disk.

Elytra wider than pronotum and 1.82 times as long, 1.31 times as long as wide; anterior margins arcuate, crenulate, with a secondary row of lunate asperities behind and parallel to it, and a few additional, scattered asperities behind this; sides straight and subparallel on anterior two-thirds, rather narrowly rounded behind, with posterior margins serrate; surface somewhat shining; striae wide and deep, with coarse, close punctures; interspaces usually narrower than striae, rugose, with low, wide, lunate, approximately uniseriate asperities; vestiture of rather stout, suberect setae, approximately uniseriate on disk and sides except in sutural interspaces. Declivity arched, arising from well behind middle; striae deeper than on disk and similarly punctured; interspaces narrower, strongly convex, some of asperities reduced to granules, others elevated to form sharp, conical teeth on interspaces 3, 5, 7, and 9; setae larger and more numerous than on disk.

Male.—Similar to female, but with frons concave from above level of eyes to epistomal margin, interantennal elevation incomplete in median third; antenna similar to that of female but with longer, more numerous hairs on scape.

Type locality.—Aguaray and Tartegal, Argentina.

Host.—Unknown.

Type material.—Holotype, allotype, and 8 paratypes, U.S.N.M. No. 56566.

The type series was collected by G. L. Harrington on October 19–21, 1920.

PHLOEOTRIBUS JUJUYA, new species

PLATE 17, FIGURES 35, 36

Female.—Reddish brown, with head piceous-brown; 2.53 mm. long, 2.16 times as long as wide.

Frontal rectangle 0.71 as long as wide, including epistomal lobe, which is longer than wide; frons (fig. 36) convex above, reddish, closely, moderately coarsely punctured; transversely impressed below; elevated between antennal bases, transversely flattened above, median line with a carinal elevation which in turn has a median sulcus; vestiture short, fine, and sparse. Eye elongate elliptical. Antenna inserted at side near eye; scape and funicle light reddish brown, club darker, with segments less than twice as wide as long.

Pronotum 1.17 times as wide as long, widest at base, posterior outline scarcely sinuate, not at all extended posteriorly, posterior angle scarcely rounded; sides convergently arcuate, with little evidence of anterior constriction, anterior margin very broadly rounded, subsinuate in me-

dian area, margin without serrations; surface moderately shining, median area with moderate close, very shallow punctures, interstices reticulate, appearing subgranulate; median line impunctate, extending slightly past middle, somewhat elevated anteriorly; sides with very low, broad, small asperities becoming granulate near base; vestiture of scanty, fine, appressed hairs.

Elytra wider than pronotum and 1.90 times as long, 1.39 times as long as wide; anterior margins rather weakly arcuate, crenulate, with scattered, lunate asperities posterior to it; sides nearly straight and subparallel on less than anterior two-thirds, rather narrowly rounded behind, with margins serrate; surface shining; striae wide and deep, with coarse, close, transverse punctures; interspaces variable, but not wider than striae, rugose-granulate, with granules coarse and uniseriate posteriorly; vestiture of small, semierect, inconspicuous hairs on disk, sides, and declivity; declivital granules coarser on interspaces.

Male.—Unknown.

Type locality.—Santa Clara, Jujuy, Argentina.

Host.—Unknown.

Type material.—Holotype, U.S.N.M. No. 56567.

The holotype was collected by G. L. Harrington on September 23, 1921.

Genus RENOCIS Casey

RENOCIS CHAPINI, new species

Female.—Reddish brown, with light cinereous scales and setae; 1.58 mm. long, 1.90 times as long as wide; allied to *Renocis braziliensis* Blackman and *R. insularis* Blackman, but slightly slenderer than either.

Frons with epistomal margin without visible tooth in median line, fringed with fine yellowish setae; broadly, shallowly impressed above epistoma, shining, finely punctured below, convex above, subopaque, finely reticulate, finely punctate, with short cinereous hairs and divided scales. Eye about three times as long as wide, finely faceted; inner outline scarcely emarginate. Antenna with scape, 5-segmented funicle, and club nearly equal in length; club 1.53 times as long as wide, ovate, with distal end subacuminate, sutures setose and weakly, annularly impressed.

Pronotum 1.36 times as wide as long, widest near base, basal margin bisinuate, sides strongly arcuate from base to weak constriction just behind the very broadly rounded front margin, which bears a few longer setae; surface reddish brown, weakly shining, finely, closely punctured, finely reticulate, subgranulate; each side with a few very small asperities, variable in number and scarcely visible; surface partly concealed by numerous small, cinereous scales, often bifurcate, many of those near base nearly white.

Elytra wider than pronotum and 1.92 times as long, 1.31 times as long as wide; sides subparallel on anterior two-thirds, rather broadly rounded behind; basal margins from suture to fifth interspace with 6-7 crenulations on each elytron, in a continuous line; striae impressed, much stronger behind, punctures moderately large, close; interspaces wider, moderately convex, with numerous fine punctures bearing small, subcircular, appressed scales, with a median row of larger punctures bearing larger, narrower, erect scales in each interspace; scales varying in color from nearly white to testaceous, but not forming a color pattern. Declivity evenly arched, not modified, scales slightly longer and more erect than on disk.

The male is unknown.

Type locality.—Ocho Rios, Jamaica.

Host.—Unknown.

Type material.—Holotype and 1 paratype, U. S. N. M. No. 56568.

The two specimens comprising the type series were taken, flying at dusk, on February 2, 1937, near Ocho Rios, Jamaica, by E. A. Chapin and R. E. Blackwelder.

Genus CHRAMESUS LeConte

CHRAMESUS PANAMENSIS, new species

Female.—Dark reddish brown to piceous, opaque, with yellow-cinereous bristles and scales; 1.43 mm. long, 1.70 times as long as wide; allied to *hicoriae* LeConte and *asperatus* Schaeffer, but smaller than either of these.

Frons convex above, flattened below, with epistomal lobe nearly as long as wide arising from the liplike epistomal margin; frontal rectangle (including lobe) 1.16 times as long as wide; surface opaque to subopaque, reticulate, very finely granulate, with minute punctures bearing short, moderately stout, dorsally directed hairs. Antenna arising from side near eye, similar in general to that of *hicoriae*. Eye rather large, facets moderately large, inner line entire.

Pronotum 1.24 times as wide as long, posterior outline bisinuate, moderately produced in median line; sides strongly arcuately convergent, broadly rounded in front; feebly, transversely impressed just behind front margin; surface opaque, reticulate, finely granulate-punctate in median area, lateral areas with low, broad asperities parallel to lateral outlines and extending to base; entire surface with rather sparse, flattened, cinereous setae directed posteromesad on disk.

Elytra wider than pronotum and 1.50 times as long, 1.12 times as long as wide; bases arcuate, elevated, and serrate; sides feebly arcuate, broadly rounded behind; dorsal contour obliquely arcuate from base to apex; surface opaque to subopaque; striae impressed, with shallow, moderate-sized punctures; interspaces much wider than striae at base,

slightly wider midway, convex, uniseriately granulate, with a median row of erect, stout, yellowish-cinereous setae, with numerous much smaller, scalelike setae on sides of each interspace and between the larger setae; declivity without special modifications.

Male.—Similar to female in habitus but with frons strongly concave, bordered at each side by a sharp, elevated ridge.

Type locality.—Panama Canal Zone.

Host.—Unknown.

Type material.—Holotype, allotype, and 5 paratypes, U. S. N. M. No. 56569.

The type series was collected by E. A. Schwarz in February and March 1911.

Genus PHRIXOSOMA Blandford

PHRIXOSOMA MAGNA, new species

PLATE 17, FIGURES 37-40

Piceous-brown, with elytra lighter brown; 3.91 mm. long, 1.93 times as long as wide; larger and much stouter than *Phrixosoma rude* Blandford.

Frons (fig. 38) convex, opaque, densely, finely granulate throughout, with fine median carina on lower half, somewhat flattened at each side; vestiture of fine, rather short, dense, yellowish hairs which are inconspicuous except in profile. Eye divided, the parts entirely separated (fig. 39) by a broad area having the texture and vestiture of the frons; facets of moderate size. Antenna (fig. 40) with scape long, slender, 2.46 times as long as 6-segmented funicle, club longer than funicle, 1.28 times as long as wide, pubescent, with 3 nearly straight sutures, marked by rows of longer setae, only the first suture partly septate.

Pronotum 1.35 times as wide as long, widest behind middle; posterior outline bisinuate, feebly margined toward sides, posterior lateral angles broadly rounded, sides not margined, very strongly arcuate, very broadly rounded in front, surface opaque, finely, densely granulate, with fine, short hairs; median line narrowly elevated on less than posterior half.

Elytra wider than pronotum and 2.06 times as long, 1.33 times as long as wide; bases margined and slightly elevated, finely granulate-crenate; sides weakly arcuate on anterior two-thirds, more strongly behind, apex rather narrowly rounded; surface opaque, cinnamon brown, infumated with piceous brown on humerus; striae deeply impressed, narrow, punctures small and moderately spaced; interspaces broad, weakly convex, densely, finely granulate, with fine, short, silky, cinereous hairs, similar on disk, sides, and declivity.

The locality.—Bolivia, South America.

Host.—Unknown.

Type material.—Holotype and 4 paratypes, U. S. N. M. No. 56570.

The type series was collected by G. L. Harrington in the Departments of Beni and La Paz, Bolivia, in August and September 1925.

PHRIXOSOMA OBESA, new species

Dark cinnamon-brown with elytra lighter, 2.36 mm. long, 1.86 times as long as wide; smaller and slightly stouter than *Phrixosoma magna*, new species.

Frons convex, surface opaque, densely, finely granulate, with very fine, indistinct median carina on lower half, transversely impressed above epistomal margin; vestiture fine, short, inconspicuous except in profile, slightly longer on epistoma. Eye entirely divided into two parts, separated by a broad area having the texture and vestiture of the frons; facets rather small. Antenna apparently similar to that of *magna*, new species (no balsam mounts available).

Pronotum 1.26 times as wide as long, widest at base; posterior outline bisinuate, submargined toward sides, posterior lateral angles sharp; sides arcuately narrowed from base to broadly rounded front margin; surface subopaque, finely, densely granulate-punctate, with fine, short hairs, conspicuous only with proper lighting; median line narrow, elevated, shining, and impunctate, evident only on posterior third.

Elytra wider than pronotum and 1.84 times as long, 1.31 times as long as wide; bases submargined, granulate; sides nearly straight, very feebly arcuate on anterior two-thirds, apex moderately rounded; surface opaque, cinnamon-brown; striae narrow, deeply impressed, punctures small, indistinct, close; interspaces wide, nearly flat on disk, convex behind, finely, closely granulate, with fine, rather short, silky, yellow-cinereous hairs, similar throughout.

Type locality.—Gatun, Panama Canal Zone.

Host.—Unknown.

Type material.—Holotype, U. S. N. M. No. 56572.

The holotype was taken by E. A. Schwarz on April 7, 1911.

PHRIXOSOMA PARVA, new species

Piceous-brown, subopaque, with elytra slightly lighter, 2.10 mm. long, 2.16 times as long as wide.

Frons convex, surface opaque, densely, finely granulated, with very fine, indistinct median carina on lower half, epistoma slightly impressed at each side; vestiture short, fine, inconspicuous, longer on epistoma. Eye bipartite, the smaller upper portion entirely sepa-

rated from the lower portion by a broad area similar in texture and vestiture to the frons. Antennae similar to those of other species.

Pronotum 1.14 times as wide as long, widest at base, posterior outline bisinuate, submargined toward sides, posterior lateral angles not rounded; sides without beaded margin, weakly convergently arcuate on posterior half, constricted before middle, broadly rounded in front; surface subopaque, finely, densely granulate-punctate, with rather short, fine hairs, inconspicuous except with proper lighting; median line narrow, slightly elevated, on posterior two-fifths.

Elytra only slightly wider than pronotum and 1.87 times as long, 1.51 times as long as wide; bases feebly arcuate, margins scarcely elevated; sides nearly straight, feebly converging on anterior two-thirds, narrowly rounded behind; surface subopaque, striae moderate in width, impressed, punctures small, moderately spaced; interspaces nearly twice as wide as striae, nearly flat on disk, somewhat convex behind, finely, closely granulate-punctate, with fine, moderately short, silky hairs throughout; declivity rather sloping.

Type locality.—Cayamas, Cuba.

Host.—Unknown.

Type material.—Holotype and 1 paratype, U. S. N. M. No. 56571.

The type material was collected by E. A. Schwarz on February 14.

Genus *LEPERISINUS* Reitter

LEPERISINUS HOFERI, new species

Female.—Reddish brown to piceous, with anterior borders of pronotum and elytra lighter; 2.6–3.5 mm. long, holotype 3.43 mm. long, 1.9 times as long as wide; allied to *californicus* Swaine and *imperialis* Eichhoff.

Frons broadly, moderately deeply concave, surface reticulate, subshining, sides finely, rather closely punctate, subgranulate, more distinctly granulate-punctate above, median area below with very few, very fine punctures, bearing few hairs, sides and upper frons with light, sordid-yellow, appressed, moderately long hairs directed mesodorsad; frontal rectangle 0.54 as long as wide, very wide between eyes, epistomal lobe very low and wide, with epistomal margin ventrad of it broadly emarginate. Eye elongate oval, margin entire, facets moderately coarse. Antennal club elongate oval, compressed, with silky pubescence and a few longer hairs; first two sutures transverse, third obliquely arcuate.

Pronotum 1.34 times as wide as long, widest slightly before base; posterior outline bisinuate, somewhat produced in median line; posterior lateral margins rounded, sides strongly, convergently arcuate,

constricted anteriorly, anterior margin very broadly rounded, scarcely impressed posterior to it; surface shining but mostly concealed by scales, punctures dense but very shallow, interstices variably granulate in median area; lateral areas with rather numerous, coarse asperities arranged as a submarginal row in front and extending to base and across anterior disk, smaller behind and in anterior median area; color markings produced by scales of two colors—dark-brown scales in a nearly regular, diamond-shaped median area and an irregular area at each side of disk, and at each side two light areas formed by light-yellow cinereous scales, one at extreme sides and one between the median and lateral dark areas.

Elytra wider than pronotum and 2.07 times as long, 1.35 times as long as wide; bases arcuate, elevated, and serrate; sides subparallel on anterior half, then gradually narrowed to the narrowly rounded apex; dorsal contour oblique, arcuate from middle to apex; surface shining, but almost entirely hidden by scales and hairs of two colors; striae impressed, punctures small and indistinct; interspaces wide, nearly flat on disk, more or less convex behind, granulate-punctate with larger granules or asperities, densely clothed with scales varying from subcircular to slender and with a few hairs, with hairs or slender scales forming the middle row in each interspace on sides and on anterior part of disk, these replaced on posterior half by erect or semierect, broad scales which exaggerate the convexity of the posterior part of most interspaces. Declivity sloping, suture decidedly convex, second interspace narrow, flat, appearing depressed, third interspace broad, convex, the others slightly convex. Color pattern of elytra formed by arrangement of dark-brown scales and hairs and yellow-cinereous scales and hairs as follows: A dark band at base, then a wider, irregular, light band, next an irregular dark band, incomplete at sides, followed by a light, irregular, oblique band, and finally an irregular dark spot involving interspaces 2 and 3; posterior border and sides prevailingly light.

Male.—Similar to female in habitus; frons flattened from eye to eye, reticulate, subshining, finely punctate, with hair as in female; median carina short, blunt, shining, midway between epistomal margin and upper level of eye.

Type locality.—Sabino Canyon, Ariz.

Host.—*Fraxinus* sp.

Type material.—Holotype, allotype, and 19 paratypes, U. S. N. M. No. 56573.

Holotype, allotype, and 12 paratypes taken from felled ash trap tree, at Sabino Canyon, Ariz., May 20, 1918, by George Hofer. 7 paratypes taken from *Fraxinus* sp. at Meek, N. Mex., by W. F. Fiske.

LEPERISINUS OREGONUS, new species

Female.—Piceous-brown, with elytra and anterior border of pronotum lighter; 2.8–3.3 mm. long, holotype 3.00 mm. long, 1.91 times as long as wide; allied to *californicus* Swaine and *hoferi*, new species, and intermediate in size between the two.

Frons very wide between eyes, frontal rectangle 0.61 as long as wide; broadly, rather deeply concave, more strongly above; surface shining except where hidden by vestiture, faintly reticulate, moderately closely, finely punctate at sides, subgranulate-punctate above, median eighth between eyes with few or no punctures; sides and upper frons with rather coarse, moderately long, cinereous hairs, directed mesodorsad; epistomal lobe inconspicuous. Eye less elongate than in *californicus* and *hoferi*, facets moderately coarse. Antennal club 1.7 times as long as wide, somewhat compressed, first 2 sutures transverse, third suture slightly arcuate and oblique.

Pronotum 1.41 times as wide as long, widest at base; posterior outline bisinuate; posterior lateral angles not rounded, sides arcuate and convergent, slightly constricted just behind the very broadly rounded anterior margin; surface almost entirely concealed by scales but shining where visible, median area punctate-granulate, lateral areas with asperities smaller than in *californicus* and much smaller than in *hoferi*, replaced by granules near base; color markings similar to those of its allies.

Elytra wider than pronotum and 2.14 times as long, 1.38 times as long as wide; bases arcuate and serrate, sides subparallel on anterior half, then gradually narrowed, moderately rounded behind (more broadly rounded than in *hoferi*); dorsal contour nearly straight on more than anterior half, declivity weakly arcuate; surface almost entirely hidden by scales and hairs; striae impressed, narrow, nearly concealed by scales from interspaces, punctures small and inconspicuous; interspaces wide, nearly flat, finely granulate-punctate, asperities much smaller than in *californicus*, *hoferi*, etc., not notably larger on posterior half; vestiture of scales and hairs, of which the former are much more numerous; middle row of vestiture in each interspace on sides and on anterior half of disk consisting of semierect hairs or slender scales, middle rows on first 3 interspaces of the declivity of large, erect scales, very broad on distal two-thirds; color pattern formed of yellow scales and hairs and brown scales and hairs similar in general to that of its allies.

Male.—Similar to female in habitus, frons not so deeply concave and with a distinct transverse elevation (carina) between bases of antennae, and extending dorsad from this an elevated median carina; surface not so finely punctured, with slightly sparser hairs; pronotal

and elytral asperities coarser and yellow scales more numerous than in female; elytral interspaces with larger asperities than in female.

Type locality.—Forest Grove, Oreg.

Additional localities.—Corvallis, Portland, St. Helens, Oreg.

Host.—*Fraxinus oregona* Nuttall.

Type material.—Holotype, allotype, and 25 paratypes, U.S.N.M. No. 56574.

The holotype, allotype, and 5 paratypes were taken from Oregon ash at Forest Grove, Oreg., by M. C. Lane, January 8, 1919; 11 paratypes, Corvallis, Oreg., 1931; 7 paratypes taken at Portland, Oreg., August 31, 1926, by C. E. Wood; 2 paratypes, St. Helens, Oreg., from *Fraxinus*, by A. D. Hopkins.

Genus PHLOEOSINUS Chapuis

PHLOEOSINUS BLACKWELDERI, new species

Male.—Black, with elytra reddish brown; 2.97 mm. long, 2.10 times as long as wide; closely allied to *nitidus* Swaine and *cupressi* Hopkins.

Frons rather wide between eyes, frontal rectangle about 0.63 as long as wide; epistomal lobe very short; surface piceous, finely, densely granulate-punctate at sides, deeply, closely punctate above (more so than in *nitidus*), median area shining, concave between eyes (less deeply than in *nitidus*), not extending to epistoma, which is very finely granulate-punctate; median carina short and not conspicuous; hairs short. Eye more than 3 times as long as wide, more than half divided by an emargination. Antenna with club nearly twice as long as wide, sutures oblique.

Pronotum 1.10 times as wide as long, widest at base; sides regularly, convergently arcuate, without constriction, broadly rounded in front; surface brightly shining, piceous-black, closely, deeply punctured on disk, more finely and densely near anterior margin, sides subgranulate-punctured; lateral calli distinct; hairs fine and short (shorter than in *nitidus*) over most of pronotum, with longer hairs anterolaterad of calli.

Elytra wider than pronotum and 1.63 times as long, 1.34 times as long as wide, widest behind middle; sides slightly sinuate, subparallel, very broadly rounded behind; surface shining, striae sinuate, deeply impressed, punctures large, close, shallow; interspaces on disk rugose-granulate, convex, with very fine punctures, much wider than striae near base, about equal in width to striae on most of disk, granules confused anteriorly, becoming uniseriate posteriorly; sides with striae and interspaces about equally wide, interspaces less strongly rugose and granulate; hairs short and fine, not abundant. Declivity abrupt, of the *nitidus-cupressi* type, with coarse, black serrations; first inter-

space with several (three in type) coarse, black serrations only at summit of declivity, with apical three-fourths flat, shining, moderately, rather roughly punctured; second interspace obliterated in middle half of declivity but widened into an angular area near apex; third interspace elevated, with 8-10 coarse, stout, blunt, black serrations (coarser and much blunter than in *nitidus*); fifth, seventh, and ninth interspaces each with a few smaller serrations; hairs slightly longer than on disk.

Female.—Similar to male but averaging somewhat larger; frons wider between eyes, frontal rectangle 0.62 as long as wide; convex, densely granulate-punctate, median carina variably, often feebly developed on lower half; pronotum with lateral calli less developed; elytral declivity similar to that of *nitidus* but with the serrations much smaller; with numerous scales on first to fourth interspaces.

Type locality.—Ciricito, Panama Canal Zone.

Host.—Unknown.

Type material.—Holotype, allotype, and 14 paratypes, U. S. N. M. No. 56576.

The type series was taken March 4, 1930, by R. E. Blackwelder, as the specimens alighted upon the trunk of an unknown felled tree at Ciricito, Canal Zone.

CARPHOBIUS, new genus

Body subcylindrical, moderately stout, ornamented with hairs; frons convex above, flattened below; eye weakly emarginate, finely faceted; antennal club connate, with impressed, setigerous sutures, partly septate, funicle 6-segmented; pronotum wider than long, with posterior outline bisinuate as in *Phlocosinus* Chapuis, fore coxae moderately widely separated, third tarsal joint bilobed; elytra with anterior margins arcuate, serrate, striae scarcely impressed, interspaces with moderate hairs; declivity moderately sulcate, first interspace somewhat elevated, third interspace more strongly elevated, granulate-dentate in male.

Genotype, *Carphobius arizonicus*, new species.

CARPHOBIUS ARIZONICUS, new species

PLATE 17, FIGURES 41-45

Female.—Piceous-brown; 1.79 mm. long, 2.23 times as long as wide.

Frons (fig. 43) convex above, somewhat flattened, feebly subconcave below, finely, moderately closely, subgranulately punctured, with fine hairs of moderate length. Eye with inner outline broadly, shallowly emarginate; facets fine. Antenna (fig. 45) with scape club-shaped,

as long as club; funicle very slightly shorter, 6-segmented, with distal segment much wider than others; club 1.44 times as long as wide, widest through second segment; first two sutures incompletely septate, very strongly annulately constricted, and further marked by rather long, conspicuous hairs, third suture marked by setae.

Pronotum 1.18 times as wide as long, widest near base, posterior angles somewhat rounded, posterior outline bisinuate as in *Phloeosinus* spp., sides feebly, convergently arcuate on posterior half, distinctly constricted in front of middle, very broadly rounded in front; surface piceous brown, shining, impressed across dorsum behind anterior margin, deeply, rather closely, moderately finely punctured on most of disk, more finely and densely in front, finely subgranulate-punctate at sides, median line not elevated, punctured as on rest of disk; vestiture of hairs of moderate size.

Elytra wider than pronotum and 1.86 times as long, 1.43 times as long as wide; anterior margins arcuate, elevated and serrate as in *Phlocosinus* spp.; sides subparallel on anterior two-thirds, broadly rounded behind; surface subshining, piceous brown; striae slightly impressed, punctures close, moderate in size; interspaces wider than striae, rugulose, feebly granulate, with many fine punctures and rather numerous, rather small hairs, granules reduced posteriorly. Declivity sloping, first and third interspaces elevated, finely punctured, not granulate, first stria impressed, distinctly punctured, second stria not impressed, punctures smaller than on disk; intervening second interspace flat, finely punctured; all of interspaces with numerous rather small hairs.

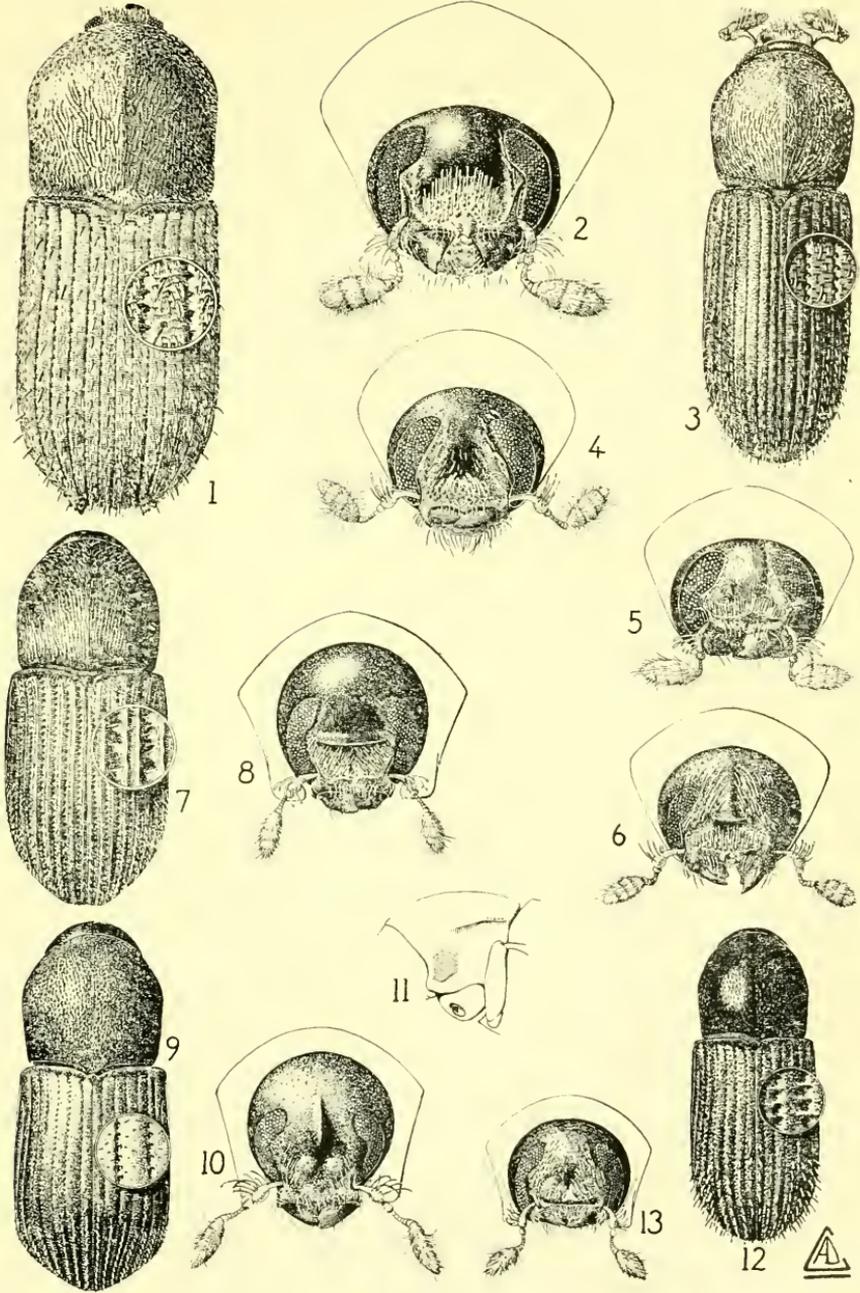
Male.—Slightly stouter than female but similar in general habitus; frons (fig. 44) more coarsely sculptured, distinctly but not strongly concave between eyes; elytral declivity with first interspace more weakly elevated than in female, third interspace more strongly elevated and with several tubercles, the two most posterior ones tooth-like, with their apices sharp.

Type locality.—Huachuca Mountains, Ariz.

Host.—Unknown.

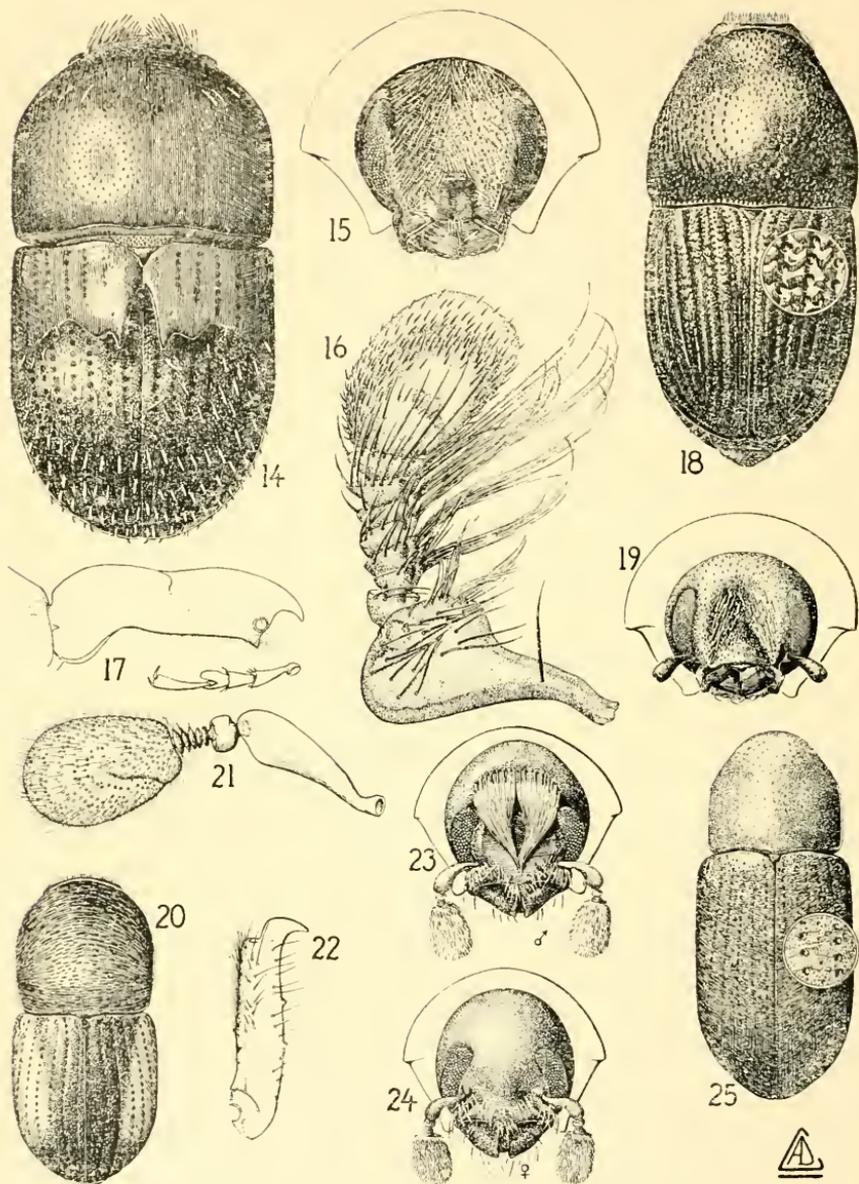
Type material.—Holotype, allotype, and 3 paratypes, U.S.N.M. No. 56575.

The type series, consisting of 4 females and 1 male, was collected in Miller Canyon, Huachuca Mountains, Ariz., August 27, 1907, by H. A. Kaeber.



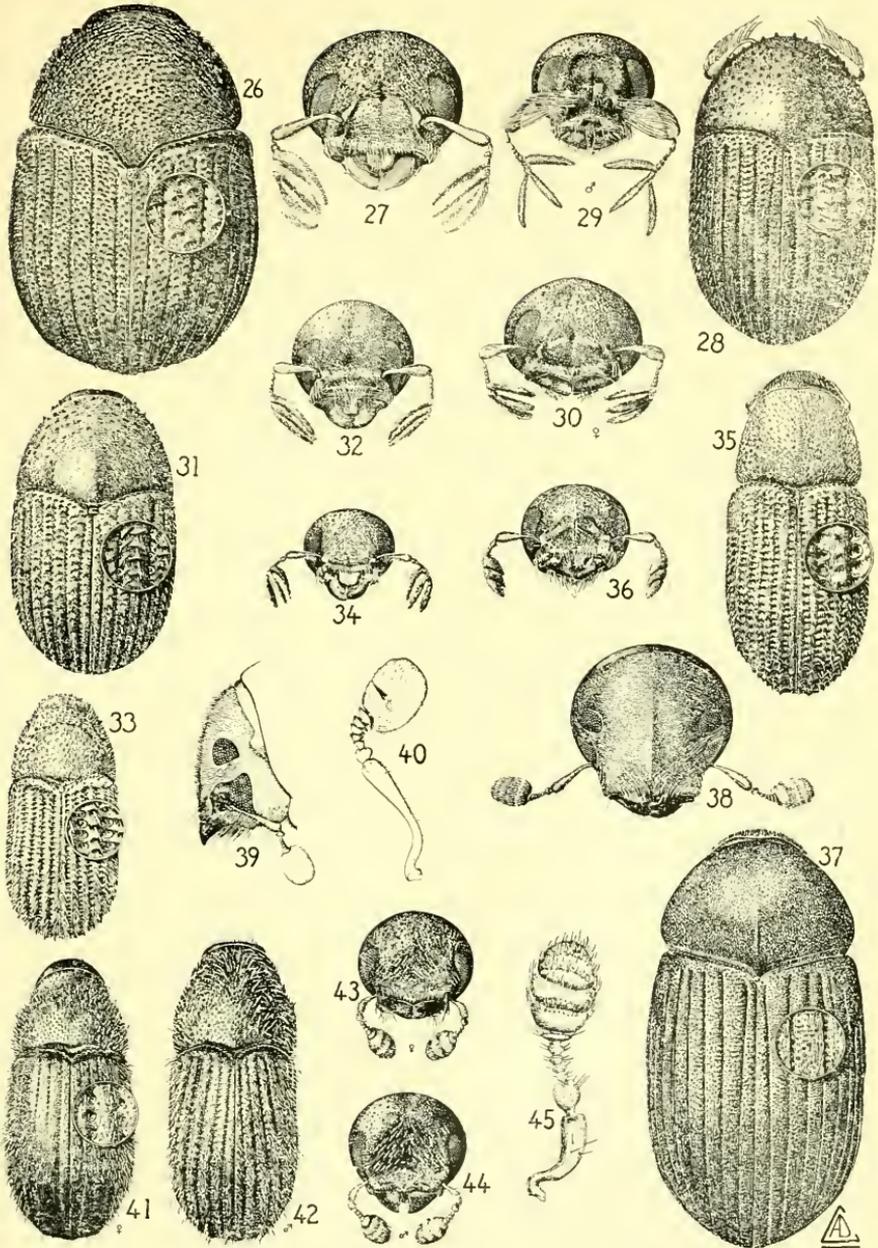
NEW SPECIES OF CNESINUS.

1, 2, *C. cubensis*, dorsal (1) and frontal (2) views; 3, 4, *C. panamensis*, dorsal (3) and frontal (4) views; 5, *C. robai*, frontal view; 6, *C. cognatus*, frontal view; 7, 8, *C. similis*, dorsal (7) and frontal (8) views; 9-11, *C. foveatus*, dorsal (9) and frontal (10) views and sketch of side of pronotum showing fovea (11); 12, 13, *C. nitidus*, dorsal (12) and frontal (13) views.



NEW SPECIES OF CAMPTOCERUS AND HEXACOLUS.

14-17, *Camptocerus quadridens*, dorsal (14) and frontal (15) views, antenna (16), and foretibia and tarsus (17); 18, 19, *C. boliviae*, dorsal (18) and frontal (19) views; 20-24, *Hexacolus swieteniae*, dorsal view (20), antenna (21), foretibia (22), frontal view of male (23), and frontal view of female (24); 25, *H. levis*, dorsal view.



NEW SPECIES OF PHLOEOTRIBUS, PHRIXOSOMA, AND CARPHOBIUS.

26, 27, *Phloeotribus manni*, dorsal (26) and frontal (27) views; 28-30, *P. argentinae*, dorsal view (28), frontal view of male (29), and frontal view of female (30); 31, 32, *P. boliviae*, dorsal (31) and frontal (32) views; 33, 34, *P. harringtoni*, dorsal (33) and frontal (34) views; 35, 36, *P. jujuya*, dorsal (35) and frontal (36) views; 37-40, *Phrixosoma magna*, dorsal (37) and frontal (38) views, lateral view of head (39), and antenna (40); 41-45, *Carphobius arizonicus*, dorsal views of female (41) and male (42), frontal views of female (43) and male (44), and antenna (45).



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A REVISION OF THE EMBIOPTERA, OR WEB-SPINNERS,
OF THE NEW WORLD

By EDWARD S. ROSS

INTRODUCTION

THE present contribution is intended to be a summary of the systematics of the known Recent and Tertiary species of Embioptera of North and South America. Although the writer has recently revised the North American species (1940b), it seems desirable to include them at this time in the light of new information and the need for describing related new species. The current revision was initiated by the discovery of many new species, as well as genera, in collections sent to the writer for study, and by the availability of supplementary data concerning certain poorly known old species. It is hoped that this paper will attract the attention of field collectors and students to this very interesting, but much neglected, order of insects. The extent of this neglect can best be illustrated by the fact that this study, by reference to only a few small collections, nearly doubles the number of known American species.

The 71 recognizable American species are distributed in 17 genera and 6 families. Except for the genus *Oligotoma* (represented only by 3 introduced species), all genera seem to be endemic to the New World. The Embiidae apparently constitute the only family, except possibly the Oligotomidae (genus *Gynembia* Ross), represented by endemic genera in both the Old and New World. At least two of these genera (*Embolynta* Davis and *Pararhagadochir* Davis) appear

to be closely related to certain Old World genera, as will be discussed later, but otherwise those of the two faunas seem to be very distinct. The other families, Oligembiidae, Anisembiidae, and Teratembidae, are peculiarly American.

Conclusions regarding the geographic distribution and phylogeny of the New World species must await more adequate data. It is interesting to note, however, that in the Clothodidae we have species exhibiting the most generalized structural features of the order, while in the genera *Oligembia* Davis and *Chelicerca* Ross some of the highest specialization occurs. Most of the genera are well defined and are often difficult to relate to one another, but in the Anisembiidae it is possible to trace a serial specialization of generic and specific characters that seems to correlate with a distributional pattern—the more generalized forms being found in tropical South America and the most highly specialized in environments bordering the Sonoran deserts of North America. As evidenced by the fossil record (*Clothoda florissantensis* Cockerell), the order ranged beyond its present limits during the warm periods of the Tertiary. Most of this migration appears to have come from the south, but there is a possibility that during one of these warm periods one species (*Gynembia tarsalis* Ross) came to North America from the Old World, as did so much of its Pacific coast biota, by means of a land bridge in the vicinity of the Bering Strait. This will be more fully discussed hereinafter (p. 497).

References to the South and Central American Embioptera are widely scattered in the literature. Navás (1918) made the only attempt to treat in one paper the South American species, but his concepts have been considerably altered by later workers and by the discovery of many additional species. Davis (1939-40) in his "Taxonomic Notes on the Order Embioptera," has added more than any other one worker to our knowledge of the American Embioptera. His work is made particularly valuable by the fact that he had the opportunity to redescribe and figure the type specimens of many American species.

Before passing to the present treatment it may be well to repeat that the systematics of the order, as they probably always will be, are based almost entirely upon the characters of the mature male. The females are neotenic to a high degree and exhibit few characters. There are as yet no available clear-cut characters that can be used to determine the genus, or even family, of the females or immature specimens. The best means of identifying these is by their definite association with males, although it is possible at times to make determinations by a process of elimination based upon geographic distribution, color, size, and number of hind basitarsal sole-bladders.

Almost without exception the descriptions and figures presented by the writer, as well as by Davis, are made from specimens treated in 10-percent potassium hydroxide, and, after due procedure (Ross, 1940b, p. 634), mounted on slides. Unless this preparation for study is used, many of the minute characters of the abdominal terminalia cannot be seen or be compared on a common basis of interpretation with the results of recent studies wherein such methods were used.

In this revision it has been the practice, where the writer has nothing to add to the knowledge of a species or genus, to cite only the references and the type locality. Most such abbreviated treatments involve species that have already been fully described and illustrated by Consett Davis or the writer.

In the synonymies the asterisks serve to identify the references with the corresponding locality records given in the text following.

GENERAL EXPLANATION OF FIGURES

The drawings are based upon simple camera lucida outlines. Setae, indications of pattern, and relative degree of sclerotization have been omitted. Membranous areas are represented by stippling. In the figures of the head, the mandibles are often shown spread apart; the palpi, terminal antennal segments, and facets of the eyes have been omitted. No attempt has been made to adopt a uniform scale. *Explanation of symbols:* 8=eighth, 9=ninth, 10=tenth abdominal tergites; 10 L=left hemitergite of tenth tergite; 10 R=right hemitergite of tenth tergite; 10 LP=process of 10 L; 10 RP, 10 RP₁, 10 RP₂=processes of 10 R; H=hypandrium or ninth abdominal sternite; HP=process of H; LPPT and RPPT=left and right paraprocts; LCB and RCB=left and right cercusbasipodites; LCB+LPPT=composite left cercus-basipodite and left paraproct; LC₁=basal segment of left cercus. These symbols are the same as those used by Davis except for LPPT and RPPT, which he regards as hemisternites of the tenth sternite (XL and XR).

ACKNOWLEDGMENTS

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Imperial Institute of Tropical Agriculture, St. Augustine, Trinidad (EMcC); F. Plaumann, Nova Teutonia, Brazil; E. C. Van Dyke, California Academy of Sciences; and P. W. Wygodzinsky, Rio de Janeiro, Brazil. The initials enclosed in parentheses following certain names will be used as symbols to give due credit for the source of material. Dr. E. A. Chapin, curator of insects, United States National Museum, very kindly assisted, during the writer's absence from the country, in seeing this paper through the press.

KEY TO NEW WORLD FAMILIES OF EMBIOPTERA (MALES)

1. Mandibles with distinct inner apical dentations----- 2
Mandibles without apical dentations----- Anisembiidae
2. Wings with either R_{2+3} or R_{4+5} forked----- 3
Wings with R_{2+3} and R_{4+5} simple----- Oligotomidae
3. Wings with R_{2+3} simple and R_{4+5} forked----- 4
Wings with R_{2+3} forked and R_{4+5} simple----- Teratembidae
4. Left cercus without echinulations on inner side----- 5
Left cercus with echinulations on inner side—these usually located on an inner apical nodule----- Embiidae
5. Large sized (15–18 mm.); wings with all veins strongly represented, Cu_{1a} usually multibranching; abdominal terminalia subsymmetrical and unspecialized, processes short----- Clothodidae
Small sized (5–8 mm.); wings with veins (except R_1 , R_{2+3} , and Cu_{1b}) poorly represented, subobsolete, Cu_{1a} simple; abdominal terminalia highly asymmetrical and specialized, processes prominent----- Oligembidae

Family CLOTHODIDAE

Clothodinae ENDERLEIN, 1909, p. 175 (subfamily of Embiidae); 1912, p. 21.

Clothodidae TILLYARD, 1937, p. 251.—DAVIS, 1940e, p. 536; 1940f, p. 678; 1942, p. 111.

Type genus.—*Clothoda* Enderlein.

Characters and distribution of the single genus.

Genus CLOTHODA Enderlein

Clothoda ENDERLEIN, 1909, p. 176; 1912, p. 21.—NAVÁS, 1918, p. 109 (tribe Clothodinos).—DAVIS, 1939c, p. 373; 1942, p. 111.

Antipaturia ENDERLEIN, 1912, p. 63 (genotype: *A. acquicreata* Enderlein).—NAVÁS, 1918, p. 106.—DAVIS, 1939c, pp. 373, 379 (establishes synonymy).

Males.—Very large, uniformly dark-pigmented. Head large, with eyes relatively small, inflated, facets small, mandibles stout with large, blunt apical dentations, 3 on the left mandible, 2 on the right; mentum obsolete; antennae 23-segmented (?), brown with terminal 5 segments white. Wings dark, with all veins nearly complete to terminus; cross veins numerous; R_{2+3} simple; R_{4+5} forked; M simple; Cu_{1a} simple or with 1 or 2 branches; anal vein well represented, entire. Hind basitarsi with 2 large sole-bladders. Abdominal terminalia simple, subsymmetrical; tenth tergite usually cleft medially, hemiter-

gites subequal, each usually bearing a small, poorly developed, simple process; ninth sternite and process symmetrical; vestiges of paraprocts present, especially those of the left; vestiges of both cercus-basipodites present in ventral membrane; cerci large, simple, not clavate, equal, nonechinulate.

Females.—Very large (15 to 20 mm. long); uniformly medium brown; antennae brown with several terminal segments white. Occipital foramen acutely pointed apically. Prothorax broad, with a longitudinal pale streak on each anapleurite extending from apophysal pit to anterior dorsal margin. Hind basitarsi elongate, with two prominent sole-bladders.

Genotype.—*Embia nobilis* Gerstaecker, by original designation.¹

Distribution.—RECENT: Northern South America. TERTIARY: Miocene (?), Florissant of Colorado.

Remarks.—Specimens of this easily recognized genus appear to be rare in collections. The numerous occasions on which specimens (mostly immature) have been collected in plant quarantine among orchid roots seem to indicate that this is a favorite habitat of the genus and one to be carefully investigated by field collectors.

In many features, particularly the simple structure of the male abdominal terminalia, *Clothoda* easily ranks as the most generalized group of the order. The species, unlike those of most other genera, do not seem to have constant intraspecific characters; even wing venation is subject to individual variation. There is a great need for studies based upon large numbers of specimens from scattered and single localities, in order to test the constancy of certain characters. The writer provisionally recognizes three Recent species and one subspecies at this time. These may be differentiated as follows:

KEY TO SPECIES OF CLOTHODA (MALES)

- | | |
|--|-------------------|
| 1. Tertiary, Florissant of Colorado..... | florissantensis |
| Recent, northern South America..... | 2 |
| 2. Tenth abdominal tergite entire, without a median cleft or caudal processes;
Brazil..... | nobilis |
| Tenth tergite medially cleft; each hemitergite thus formed bearing a small
but distinct process..... | 3 |
| 3. Wings with Cu _{1a} usually unbranched; Trinidad..... | urichi urichi |
| Wings with Cu _{1a} 1- or 2-branched; South America..... | 4 |
| 4. Cu _{1a} with two branches; process of left hemitergite curved mesad at apex;
membranous median cleft of tenth tergite extending to basal margin; second-
ary process of right hemitergite (10 RP ₂) attached basally to right hemitergite (10 R); Venezuela..... | urichi intermedia |
| Cu _{1a} with one branch; 10 LP curved outward at apex; membranous medial cleft
not attaining basal margin; 10 RP ₂ free, not attached to 10 R; Colombia | aequicercata |

¹Enderlein's concept of this species was based on a specimen from Fonte Boa, Brazil (800 miles from the type locality of *nobilis*), deposited in the Stettin Museum.

CLOTHODA FLORISSANTENSIS (Cockerell)

Embia florissantensis COCKERELL, 1908, p. 231, fig. 4.—HANDLIRSCH, 1906-8, p. 1357.—ENDERLEIN, 1912, p. 53.

Oligotoma florissantensis (Cockerell) KRAUSS, 1911, p. 48.

Clothoda florissantensis (Cockerell) DAVIS, 1939c, p. 379.

Holotype.—Winged male, on rock slab in Riker Mount, University of Colorado Museum.

Type data.—Florissant Colorado Station 14, 1907 (W. P. Cockerell) (Miocene).

Remarks.—This is the only known American fossil embiopteran except *Protembia permiana* Tillyard (1937). Evidence for placing it in the genus *Clothoda* is very inconclusive. In any event, it is probably not an *Embia*, as that genus is confined to Africa and the Mediterranean Region of the Old World.

CLOTHODA NOBILIS (Gerstaecker)

Embia nobilis GERSTAECKER, 1888, p. 1.

Embia (Olyntha) nobilis (Gerstaecker) KRAUSS, 1899, p. 148.

Olyntha nobilis (Gerstaecker) KRAUSS, 1911, p. 31.

Clothoda nobilis (Gerstaecker) ENDERLEIN, 1909, p. 176; 1912, p. 22, figs. 4-6, pl. 1, A-B.*—NAVÁS, 1918, p. 109, fig. 6.—DAVIS, 1939c, p. 373, figs. 1-7.**

Lectotype (?).—Male, McLachlan collection, British Museum of Natural History.

Type data.—"Itaituba (Amazonas)" (Brazil).

Other records.—Fonte Boa (Amazons), Brazil (male and female)*; Amazons, Brazil*; Itaituba, Brazil (male) (McLachlan collection) (BMNH).**

Davis (1939c) has redescribed and figured this species from a topotype specimen in the McLachlan collection that is apparently a Gerstaecker cotype and that perhaps should now be regarded as the lectotype.

CLOTHODA URICHI URICHI (Saussure)

FIGURE 8

Embia urichi SAUSSURE, 1896a, p. 293.

Olyntha urichi (Saussure) KRAUSS, 1911, p. 29, pl. 1, figs. 2, 2A, fig. B (misidentification?).

Antipaluria urichi (Saussure) ENDERLEIN, 1912, p. 64.—NAVÁS, 1918, p. 106.

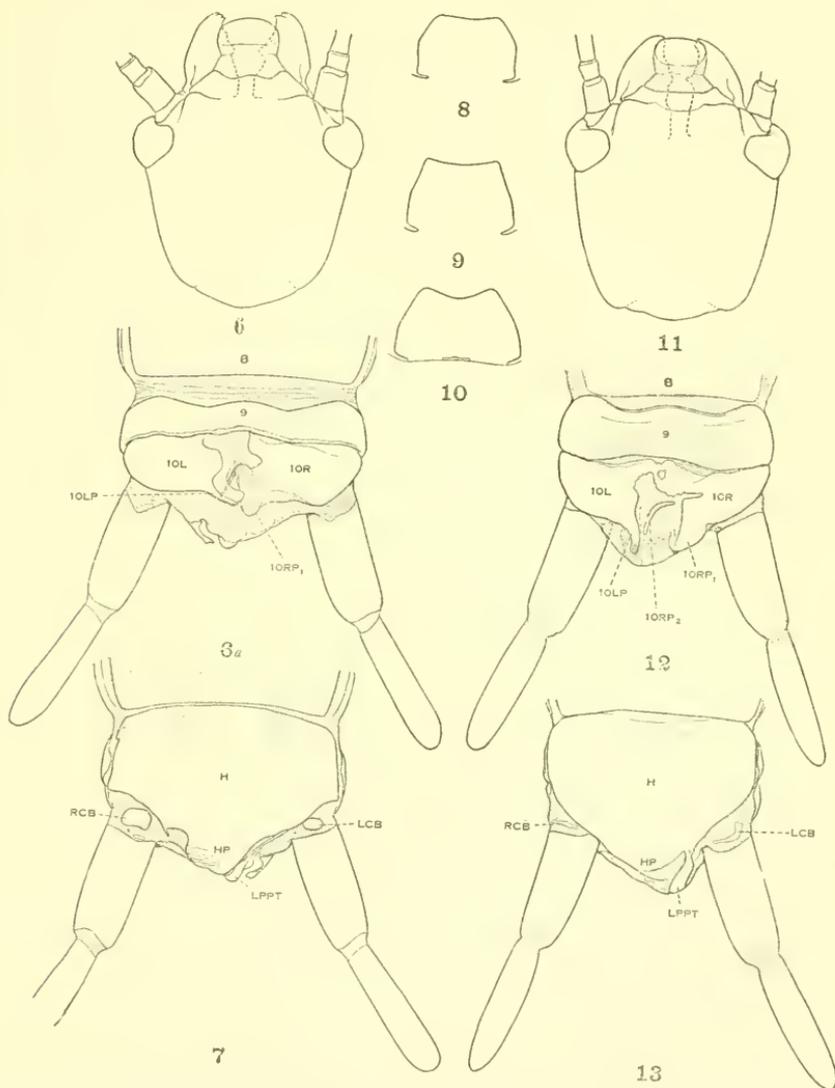
Clothoda urichi (Saussure) DAVIS, 1939c, p. 377, figs. 17-25*; 1942, p. 111, figs. 1-5.**

Embia urichi SAUSSURE (*lapsus calami*), 1896b, p. 350, figs. 1-12.—MELANDER, 1903, p. 103, fig. 2.—FRIEDERICHs, 1906, p. 238.—KERSHAW, 1914, p. 24, pls. 3, 4 (embryology).

Cotypes.—Males and females (dried) in Muséum d'Histoire Naturelle, Geneva. The cotype described and figured by Davis (1939c) should have been designated the lectotype.

Type data.—"Insula Trinitaris (Antillae), a Dom. Uricho lecta" (probably at Port of Spain).

Records (all Trinidad).—Port of Spain—1 male (MCZ); 2 females, July 8, 1920 (Wheeler); 1 male (H. Caracicola) (USNM). St. Augustine—1 male, March 13, 1941, "on grapefruit trunk" (E. McC.



FIGURES 6, 7, 9.—*Clothoda urichi intermedia* Davis, plesiotype male (Venezuela): 6, Head; 6a, terminalia (dorsal); 7, terminalia (ventral); 9, outline of submentum.

FIGURE 8.—*Clothoda urichi urichi* (Saussure), male (Trinidad): Outline of submentum.

FIGURES 10-13.—*Clothoda aequicercata* (Enderlein), plesiotype male (Colombia): 10, Outline of submentum; 11, head; 12, terminalia (dorsal); 13, terminalia (ventral). Explanation of symbols on p. 403.

Callan) (EMcC); 1 male, March 18, 1938*; 2 males, 20 immature, January 6, 1939.** Gaspar Grande—3 moles, 1 female, December 13, 1936 (A. M. Adamson) (EMcC) (1 male retained in writer's collection). Mount St. Benedict—2 males, 15 immature, January 23, 1938 (E. McC. Callan).** La Laja—1 male, 8 females, 11 immature, April 24, 1938 (E. McC. Callan).**

Remarks.—Krauss (1911) recorded this species from Colombia. This appears to be based upon a misidentified specimen of *aequicercata*. This very same specimen may have indeed later become the holotype of *aequicercata*, as the data and disposition records are identical in both cases. The wing figured by him (*l. c.*, fig. 2), however, appears to be that of a specimen of *Pararhagadochir*.

C. u. urichi, like *nobilis*, has been adequately treated by Davis, who had the opportunity to redescribe one of Saussure's cotypes. The abdominal terminalia of the male are almost identical to those of the Venezuelan subspecies *intermedia* Davis (*vid. infra*), but *urichi* can be separated by its lighter color, smaller size, usually unbranched Cu_{1a} wing vein, the shape of the submentum (figs. 8 vs. 9), and its insular distribution. Two female specimens at hand can be separated from the mainland *Clothoda* females by the light, golden-brown color and the visible dorsal head pattern.

CLOTHODA URICHI INTERMEDIA Davis

PLATE 18, A; FIGURES 6, 6a, 7, 9

Clothoda intermedia DAVIS, 1939c, p. 376, figs. 8–16; 1942, p. 112 (as a synonym of *urichi*).

Holotype.—Male (dried) (damaged in transit after description was made), British Museum of Natural History.

Type data.—Caracas, Venezuela (Dr. Ernst).

Neallotype (by present designation).—Female, on slide, deposited in United States National Museum, from El Valle, Venezuela, June 11, 1938, collected on *Ceiba pentandra* (C. H. Ballou).

Plesiotype (by present designation).—Male, on slide, with same data as neallotype female (from same vial), deposited in United States National Museum.

Other records.—One male (terminalia missing), Caracas, Venezuela, July 10, 1938 (C. H. Ballou) (USNM) (retained in writer's collection); six females, Los Teques, Venezuela, September 23, 1938, "on clay bank" (C. H. Ballou) (USNM) (two retained in writer's collection).

Plesiotype male.—Color (on slide) uniform reddish brown, terminal antennal segments cream-colored. Length 17 mm.; forewing length 10.5 mm., breadth 2.5 mm.

Head (fig. 6) medium sized; with sides behind eyes rather straight, gradually convergent, caudal angles evenly rounded, caudal margin arcuate, not deeply emarginated at postoccipital sutures. Antennae with 22 segments present (incomplete). Mandibles dark reddish brown, grinding surfaces nearly black; left mandible with 3 apical dentations and a large medial tooth on grinding surface; right mandible with 2 broad apical teeth and without a medial tooth. Submentum (fig. 9) about as long as broad; sides gradually convergent, slightly biemarginate. Ventral bridge as long as submentum. Occipital foramen acute apically, longer than broad.

Wings (pl. 18, A) relatively long and narrow, venation and cross veins as figured; Cu_{1a} in both wings with two branches, the second branch represented by only a hyaline interveinal line and a row of sparse setae in hindwing.

Terminalia (figs. 6a and 7) relatively larger and broader than those of *aequicercata*. Ninth tergite (9) seven times longer than broad, with basal margin broadly biemarginate, not so elongate at median arcuation as at sides; apical margin narrowly membranous throughout most of its width. Tenth tergite rather narrowly cleft to basal margin, cleft broadly membranous basally; left hemitergite (10 L) rectangular, transverse; process (10 LP) distinct, directed mesocaudad at a 20° angle, sclerotized along outer (left) margin, fleshy along inner margin; right hemitergite (10 R) larger and broader than 10 L; process (10 RP_1) an irregular, caudally membranous lobe; inwardly slanting secondary process (10 RP_2) very narrow, sclerotic, connected basally with base of 10 RP_1 . Ninth sternite (H) strongly transverse, basal margin interrupted by two lightly pigmented areas; process (HP) relatively well developed, irregular in outline. Right paraproct obsolete. Left paraproct (LPPT) distinct, extending from base of left cercus to beyond apex of HP, narrow, irregular, lying close to HP throughout its length, expanded apically. An isolated, twisted, small sclerite of undetermined homology projects caudad between LPPT and base of left cercus. Left and right cercus-basipodites (LCB, RCB) represented by small, circular, setose sclerites in ventral membrane. Left and right cerci subequal.

Neallotype female.—Color (on slide): Head dark chocolate brown, thoracic and abdominal segments progressively lighter brown caudad, terminal segments pale tan; legs uniform light brown, except hindtibiae and tarsi, which are pale tan. Length 18.5 mm. Head with occipital foramen acutely pointed anteriorly; ventral bridge very pale medially; dorsal pattern obsolete.

Remarks.—Davis (1942) has placed his *intermedia* in synonymy with *urichi*, but the writer prefers to regard *intermedia* as a mainland subspecies of *urichi*, as the Venezuelan specimens studied are larger

and darker and have minor structural differences in head form, shape of the submentum, etc., and Cu_{1a} two-branched. The writer has seen specimens from Trinidad that indeed possess some or all of the characters of the mainland series, but this is regarded as a normal phenomenon associated with certain subspecies populations. It is likely that large series from each area will exhibit a preponderance of one or the other combination of characters with a certain percentage of discrepant individuals, which can be assigned to their proper subspecies only upon distributional data.

CLOTHODA AEQUICERCATA (Enderlein)

FIGURES 10-13

Antipaluria aequicercata ENDERLEIN, 1912, p. 63.—NAVÁS, 1918, p. 107.

Clothoda aequicercata (Enderlein) DAVIS, 1939c, p. 379.

This species, known heretofore by only the unique male holotype from Colombia with damaged terminalia, is here redescribed from a perfect male from the same country which fits Enderlein's original description so well that it is believed to be conspecific with the holotype of *aequicercata*.

Plesiotype male.—Color (on slide) uniform dark chocolate brown; head, prothorax, and forelegs somewhat darker; five terminal antennal segments cream-colored. Length 16.5 mm.; forewing length 10 mm., breadth 2.5 mm.

Head (fig. 11) large, quadrate, nearly as broad at caudal angles as behind eyes; sides scarcely convergent, very slightly arcuate; caudal margin truncate, deeply emarginated on each side at postoccipital sutures, region between broadly arcuate. Antennae 23-segmented (apparently complete). Mandibles stout, similar to those of *intermedia* but strongly curved downward apically. Submentum (fig. 10) much broader than long; sides strongly convergent, somewhat arcuate. Ventral bridge extensive, one-half longer than length of submentum. Occipital foramen rounded apically; as broad as long.

Wings relatively short and broad, venation and cross veins similar to *intermedia* (pl. 18, A); Cu_{1a} in both wings with but one branch.

Terminalia (figs. 12, 13) relatively small. Ninth tergite (9) elongate, only four times as broad as median length; basal margin biemarginate; as elongate at median arcuation as at sides; apical region extensively membranous medially. Tenth tergite broadly cleft, but not entirely to base; left hemitergite (10 L) triangulate; process (10 LP) distinct, inwardly directed caudad at 45°, curving straight back and outward at apex; right hemitergite (10 R) more transverse than 10 L; process (10 RP_1) indefinite, lobelike; inwardly slanting, narrow, sclerotic process (10 RP_2) (connected to 10 RP in *intermedia*) isolated in membrane. Ninth sternite (H) broad basally,

gradually convergent from sides at basal half; process (HP) not developed. Right paraproct obsolete. Left paraproct (LPPT) narrowly fused to H basally, broadened and spatuliform apically. Left and right cercus-basipodites (LCB, RCB) represented by small, narrow, ventral, setose, sclerotic areas. Left and right cerci subequal.

Female.—No specimens definitely associated with male.

Holotype.—Male (terminalia damaged), in Berliner Zoologischen Museum (No. 2734).

Type data.—Colombia (Moritz collection).

Plesiotype (described above).—Male, on slide, in United States National Museum, collected May 3, 1939, in plant quarantine at Washington, D. C., in wild orchids shipped from Medellín, Colombia.

Remarks.—It is difficult to understand why Enderlein placed this species, as well as *urichi*, apart from *Clothoda* into his genus *Antipaluria*; *aequicercata* is closely related to *urichi* and *intermedia* but may be separated from both by its much darker color, the broad, parallel-sided head, the transverse submentum, the forked Cu_{1a} vein (usually simple in *urichi*, usually 2-forked in *intermedia* and *nobilis*), and the fact that the cleft of the tenth tergite does not attain the base.

A curious venational aberration is present on the left hindwing of the plesiotype. The media unites with the anterior branch of Cu_{1a} , and both veins continue to the terminus as a single vein. The hyaline stripe between the veins is abruptly terminated at the point of union of the two.

A female *Clothoda* at hand from Colombia, which appears to be *aequicercata*, is easily distinguishable from those of *urichi* and *intermedia* by its very dark color. The head, prothorax, and forelegs (including tarsi) are blackish brown.

Family EMBIIDAE

[Complete list of references not given.]

Embiidae BURMEISTER, 1839, p. 763.

Embiidae ENDERLEIN, 1909, p. 176.

Olynthidae KRAUSS, 1911, p. 27.

Old and New World Embioptera: Males with dentate mandibles—three apical dentations on the right, two on the left. When winged, R_{4+5} forked in both wings (except forewing of *Calamoclostes albistriolatus*). Tenth abdominal tergite medially cleft to basal margin, each hemitergite bearing caudal processes; the left process usually narrow, sclerotic, and more definite than the right process, which is generally broad and not sharply defined. Composite left paraproct and left cercus-basipodite well represented. Left cercus with basal segment always echinulate on inner side and sometimes strongly lobed. Hind basitarsus with either one or two sole-bladders.

Type genus.—*Embia* Latreille.

Distribution.—Circum-Mediterranean, African, Indian, South American, and Central American regions.

KEY TO GENERA OF AMERICAN EMBIIDAE (MALES)

1. Process of left hemitergite complex, bifid; usually bearing both a sclerotic, talonlike, inner process and a submembranous, broader, irregular, outer lobe..... Pararhagadochir
- Process of left hemitergite simple, represented by only a slender, usually outwardly curving process..... 2
2. Size small (about 5 mm. long); left cercus without a definite, swollen inner nodule; terminal segment of labial palpus, conical, acutely pointed
Microembia
- Size moderate to large (at least 9 mm. long); left cercus with a definite, usually subapical, inner nodule; terminal segment of labial palpus globular, rounded apically..... 3
3. Basal segment of left cercus with echinulate nodule located at base
Neorhagadochir
- Basal segment of left cercus with echinulate nodule located medially or terminally on inner side..... 4
4. Right hemitergite small, not developed caudally as a process, but as a fleshy lobe..... Calamoclostes
- Right hemitergite well developed, caudal angle pointed, sclerotized
Embolynta

Genus EMBOLYNTHA Davis

Embolynta DAVIS, 1940b, p. 344.

Emblius GRAY, 1832, p. 786, pl. 72, fig. 2 (name preoccupied).

Olynta GRAY, 1832, p. 347 (name preoccupied in Lepidoptera, *i. e.*, *Olyntus* Hübner, 1818).

Genotype.—*Olynta brasiliensis* Gray, by original designation.

Distribution.—South America.

This genus has been very well treated by Davis, who had the good fortune of being able to examine, redescribe, and figure the holotypes of each of the four species² he included in the genus. However, a question arises concerning the possibility that some, or all, of these species are congeneric with *Calamoclostes albistriolatus* Enderlein. The writer has examined the two specimens from Barro Alto, Brazil (MCZ), which were identified as *batesi* by Davis. These are unquestionably congeneric with a new species from Colombia, which the writer prefers to assign to the genus *Calamoclostes* because the structure of its terminalia seems to be very similar to *albistriolatus*. The peculiar wing venation (possibly anomalous) of the latter species and its slightly more complex left tergal process are not regarded here as characters of generic importance. However, the writer is not placing the genus *Embolynta* as a synonym of *Calamoclostes* at this time, as he has not studied the genotypes.

² One of these, *salvini*, is now removed to the new genus *Neorhagadochir*.

KEY TO SPECIES OF EMBOLYNTHA (MALES)³

1. Posterior process of right hemitergite slender, directed outward; internal echinulate lobe of first segment of left cercus subterminal----- 2
Posterior process of right hemitergite short and thick, directed inward; internal lobe of first segment of left cercus medial (subterminal in nontypical variations)----- batesi
2. Process of left hemitergite bearing two small hooks; internal lobe of basal segment of left cercus longer than thick----- brasiliensis
Process of left hemitergite not as above; internal lobe of basal segment of left cercus broader than long----- wagneri

EMBOLYNTHA BRASILIENSIS (Gray)

Emblius (?) *brasiliensis* GRAY, 1832, p. 786, pl. 72, fig. 2.

Olyntha brasiliensis (Gray) GRAY, 1832, p. 347.—WESTWOOD, 1837, p. 373, pl. 2, fig. 3.—BURMEISTER, 1839, p. 770.—WALKER, 1853, p. 532.—KRAUSS, 1911, p. 28, pl. 1, fig. 1.

Embia (*Olyntha*) *brasiliensis* (Gray) HAGEN, 1885, p. 195.

Embia brasiliensis (Gray) ENDERLEIN, 1912, p. 48, fig. 24.—NAVÁS, 1918, p. 98.

Embolynta brasiliensis (Gray) DAVIS, 1940b, p. 345, figs. 1-7 (redescribes and figures holotype).

Embia brasiliensis var. *flavicercatus* ENDERLEIN, 1912, p. 49.

Holotype.—Male, Children collection, British Museum of Natural History (redescribed by Davis).

Type data.—"Brazil."

Remarks.—Enderlein's "variety" *flavicercata*, based upon a specimen determined as *brasiliensis* by Burmeister and apparently not actually seen by Enderlein, will require reexamination before the name can be accepted.

EMBOLYNTHA BATESI (McLachlan)

Embia batesi McLACHLAN, 1877, p. 380.—NAVÁS, 1918, p. 90.

Embia (*Olyntha*) *batesi* McLACHLAN, HAGEN, 1885, p. 195.

Olyntha batesi (McLachlan) KRAUSS, 1911, p. 29.

Rhagadochir batesi (McLachlan) ENDERLEIN, 1912, p. 56.

Embolynta batesi (McLachlan) DAVIS, 1940b, p. 347, figs. 8-27 (redescribes and figures holotype).*

Type data.—"Amazons," Brazil (Bates).

Other records.—Espírito Santo, Brazil (McLachlan collection), males*; Barro Alto, Est. Minas, Brazil (MCZ), 2 males.*

EMBOLYNTHA WAGNERI (Navás)

Embia wagneri NAVÁS, 1924a, p. 13, fig. 3.

Embolynta wagneri (Navás) DAVIS, 1940b, p. 351, figs. 38-41 (redescribes and figures holotype).

Holotype.—Male, Paris Museum (redescribed by Davis).

Type data.—Argentina: "Chaco de Santiago del Estero. Bords du Río Salado. La Palisa de Bracho. 25 kil. N. O. [N. W.] d'Icaño. E. R. Wagner, Décembre 1905."

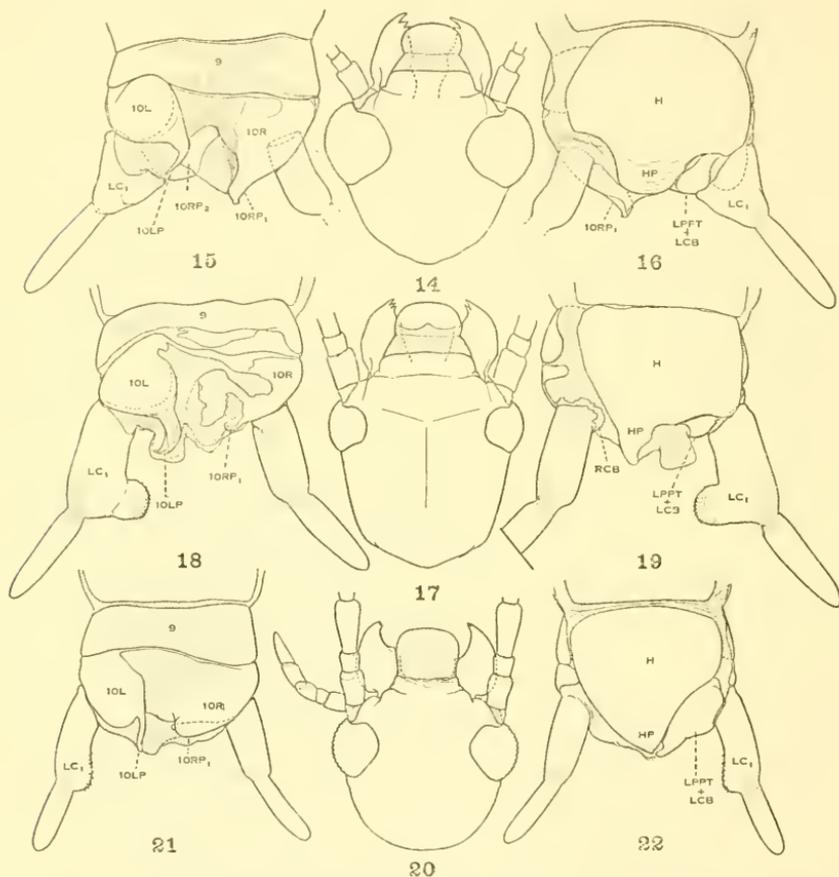
³ After Davis, 1940b, p. 351.

Genus CALAMOCLOSTES Enderlein

Calamoclostes ENDERLEIN, 1909, p. 188.—KRAUSS, 1911, p. 73.—ENDERLEIN, 1912, p. 27.—NAVÁS, 1918, p. 94.—DAVIS, 1940a, p. 189.

Genotype—*Calamoclostes albistriolatus* Enderlein, by original designation.

Distribution—Ecuador, Colombia.



FIGURES 14-16.—*Neorhagadochir inflata*, new genus and species, holotype male (Guatemala): 14, Head; 15, terminalia (dorsal); 16, terminalia (ventral).

FIGURES 17-19.—*Calamoclostes gurneyi*, new species, holotype male (Colombia): 17, Head; 18, terminalia (dorsal); 19, terminalia (ventral).

FIGURES 20-22.—*Microemia rugosifrons*, new genus and species, holotype male (Peru): 20, Head; 21, terminalia (dorsal); 22, terminalia (ventral). Explanation of symbols on p. 403.

This genus was originally based upon a single male specimen from Ecuador with R_{4+5} simple in the forewing and terminally forked in the hindwing. The writer is now adding a second species, which,

though possessing typical embioid wing venation (i. e., R_{4+5} forked in both wings), has abdominal terminalia apparently very similar to *albistriolatus* (as near as can be judged by reference to Enderlein's incomplete figure (1912, fig. 11)). The peculiar wing venation of Enderlein's specimen may prove to be anomalous, and thus the genus should be defined on the basis of structure of terminalia. The genus appears to be allied to *Embolyntha* but apparently can be separated from it by the weakly developed, fleshy right hemitergite.

It is noteworthy that the two included species occur in the same region, i. e., along adjacent upper tributaries of the Amazon River. *C. albistriolatus* apparently can be distinguished from *C. gurneyi* by the white cross veins of the wings and the basal tooth on the outer margin of the left tergal process (10 LP).

CALAMOCLOSTES ALBISTRIOIATUS Enderlein

Calamoclostes albistriolatus ENDERLEIN, 1909, p. 189.—KRAUSS, 1911, p. 73.—ENDERLEIN, 1912, p. 28, figs. 10-11, pl. 3, fig. M.—NAVÁS, 1918, p. 94.—DAVIS, 1940a, p. 189, figs. 82-83 (after Enderlein).

Holotype.—Male, in Stettiner Zoologischen Museum.

Type data.—"Ecuador. Baños am Ostabhänge der Ostkette der Cordilliere, 1800 m. hoch. 31, März 1899. 1 ♂, gesammelt von E. Schmidt (coll. Haensch)."

CALAMOCLOSTES GURNEYI, new species

FIGURES 17-19

Male.—Color (on slide) very uniform dark chocolate brown throughout, head slightly darker. Length 16 mm.; forewing length 9.5 mm., breadth 2.3 mm.

Head (fig. 17) relatively small; eyes moderate sized, inflated, separated by an interspace three times their width; sides behind eyes two and one-half eye lengths long, nearly straight, gradually convergent; caudal angles abrupt, margin obtusely rounded. Mandibles very broad, thick; apical dentations prominent, sharply pointed. Mentum well developed, broadly triangulate. Submentum sclerotized, quadrate, broader than long. Occipital foramen elongated, acutely pointed apically. Ventral bridge slightly shorter than length of submentum. Antennae with segments very broad, stout.

Wings large, with rather few cross veins; venation embioid, with all veins well defined nearly to terminus. Hyaline lines narrow, definite.

Hind basitarsi elongate, with only one sole-bladder.

Terminalia (figs. 18, 19) with ninth tergite strongly asymmetrical, interrupted by membranous areas, possessing a medial, darkly pigmented area on caudal margin in an upright position. Tenth tergite

greatly broken up by an extensive medial cleft, short, strongly asymmetrical; left hemitergite (10 L) large, dark, well defined, convex, its process (10 LP) large, stout, directed inward at 45° at basal half, thence caudad, the extreme tip truncate and bearing a small, sharp point on outer angle directed laterad; right hemitergite (10 R) small, irregular, caudal angle a membranous lobe, inner margin produced inward and expanded as a broad pigmented sclerite (10 RP₂). Ninth sternite (H) very large, quadrate; developed toward right side as a weak, terminally membranous process (HP). Left paraproct probably represented by a fleshy lobe (LPPT?) subtending 10 LP, setose. Left cercus-basipodite probably represented by a very dark, sclerotic sclerite (LCB?) fused basally to H. Right cercus-basipodite (RCB) a nearly complete ventral, ragged ring at base of right cercus. Left cercus with basal segment LC₁ very large, broad, cylindrical basally, but apically abruptly produced inward as a large echinulate nodule; outer apical angle membranous. Terminal segment narrow, gradually acuminate distad. Basal segment of right cercus stout, cylindrical, submembranous dorsally; terminal segment similar to that of LC, but stouter.

Female.—Unknown.

Holotype.—Male, on slide, U.S.N.M. No. 56041.

Type data.—Upper Putumayo River, Colombia (B. Guevara) (USNM).

Remarks.—The large size and uniform brown color give this species the general appearance of a *Clothoda*. It is named for Dr. A. B. Gurney, of the United States Bureau of Entomology and Plant Quarantine.

MICROEMBIA, new genus

Males.—Small, 4.5 to 5 mm. long. Head with eyes large, facets very prominent; clypeal margin heavily sclerotized, rugose, lateral angles produced. Antennae relatively large. Mandibles very large, broad outer margins strongly arcuate; apices microdentate, three dentations on the left and two on the right mandible. Terminal segment of labial palpus strongly tapered and pointed. Prothorax small. Legs long, slender; hind basitarsi elongate, ventral setae long, with only a very small terminal sole-bladder. Wings relatively large; R₁ narrow, terminating abruptly before apical margin; R₂₊₃ simple; R₄₊₅ forked before middle; M and Cu_{1a} simple; R₄₊₅, M and Cu_{1a} represented only by rows of setae and pigment bands; two cross-veins present between apex of R₁ and R₂₊₃ of forewing; hyaline bands broad, bordered by definite rows of macrotrichiae. Terminalia small, pale; tenth tergite entirely cleft to basal margin forming a broad, membranous basal area; left hemitergite bearing a narrow, simple process projecting straight back from inner margin; right hemiter-

gite rounded caudally, without definite processes. Process of ninth sternite simple. Composite left paraproct and left cercus-basipodite well represented, large, simple. Left cercus not strongly clavate, bearing a few large echinulations subapically on inner side; terminal segment rather short, broad basally, distally acuminate. Right cercus with terminal segment narrower than that of left cercus. Both cerci with sensory setae well developed, "rosette" sockets prominent.

Female.—Unknown.

Genotype.—*Microembia rugosifrons*, new species.

Distribution.—Peru.

MICROEMBIA RUGOSIFRONS, new species

FIGURES 20-22

Male.—Color (on slide): Body, legs, and wings light tan; head medium brown, mandibles yellowish. Length 4.5 mm.; forewing length 3.5 mm., breadth 0.9 mm.

Head (fig. 20) short, circular—as broad across eyes as long, dorso-ventral thickness unusually great; eye interspace two eye widths wide; sides behind eyes short—one eye length long, gradually rounded behind; caudal margin evenly arcuate; surface clothed with long sparse setae; dorsal and ventral margins of antennal foramen extensive; mentum a very small sclerite; submentum dark, broad anteriorly, gradually narrowed basally, anterior margin transverse, mandibles broad with apical teeth scarcely separated, greatly expanded before base, base abruptly narrowed; occipital foramen rounded anteriorly.

Terminalia (figs. 21, 22) with left hemitergite (10 L) large, dark, inner margin straight, continued caudad to form inner margin of straight process (10 LP), which is narrow, simple, slightly dilated terminally; right hemitergite (10 R) short, caudal margin rounded without a developed process but folded down and inward. Ninth sternite (H) broad, quadrate, clothed with sparse, long setae, gradually tapered caudad to form a short, pointed process (HP). Composite left paraproct and left cercus-basipodite (LPPT+LCB) large, elongate, rhomboid. Basal segment of left cercus (LC₁) only slightly clavate terminally; echinulations large, sparse, bifid. Terminal segment broadly attached basally, short, broad. Terminal segment of right cercus normally attached basally, narrower and slightly longer than that of LC₂.

Female.—Unknown.

Holotype.—Male, on slide, U.S.N.M. No. 56043.

Type data.—Iquitos, Peru, March–April 1931 (R. C. Shannon) (USNM).

Paratype.—Male, on slide with type data, deposited in writer's collection.

Remarks.—Two other specimens at hand are in such poor condition that they cannot be designated paratypes. The above series was probably collected at light.

NEORHAGADOCHIR, new genus

Males.—Moderate sized (7.5–10.5 mm. long). Head with eyes medium to large sized, inflated; mandibles dentate, three apical teeth on the left and two on the right mandible; submentum very large, sclerotic, similar to that of *Pararhagadochir*; mentum represented by setae only. Wings embioid, without apparent generic characters. Terminalia with tenth tergite completely, broadly cleft to base; left tergal process simple, talonlike; right tergal process poorly defined, similar to that of *Pararhagadochir* as is also the diagonal median process (10 RP₂). Hypandrium process (HP) symmetrical, broad, truncate, simple. Composite left paraproct and left cercus-basipodite well developed. Basal segment of left cercus short, conical; basal foramen very broad, margin sclerotic; gradually, inwardly produced at base as an echinulate nodule; terminal portion cylindrical, unclavate. Terminal segment of left cercus elongate, longer than basal segment.

Female.—Unknown.

Genotype.—*Neorhagadochir inflata*, new species.

Distribution.—Central America.

Remarks.—This genus is primarily proposed for *inflata*, new species, which apparently cannot be assigned to any existing genus; *salvini* is tentatively included because of the nature of its left cercus and the conformity of certain other characters with *inflata*. *Neorhagadochir* appears to have more characters in common with *Pararhagadochir* than *Embolynta*, i. e., the characters of the head, particularly the mandibles and labium and the median tenth tergal process (10 RP₂). It can be separated from *Pararhagadochir* by the simplicity of the left tergal process and from *Embolynta* by the basal position of the echinulate nodule of the left cercus.

The two included species may be separated as follows:

KEY TO SPECIES OF NEORHAGADOCHIR (MALES)

1. Process of left hemitergite greatly elongated — longer than basal segment of left cercus; composite left paraproct and left cercus-basipodite (LPPT+LCB) terminally echinulate; head with eyes relatively small, one-fourth as long as sides of head, which are only slightly convergent-----*salvini*
Process of left hemitergite short—shorter than basal segment of left cercus; LPPT+LCB not echinulate; head with eyes very large, as long as sides of head which are strongly convergent-----*inflata*

NEORHAGADOCHIR INFLATA, new species

FIGURES 14-16

Male.—Color (on slide) uniform, light golden brown; head considerably darker. Length 7.5 mm.; forewing length 5 mm., breadth 1.2 mm.

Head (fig. 14) very broad across eyes, short; eyes very large, strongly inflated, facets large; sides behind eyes short, strongly convergent; caudal margin obtusely rounded. Mandibles thin, with apical dentations large, sharp. Submentum sclerotic, large, elongate; sides evenly arcuate; apical margin evenly emarginated. Occipital foramen with apical angle acute.

Wings with R_1 closely paralleling costa almost to terminus, then curving toward R_{2+3} . R_{2+3} forked at basal third of wing and R_{4+5} just within its basal half in both wings. Cross veins not prominent. Hyaline stripes rather narrow, sharply defined.

Hind basitarsi short; plantar setae sparse, stout; only one bladder.

Terminalia (figs. 15, 16) small, transverse; tenth tergite broadly cleft to base. Left hemitergite (10 L) small, convex; gradually tapered on inner apical angle to form a process (10 LP) that abruptly curves outward nearly at 90° , and becomes a very narrow, simple, tapered, sharp point as long as its base and heavily sclerotic. Right hemitergite (10 R) broad, tapered at caudal angle to form a small, truncate process (10 RP_1) which is narrowest at base. Ninth sternite (H) transverse; caudal and lateral margins arcuate, symmetrically produced medially as a short, truncate process (HP). Composite left paraproct and left cercus-basipodite, (LPPT+LCB) triangular. Right paraproct (RPPT) rudimentary, fused to side of HP. Basal segment of left cercus (LC_1) very short, funnel-shaped; basal foramen very large, margin sclerotic; gradually produced inwardly at extreme base as a conical, microechinulate nodule. Terminal segment elongate, nearly twice as long as LC_1 . Basal segment of right cercus (RC_1) very short, membranous at outer half, membrane at base with a distinct ring (probably the right cercus-basipodite (RCB)); terminal segment lost, but probably similar to LC_2 .

Female.—Unknown.

Holotype.—Winged male, on slide, U.S.N.M. No. 56042.

Type data.—Cayuga, Guatemala, May 1915 (Wm. Schaus).

NEORHAGADOCHIR SALVINI (McLachlan), new combination

Embia salvini McLACHLAN, 1877, p. 380.—ENDERLEIN, 1912, p. 51.

Embia (Olynta) salvini McLachlan, HAGEN, 1885, p. 198.*

Olynta salvini (McLachlan) KRAUSS, 1911, p. 31.

Embotyntha salvini (McLachlan) DAVIS, 1940b, p. 349, figs. 32-37 (redescribes and figures holotype).

Embia salomi ENDERLEIN, 1912, p. 30 (footnote, *lapsus calami* for *salvini*, corrected p. 116).

Holotype.—Male, McLachlan collection, British Museum of Natural History.

Type data.—Chinuatta, [Guatemala], at 4,100 feet. (Salvin).

Other record.—Isthmus of Tehuantepec, Mexico (Sumichrast) (MCZ).* The writer has recently confirmed this identification.

Genus PARARHAGADOCHIR Davis

Pararhagadochir DAVIS, 1940a, p. 181; 1942, p. 114.

Males.—Alate, medium sized (length 6–13 mm.); color usually dark brown, prothorax often pale yellow. Head with eyes medium to large; mandibles thin, with sharp inner apical dentations; submentum large, sclerotic, shieldlike. Wings dark; venation strong, R_{4+5} forked in both wings; R_1 prominent, often with broad reddish bordering bands; hyaline stripes narrow, sharply defined. Hind basitarsus with one or two sole-bladders. Terminalia with tenth tergite broadly cleft to base; left hemitergite small, its process complex, bifid, inner portion usually slender, talonlike, sclerotic, outer portion broad, thin, submembranous; right hemitergite large, tapered terminally to form an indefinite process often with a small, abrupt, narrow, sclerotic, apical appendix; inner margin produced mesad with a narrow, elongate sclerite (10 RP_2) extending caudad toward left in membrane of median cleft. Process of hypandrium short, blunt. Composite left paraproct and left cercus-basipodite broad, fused basally to ninth sternite. Basal segment of left cercus with a very large, inner, subterminal nodule, which is densely microechinulate. Terminal segments of both cerci and basal segment of right cercus narrow, elongate; basal segment of right cercus membranous except along inner margin.

Females.—Moderate sized; darkly pigmented integument sometimes metallic blue in luster. Hind basitarsi densely setose ventrally; apparently always with two sole-bladders (even in species with males possessing but one bladder), the additional bladder at times small, indistinct. Basal segments of cerci short—one-third shorter than terminal segments; outer half membranous with a partially complete basal ring.

Genotype.—*Embia trinitatis* Saussure, by original designation.

Distribution.—Northern South America and Trinidad to Argentina.

Remarks.—This distinct genus probably comprises a much larger number of species than at present described. Several difficult problems involving the definition of its species remain to be solved and more material may reveal the existence of several subspecies complexes.

The problem of the relationship of this genus to the African genus *Rhagadochir* Enderlein must be carefully investigated. The charac-

ters of *Rhagadochir carpenteri* Davis are certainly similar to those of the American series placed by Davis in his genus *Pararhagadochir*, but future studies may prove this similarity to be a result of convergence.

The number of hind basitarsal sole-bladders appears to be a constant character within a species, genus, or even family throughout the order. The genus *Pararhagadochir* is an exception to this rule, as the females of the genus seem always to have two bladders, while males of the same species may have only one. There is indeed a possibility that in males of some species this character may be subject to intraspecific variation.

KEY TO SPECIES OF PARARHAGADOCHIR (MALES)

1. Inner nodule of basal segment of left cercus conical; right hemitergite with caudal margin rounded, not acutely produced; Bolivia-----*adpersa*
Inner nodule of left cercus broadly rounded or truncate apically; right hemitergite with an acute caudal angle terminated by a narrow sclerotic spine----- 2
2. Prothorax and pterothorax unicolorous; composite left paraproct (LPPT+LCB) with a small, domelike, echinulate nodule near posterior margin or with surface of inner apical angle at least echinulate----- 6
Prothorax usually distinctly paler than pterothorax (except in *surinamensis*); LPPT+LCB without such a nodule or echinulations----- 3
3. LPPT+LCB with a sharp, sclerotic projection at inner apical angle; left tergal process (10 LP) with outer portion acutely pointed, or irregular, apex may be turned forward; northern South America-----*trinitatis* complex
LPPT+LCB with only a blunt projection, or none, at inner apical angle; 10 LP with outer portion narrowly or broadly rounded distad----- 4
4. 10 LP with outer portion broadly rounded, broader than long (fig. 60); thorax concolorous; Surinam-----*surinamensis*
10 LP with outer portion narrowly rounded, longer than broad; thorax usually bicolorous----- 5
5. 10 LP greatly elongated, about four times longer than broad; cleft originating at apical fourth (fig. 37); Argentina-----*trachelia*
10 LP much less elongated, less than three times longer than broad; cleft originating just distad of apical half (fig. 51); Paraguay-----*schadei*
6. LPPT+LCB without a distinct echinulate nodule; Brazil-----*davisi*
LPPT+LCB with a distinct echinulate nodule at caudal margin----- 7
7. 10 LP with outer portion narrow, fingerlike, outline even (fig. 49); Paraguay-----*confusa*
10 LP with outer portion broad, at least basally, irregular in outline----- 8
8. 10 LP with inner talonlike portion gradually, evenly curved outward (fig. 45); Bolivia-----*tenuis*
10 LP with inner talon abruptly curved outward, almost at 90° (fig. 41); Argentina-----*birabeni*

PARARHAGADOCHIR TRINITATIS TRINITATIS (Saussure)

FIGURES 26, 29

Embia trinitatis SAUSSURE, 1896a, p. 293; 1896b, p. 352, fig. 13.—ENDERLEIN, 1912, pp. 52, 106 (misspelled as *trinitatensis* p. 30).—NAVÁS, 1918, p. 99.

Oligotoma trinitatis (Saussure) KRAUSS, 1911, p. 42, pl. 2, figs. 11, 11a.

Pararhagadochir trinitatis (Saussure) DAVIS, 1940a, p. 182, figs. 42-48*; 1942, p. 114, figs. 6-10.**

Oligotoma flavicollis KRAUSS, 1911, p. 43, pl. 2, fig. 12 (Orinoco, Venezuela; Berlin Mus.).—ENDERLEIN, 1912, p. 100 (as a synonym of *flavicollis* Enderlein).

Cotype.—Male, Geneva Museum (redescribed and figured by Davis, 1940a), from Trinidad (Urich), probably Port of Spain.

Specimens examined (from Trinidad).—St. Augustine—1 male, July 9, 1935 (P. C. Atteck) (EMcC); many males and females, on grapefruit trunk, March 13, 15, 1941 (E. McC. Callan) (EMcC). Arouca—1 male, May 24, 1939 (E. McC. Callan) (EMcC).

Other records.—St. Augustine, Trinidad, 1 male, May 10, 1935 (N. A. Weber) (MCZ)*; St. Augustine, Trinidad, males, females, and immatures, January 17, 1938, March 25, 1938, and February 19, 1939 (E. McC. Callan).**

Remarks.—The characters of this species have been well treated by Davis (1940a, 1942), and the writer is presenting figures only of the head and left tergal process at this time.

The Venezuela specimen upon which Krauss based his *flavicollis* appears to be very similar to one before the writer, which may prove to represent a distinct subspecies. Should such a subspecies be described, Krauss's specimen would become its type, with a new name proposed to replace *flavicollis* Krauss, which is a secondary homonym.

In addition to the above recorded Trinidad specimens, the writer has before him several specimens from mainland localities which are distinct in several features, particularly in the form of the left tergal process and head. Should such features appear constant in series, in relation to geographic distribution, the specimens may be regarded as subspecies of *trinitatis*. For the present they are discussed below with accompanying figures, but not named.

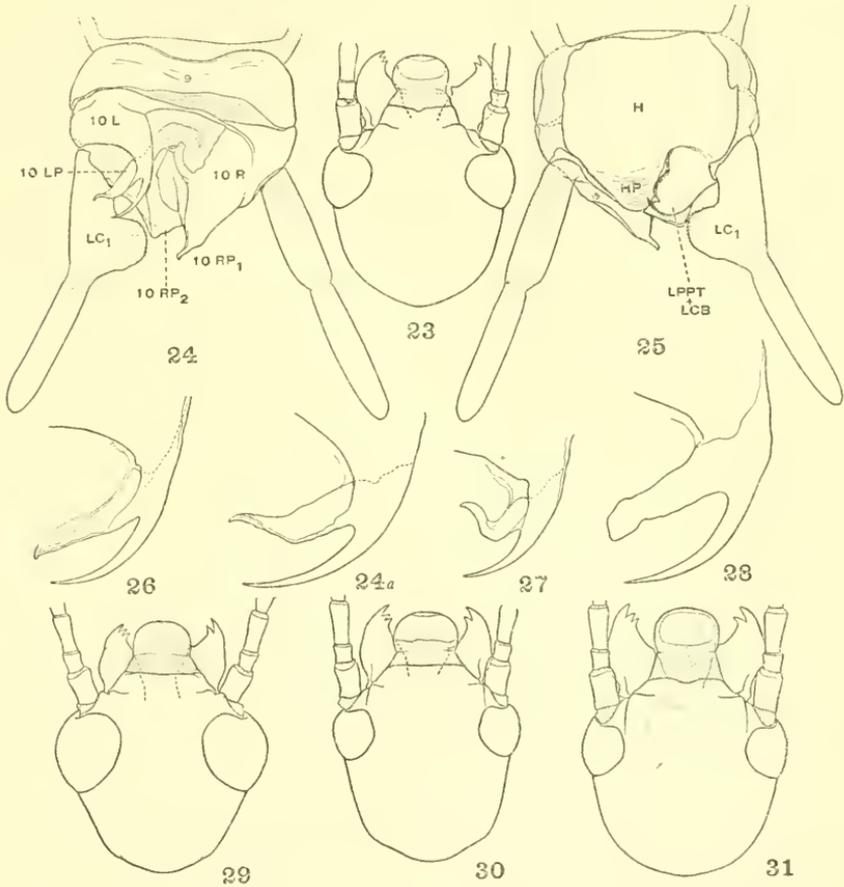
1. One male, Caracas, Venezuela, collected in plant quarantine at Washington, D. C., May 3, 1939, in a shipment of *Cattleya* (U.S.N.M.).

This male differs from those from Trinidad in its larger, more elongate head (fig. 23 vs. 29) with much smaller eyes; the sides behind the eyes are longer, more arcuate, but much less convergent; the caudal margin is somewhat acutely rounded medially, and laterally continuously arcuate with the sides. The left tergal process (10 LP) (fig. 24A) appears to be larger and to differ in shape. The much larger size (length 11.5 mm.; forewing length 7.5 mm., breadth 2 mm.) may prove to be an additional characteristic.

The entire terminalia, dorsal and ventral aspects, are shown in the accompanying figures (figs. 24, 25). As pointed out above, this specimen is probably taxonomically identical to the type of *Oligotoma flavicollis* Krauss.

2. One male, Medellín, Colombia, collected in plant quarantine at Hoboken, N. J., July 17, 1940, in a shipment of wild *Cattleya* (U.S.N.M.).

Differs from the Venezuela and Trinidad specimens in the form of the head and eyes (fig. 30) and the darker color. The head is more



FIGURES 23-25.—*Pararahagadochir trinitatis* subsp. ?, male (Venezuela): 23, Head; 24, terminalia (dorsal); 24a, detail of left tergal process (10 LP); 25, terminalia (ventral).

FIGURES 26, 29.—*Pararahagadochir trinitatis trinitatis* (Saussure), male (Trinidad): 26, Detail of 10 LP; 29, head.

FIGURES 27, 28, 30, 31.—*Pararahagadochir trinitatis* subsp. ?: 27, Detail of 10 LP; 28, detail of 10 LP; 30, head (specimen from Medellín, Colombia); 31, head (specimen from Río Frio, Colombia). Explanation of symbols on p. 403.

quadrate than either type, with the sides behind eyes scarcely arcuate or convergent; the caudal margin is more transverse with abruptly rounded sides; the eyes are still smaller than those of the Venezuela specimen and more abruptly inflated. The left tergal process (10 LP) (fig. 27) is small with the outer, flaplike portion doubled back medi-

ally toward the base. The size (length 10.5 mm.; forewing length 6.4 mm., breadth 1.8 mm.) is intermediate between that of specimens from the above localities.

Another specimen at hand from Colombia, without more definite data, is very similar to the above.

3. One male, Río Frío, Magdalena, Colombia, June 17 (Darlington) (MCZ).

Head similar to the Venezuelan specimen but shorter, evenly arcuate behind (fig. 31), and much lighter in color. Left tergal process (10 LP) (fig. 28) with outer portion not pointed, but irregularly expanded in outline distad.

PARARHAGADOCHIR TRINITATIS FLAVICOLLIS (Enderlein)

Embia flavicollis ENDERLEIN, 1909, p. 184.—KRAUSS, 1911, p. 68.—NAVÁS, 1918, p. 100.

Rhagadochir flavicollis (Enderlein) ENDERLEIN, 1912, pp. 56, 100, figs. 29, 30, pl. 3, I.

Pararhagadochir flavicollis (Enderlein) DAVIS, 1940a, p. 183, figs. 49-50 (after Enderlein).

Holotype.—Male, Stettiner Zoologischen Museum.

Type data.—Prov. Sara, Bolivia (J. Steinbach).

Paratype.—Male, with same data and disposition.

Remarks.—Enderlein's *flavicollis* was based upon specimens from both Bolivia and Venezuela. Since the Bolivian specimens are cited first, following his description, it is assumed that one of these should represent the holotype and thus that the Bolivian locality is to be regarded as the type locality of the subspecies. His specimen from Venezuela probably represented another subspecies as discussed above. Enderlein's original description and figures are inadequate, in the light of present knowledge, to characterize this subspecies, but it is assumed to be distinct because it is the only known *Pararhagadochir* from Bolivia with a bicolourous thorax. A reexamination of the type will be necessary to confirm the present placement or to determine whether it is not a distinct species.

PARARHAGADOCHIR TRACHELIA (Navás)

FIGURE 32-37

Rhagadochir trachelia NAVÁS, 1915, p. 135, fig. 9.

Embia trachelia (Navás) NAVÁS, 1918, p. 100, fig. 3; 1923a, p. 197 (record); 1924a, p. 10 (records); 1930, p. 72 (record).

Pararhagadochir trachelia (Navás) DAVIS, 1940a, p. 184, figs. 51-66 (part).

Navás's original description and figures of this species are so lacking in essential details that the identification by Davis of specimens appearing to represent the species could only be provisional. There has accordingly been a great need for a redescription of the holotype

based upon present standards. Through the great kindness of Dr. Max Biraben, of the La Plata Museum, the holotype of *trachelia*, as well as other specimens of the species, have been made available to the writer. The following description and the accompanying figures are based upon this Navás holotype.

Male (holotype, on slide).—Head, antennae, pterothorax, legs, wings, and abdominal terminalia medium chocolate brown; abdomen lighter brown; prothorax pale yellow; mandibles amber yellow, with brownish apices and inner margins; submentum reddish brown. Length 11.5 mm.; forewing length 7 mm., breadth 1.8 mm.

Head (fig. 32) large, broad, quadrate; eyes rather small, not strongly inflated, facets small, interspace equal to four eye widths; sides behind eyes two eye lengths long, nearly straight, gradually convergent, evenly rounded behind; caudal margin broad, obtusely rounded medially; mandibles similar to other species of *Pararhagadochir*; submentum with form as illustrated (fig. 33).

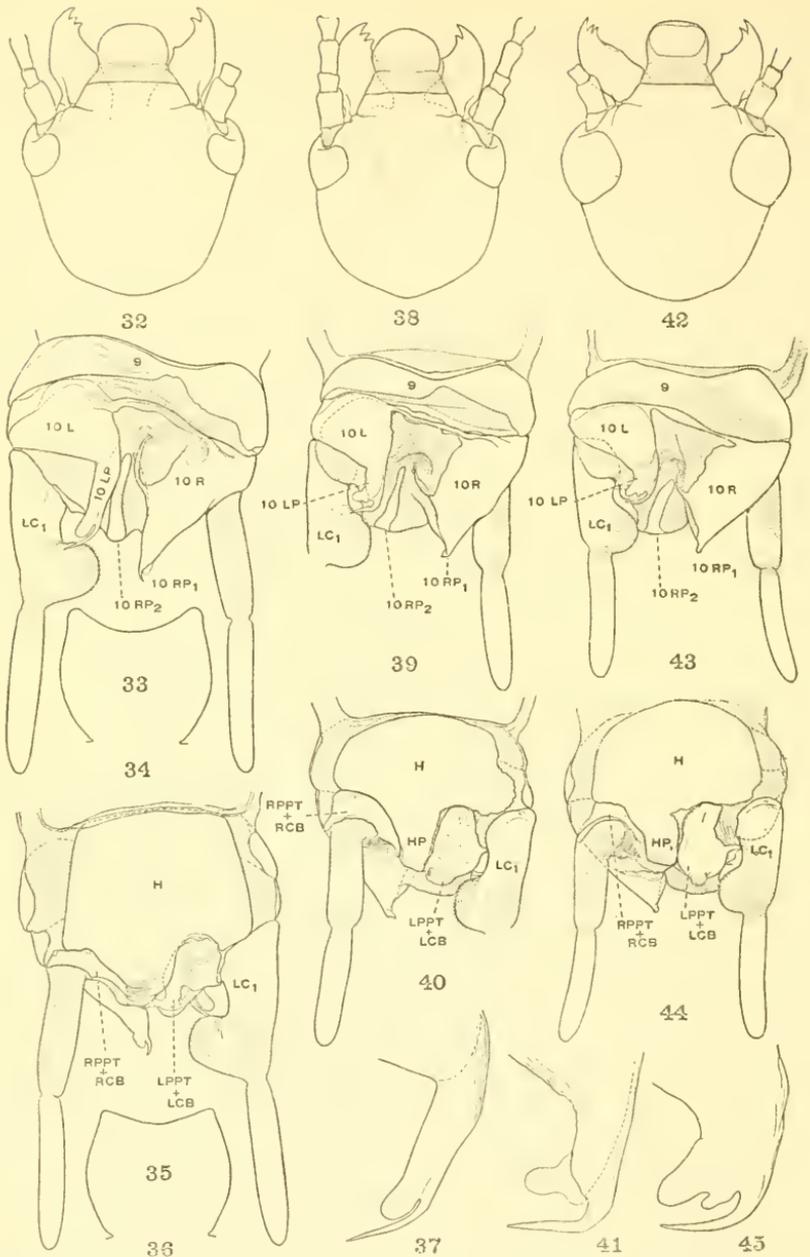
Wings with general features and venation similar to *trinitatis* from Colombia (pl. 18, B) but with three cross veins between R_1 and R_{2+3} in forewing, four in this position in hindwing; one cross vein between R_{2+3} and R_4 in both wings, this vein bordered by white.

Hind basitarsi with two sole-bladders, the second being very small, indistinct.

Terminalia (figs. 34, 36, 37): Left tergal process (10 LP) (fig. 37) greatly elongated, as long as width of 10 L, outer margin perpendicular to caudal margin of 10 L, parallel-sided; apex with a slender, gradually arcuate, talonlike inner process and an evenly rounded, submembranous outer lobe. Major right tergal process (10 RP₁) gradually tapered, bifid apically, the upper apex produced as a slender, sclerotic, downwardly curved spine, which is subtended by a vertical, membranous, disklike appendix. Ninth sternite (H) somewhat longer than broad, sides straight, parallel; process (HP) short, truncate, transversely wrinkled. Composite right cercus-basipodite and paraproct (RPPT+RCB) very dark brown, forming a half ring beneath base of left cercus, elongated toward left and fused to side of HP. Composite LCB and LPPT fused at base and inner side to H and HP, heavily sclerotized, without subechinulations on surface, inner apical angle with point indefinite. Cerci with form as illustrated, basal segment of right cercus almost wholly unpigmented.

Holotype.—Male, on slide,⁴ deposited in the La Plata Museum, Argentina.

⁴ When received the holotype was mounted dry on a pin. The specimen was carefully cleared in KOH (except one pair of wings) by the writer and mounted with the original labels on a slide in balsam to reveal specific details and to protect it from possible future damage.



FIGURES 32-37.—*Pararhagochir trachelia* (Navás), holotype male (except fig. 35) (Argentina): 32, Head; 33, outline of submentum; 34, terminalia (dorsal); 35, outline of submentum of specimen with dark prothorax; 36, terminalia (ventral); 37, process of left hemitergite (10 LP).

FIGURES 38-41.—*Pararhagochir birabeni* (Navás), holotype male (Argentina): 38, Head; 39, terminalia (dorsal); 40, terminalia (ventral); 41, process of left hemitergite (10 LP).

FIGURES 42-45.—*Pararhagochir tenuis* (Enderlein), plesiotype male (Bolivia): 42, Head; 43, terminalia (dorsal); 44, terminalia (ventral); 45, process of left hemitergite (10 LP).

Explanation of symbols on p. 403.

Type data.—The holotype bears four labels in the following top-to-bottom sequence: (1) "Rep. Argentina, Pr. Santiago d. Estero 190-, C. Bruch" (printed on bordered white paper); (2) "Typus" (printed on green card with border); (3) "Rhagadochis trachelius Nav." (hand-lettered on large label with green border); (4) "Rhagadochir trachelius Nav. Navás S. J. det." (on green paper, in Navás's hand?).

The numerous records for this species given by Navás have not been listed as his specimens were not prepared (see Davis, 1940a) and thus his determinations require verification to be of any value.

All the specimens studied by Davis (*l. c.*) appear to be referable to the new species described below.

The only additional specimen at hand, besides the holotype, which appears to be *trachelia*, is a male from Campo Santo, Salto, Argentina, March 13, 1939 (Biraben-Scott) (LPM). This specimen has relatively short wings, these being about half as long as the body instead of nearly equal length as in the holotype.

Reference to more specimens of this species will probably reveal the existence of a number of subspecies. Two Argentina specimens before the writer have structural characters similar to *trachelia* but differ in being darker brown with the prothorax brown instead of pale yellow. The head is darker, with the mandibles brown instead of amber yellow, and the submentum is very dark brown with a different form (fig. 35). One of these specimens is from Chilecito, La Rioja, February 20, 1939 (Biraben-Scott) (LPM) (retained by the writer); the other is from B. de Doria Sanogasta, La Rioja, February 21, 1939 (Biraben-Scott) (LPM). The small additional hind basitarsal bladder of *trachelia* cannot be located on these specimens. Further studies may indicate that such specimens represent a distinct subspecies.

PARARHAGADOCHIR SCHADEI, new species

FIGURES 50, 51

Holotype male.—Color (on slide): Head medium brown; antennae darker; mandibles and submentum pale amber yellow, tips and inner edges of mandibles reddish brown. Prothorax pale yellow; pterothorax, legs, and wings medium brown. Abdomen pale brown, terminalia medium brown. Length 8.5 mm. (on slide), forewing length 5.5 mm., breadth 1.3 mm.

Head (fig. 50) with form as illustrated; eyes large, inflated; sides of head strongly convergent behind, short.

Wings as throughout the genus; no cross veins between R_{4+5} and M.

Hind basitarsi without an inflated second sole-bladder but with a small, pale, membranous area in the expected position which possibly may become inflated at times.

Terminalia with the general form of *trachelia* but differing as follows: Left tergal process (10 LP) (fig. 51) much shorter, base scarcely as long as inner apical "talon," outer apical spatulate portion narrower; entire process gradually curving from base toward left. The basal segment of the right cercus only half as long as terminal segment (these segments are equal in *trachelia*).

Female.—Unknown.

Holotype.—Male, on slide, deposited in the Museum of Comparative Zoology, from Villa Rica, Paraguay, December (F. Schade).

Paratypes.—Four males from same locality and collector; two collected in December and two in October. Three are deposited in the Museum of Comparative Zoology, one in the writer's collection.

Remarks.—The form of the left tergal process as well as of the head and other features is very constant in the above series. The species is similar in appearance to *trachelia* but may be distinguished by characters of the head (compare figs. 32 and 50) and by the shape of 10 LP (compare figs. 37 and 51).

It is possible that *trachelia* and *schadei* may occur in the same region, as the specimen from Santiago del Estero, 10 km. from Lugones, Argentina (the same state as the holotype of *trachelia*), illustrated by Davis (1940a, figs. 51-57), appears to be referable to *schadei* and not to *trachelia*.

PARARHAGADOCHIR CONFUSA, new species

FIGURES 46-49

This new name is proposed for specimens apparently erroneously determined by Davis (1940a) as *P. argentina* (Navás). This species is now referred to the genus *Idioembiia* of the Oligembiidae for reasons given in the discussion of the species. Davis's misidentification was probably due to the fact that his concept of the species was based on specimens in the Paris Museum apparently incorrectly identified as *argentina* by Navás himself.

Male.—Color (holotype, on slide): Head golden brown in frontoclypeal region, becoming medium brown caudally; antennae and palpi dark brown; mandibles straw yellow, tips and inner margins mahogany brown; submentum amber yellow. Prothorax, pterothorax, legs, wings, and terminalia medium brown. Length 11.0 mm. (on slide); forewing length 6.0 mm., breadth 1.6 mm.

Head (fig. 46) as figured, noticeably quadrate. Occipital foramen equilaterally triangulate, angles rounded, the anterior one broadly so.

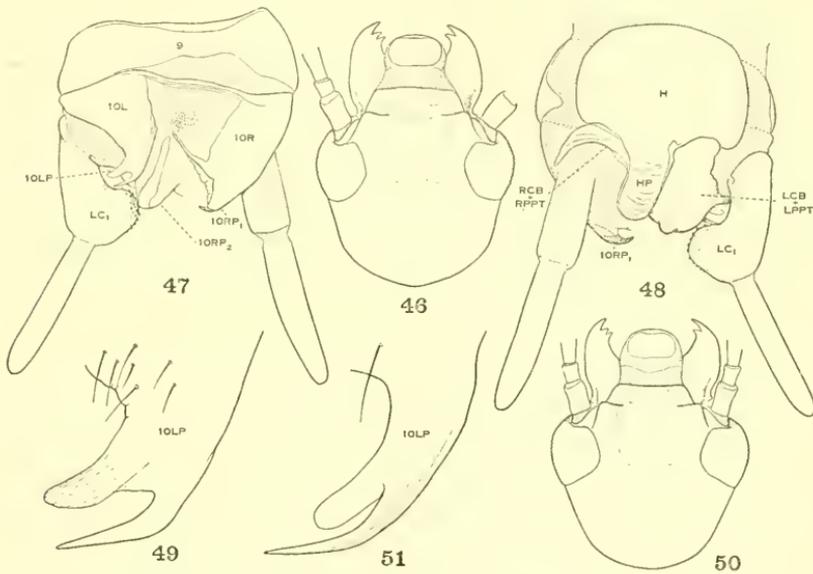
Wings as throughout the genus; forewing with four R_1 - R_{2+3} , one R_{2+3} - R_4 , and two R_{4+5} -M cross veins. Hindwing with similar cross veins.

Hind basitarsi with two large sole-bladders.

Terminalia (figs. 47–49) with usual generic structure. 10 LP (fig. 49) short, apical cleft as long as base, inner “talon” curved outward at base, thence straight, cleft broad, outer membranous portion “thumb-like”, with regular outlines. Tip of 10 RP₁ a stout, ventrally directed, sclerotic, darkly pigmented “talon.” Composite left paraproct (LPPT+LCB) without a prominent point on inner margin; apical margin submembranous, developed submedially as a domelike nodule which is densely microechinulate; outer apical angle narrowly produced partially around base of LC₁.

Female.—Unknown.

Holotype.—Male, on slide, deposited in the Museum of Comparative Zoology, from Villa Rica, Paraguay, March (F. Schade).



FIGURES 46–49.—*Pararhagadochir confusa*, new species, holotype male (Paraguay): 46, Head; 47, terminalia (dorsal); 48, terminalia (ventral); 49, detail of 10 LP.

FIGURES 50, 51.—*Pararhagadochir schadei*, new species, holotype male (Paraguay): 50, Head; 51, detail of 10 LP. Explanation of symbols on p. 403.

Paratypes.—Five topotypic males, on slides, collected during October, December, January, and February. Deposited in the Museum of Comparative Zoology and in the writer’s collection.

Other records.—Davis (1940a), under the name *argentina* (Navás), records this species from Argentina—“Chaco de Santa Fé: Las Garzas, Bords du Río Las Garzas, 25 kil. O. [W.] d’Ocampo, E. R. Wagner, 1903 (2 males in Paris Museum).”

P. confusa is a member of the *birabeni-tenuis-davisi* series, having a unicolorous thorax, and may be distinguished by the shape of the left tergal process (compare figures), its lighter color, and numerous morphological details.

PARARHAGADOCHIR BIRABENI (Navás), new combination

FIGURE 38-41

Embia birabeni NAVÁS, 1918, p. 105, fig. 5.—DAVIS, 1940b, p. 352 (*Embolynta?*).

This species has been unrecognizable because of the inadequate original description and figures. Dr. Biraben has kindly sent the writer the holotype and a topotype male of this species, and thus it is now possible to reveal its characters in detail. The following re-description and accompanying figures are based upon the holotype of *birabeni*:

Male (holotype, on slide).—Rather uniform chocolate brown throughout (including prothorax); abdomen slightly paler. Length 9.5 mm.; forewing length 4.7 mm., breadth 1.2 mm.

Head (fig. 38) moderate sized, elongate-oval; eyes rather small, only slightly inflated, facets small, interspace equal to three eye widths; sides behind eyes gradually, convergently curved, increasingly so caudally to form a narrowly rounded caudal margin; mandibles as throughout the genus, but with slightly broader, shorter teeth, uniform light brown; submentum dark reddish brown, as long as broad, sides slightly arcuate, anterior margin shallowly emarginated.

Wings rather short and narrow with venation as throughout the genus; cross veins between R_1 and R_{2+3} obsolete; only one broad, white cross vein between R_{2+3} and R_4 .

Hind basitarsi rather short and stout; with two sole-bladders, the second small and situated at apical third.

Terminalia (figs. 39-41): Left tergal process (10 LP) (fig. 41) two-thirds as long as width of 10 L, inner margin continuous with the straight inner margin of 10 L, outer margin straight, parallel to central body axis; apex bifid, inner portion sclerotic, talonlike, abruptly curved outward nearly at a right angle, outer portion irregular, fleshy, membranous. Major right tergal process (10 RP₁) with apex produced as an abruptly downwardly curved sclerotic spine, without a ventral membranous appendix. Ninth sternite (H) much broader than long, caudal angles rounded; process (HP) twice as long as broad, membranous at apex, not wrinkled. Composite right cercus-basipodite and right paraproct (RCB+RPPT) a broad, darkly pigmented, ventral crescent; broadly fused along basal margin with side of HP. Composite LCB and LPPT very large, not definitely fused at base and inner side to H and HP; dilated terminally, with a ventral, subechinulated nodule at inner apical angle. Cerci with form as illustrated; inner nodule of LC₁ large, truncate.

Female (on slide).—Uniform chocolate brown throughout except head; head yellowish brown, especially ventrally. Length 12 mm. Head circular, with antennae 21-segmented (apparently complete). Hind basitarsi short, stout; with two large, nearly contiguous sole-

bladders; ventral setae rather short and sparse. Second segment of hind tarsi with very large echinulations on bladder. Cerci short, small; basal segment with a pigmented basal ring and with outer margin membranous.

Holotype.—Male, on slide, deposited in the La Plata Museum, Argentina.

Type data.—The holotype bears four hand-lettered labels in the following top-to-bottom sequence: (1) "Unquillo (Cordoba), Dr. Max Biraben" (on thin green paper); (2) "Typus" (on red paper); (3) "Embia Birabeni Nav." (on large, green-bordered label); (4) "Embia Birabeni Nav. P. Navás S. J. det." (on thin green paper—in Navás's hand?).

Neallotype (by present designation).—Topotype female, on slide, deposited in the La Plata Museum, Argentina, described above.

Other records.—One topotype male, on slide (LPM) (retained in writer's collection); one male, on slide, Cosquin, Sierra de Córdoba, Argentina, March 1-9, 1920, Cornell University Expedition (CU).

Remarks.—*P. birabeni* is most closely related to a specimen at hand identified below as *tenuis*. The two species are separable by the differences in the form of the left tergal process.

PARARHAGADOCHIR TENUIS (Enderlein)

FIGURES 42-45

Embia tenuis ENDERLEIN, 1909, p. 186.—KRAUSS, 1911, p. 69.—NAVÁS, 1918, p. 103.

Rhagadochir tenuis (Enderlein) ENDERLEIN, 1912, p. 60, figs. 34, 35, pl. 3K.

Pararhagadochir tenuis (Enderlein) DAVIS, 1940a, p. 188, fig. 80.

Rhagadochir tenuis var. *flaviceps* ENDERLEIN, 1912, p. 61.—NAVÁS, 1918, p. 10+ (*Embia*).

Holotype.—Male, Stettiner Zoologischen Museum.

Type data.—Prov. Sara, Bolivia (J. Steinbach).

Plesiotype (by present designation).—Male, on slide, from Rurrenabaque, Bolivia, November 1921 (W. M. Mann), deposited in United States National Museum, described as follows:

Head medium brown, antennae and palpi dark chocolate brown, submentum reddish brown; mandibles straw yellow, apices reddish brown; wings, remainder of body, and appendages (except terminalia) lighter brown. Length 9 mm.; forewing length 5.7 mm., breadth 1.4 mm. Hind basitarsi with two sole-bladders; the second very small, pointed. Form of head and structure of terminalia as illustrated (figs. 42-45).

Other records.—Male paratypes with type data (Berlin and Stettin Mus.); 1 male paratype, Yungas, Brazil (Berlin Zool. Mus.).

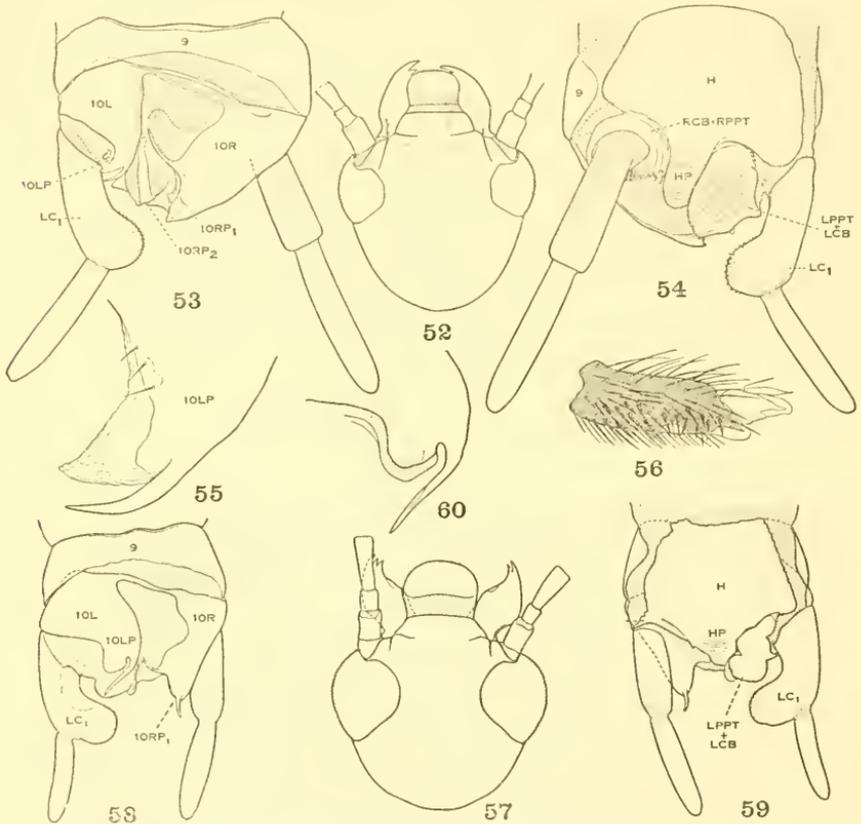
Remarks.—The identity of the above plesiotype is tentative and based only upon a comparison of its terminalia with Enderlein's figure of those of *tenuis*. The details of the left tergal process are somewhat discrepant.

PARAHAGADOCHIR DAVISI, new species

FIGURES 52-56

Male (holotype on slide).—Head and terminalia chocolate brown, body and legs medium brown throughout, wings light brown. Length 5 mm.; forewing length 3.6 mm., breadth 1.2 mm.

Head (fig. 52) broad, short; eyes large, inflated, interspace one and one-half eye widths wide; sides behind eyes short, strongly con-



FIGURES 52-56.—*Parahagadochir davisii*, new species, holotype male (Brazil): 52, Head; 53, terminalia (dorsal); 54, terminalia (ventral); 55, detail of left tergal process (10 LP); 56, hind basitarsus showing uninfused sole-bladder.

FIGURES 57-60.—*Parahagadochir surinamensis*, new species, holotype male (Surinam): 57, Head; 58, terminalia (dorsal); 59, terminalia (ventral); 60, process of left hemitergite (10 L). Explanation of symbols on p. 403.

vergent and arcuate, continuous with the narrowly rounded caudal margin; occipital foramen narrow, anterior margin transverse, feebly rounded; mandibles as throughout genus, apices reddish; submentum dark brown, with outline as indicated in figure.

Wings without special features. Hind basitarsi with a submedial, circular, membranous area on sole, but without an inflated bladder; chaetotaxy as figured (fig. 56).

Terminalia (figs. 53-55) dark brown throughout, with usual form of the genus. Left tergal process (10 LP) (fig. 55) distinctive, broad, short; outer membranous portion broadly triangular, evenly tapered caudad. Left paraproct (LPPT+LCB) simple; inner apical angle rounded, slightly lobed, minutely echinulate; outer apical angle slightly produced, truncate.

Female.—Unknown.

Holotype.—Male, on slide, deposited in the Museum of Comparative Zoology, from Parintins, Brazil, October 2, — (Parish).

Remarks.—This species is named for Dr. Consett Davis, who first described and illustrated the above holotype specimen as "*Pararhagadochir* sp. Indet." (Davis, 1940a, p. 187, figs. 76-79). It is now certain that the specimen represents a distinct new species, and through the kindness of Prof. Nathan Banks the writer was permitted to study the specimen.

P. davis may be recognized by its uniform dark brown color, the form of the head, 10 LP, and left paraproct, and by its distribution. It is a member of the *confusa-birabeni-tenuis* series.

PARARHAGADOCHIR SURINAMENSIS, new species

FIGURES 57-60

Male (on slide).—Uniform pale tan throughout (including prothorax); head medium brown, with yellowish mandibles; abdominal terminalia medium brown. Length 6.5 mm.; forewing length 4.5 mm., breadth 1.1 mm.

Head (fig. 57) somewhat larger than terminalia, short, circular, as long as broad across eyes; eyes very large, inflated, separated by interspace nearly equal to an eye width, facets prominent; sides behind eyes shorter than an eye length, moderately convergent and gradually rounded posteriorly to form a broad caudal margin; occipital foramen rounded anteriorly; submentum of same color as head, quadrate, sides slightly arcuate, anterior margin scarcely emarginated.

Wings pale, with broad hyaline stripes; with characteristic *Pararhagadochir* venation and few cross veins.

Hind basitarsi with only one sole-bladder.

Terminalia (figs. 58-60) with process of left hemitergite (10 LP) (fig. 60) very broad basally; inner talonlike portion narrow, scarcely acuminate, not curved apically; outer broad portion only half as long as "talon," very broad, fleshy. Right hemitergite (10 R) deeply excised on inner margin; caudal angle (10 RP₁) broadly rounded, thumblike with a narrow, terminal, spinelike appendix; inner pro-

jection not prominent; median sclerite narrow. Hypandrium process (HP) poorly developed. Composite left paraproct and left cercus-basipodite (LPPT+LCB) strongly lobed terminally and extensively microechinulate along margin. Basal segment of left cercus (LC₁) with inner apical lobe elongate, echinulate; terminal segment very narrow, elongate.

Female.—Unknown.

Holotype.—Male, on slide, in Cornell University collection.

Type data.—Kwakoepron, Saramacca River, Surinam, June 8, 1927 (Cornell U., Lot. 760, Sub. 87).

Remarks.—This unique species may be distinguished from all others of the genus by its broad, circular head with large eyes and by the details of the left tergal process. The holotype specimen was referred to by Davis (1940a, p. 187), who believed it to be conspecific with his "sp. indet." (i. e., *davisi*) from Parintins, Brazil.

PARARHAGADOCHIR ADSPERSA (Enderlein)

Embia adspersa ENDERLEIN, 1909, p. 185.—KRAUSS, 1911, p. 69.—NAVÁS, 1918, p. 103.

Rhagadochir adspersa (Enderlein) ENDERLEIN, 1912, p. 58, figs. 32, 33.

Pararhagadochir adspersa (Enderlein) DAVIS, 1940a, p. 188, fig. 81.

Holotype.—Male, Stettiner Zoologischen Museum.

Type data.—Prov. Sara, Bolivia (J. Steinbach).

Remarks.—This is apparently a very distinct species characterized by the large acuminate, echinulate inner nodule of the left cercus and the large, broad, bilobed left tergal process. The condition of the right hemitergite is suggestive of that found in the genus *Microembia*. Future studies may indicate that the species is not a member of the genus *Pararhagadochir*.

Family ANISEMBIIDAE

Anisembiidae DAVIS, 1940e,⁵ p. 535.—ROSS, 1940b, p. 642.—DAVIS, 1940f, p. 681.

Mesembiinae ROSS 1940b, p. 643 (type genus: *Mesembia* Ross).

Anisembiinae ROSS, 1940b, p. 649 (type genus: *Anisembia* Krauss).

American Embioptera; the males with mandibles nondentate apically; the wings (when present) with R₄₊₅ simple; the basal segment of the left cercus nodulose and echinulate on inner side (except in *Saussurembia* Davis); the hind basitarsi of both sexes with only one sole-bladder. In the males of *Anisembia* and *Chelicerca* the left cercus is usually one-segmented and some species are apterous.

Type genus.—*Anisembia* Krauss.

Distribution.—South America to southern United States and West Indies.

⁵ Davis's 15-day prior use of the name Anisembiidae (1940e) was due to an unexpectedly earlier mailing date of his publication.

Members of this family can be separated from other American species, which have the wing vein R_{4+5} simple, by the nondentate mandibles and the usually clavate and echinulate left cercus.

With the discovery of a species of *Chelicerca* (described below) having the left cercus of the male two-segmented, the division of the family into two subfamilies on the basis of segmentation of the cercus becomes untenable (i. e., Mesembiinae, left cercus two-segmented, and Anisembiinae, left cercus one-segmented).

KEY TO GENERA OF ANISEMBIIDAE (MALES)

1. Basal segment of left cercus apically echinulate on inner side..... 2
Basal segment of left cercus not echinulate..... Saussurembia
2. Left cercus usually 1-segmented; when 2-segmented terminal segment broadly attached basally and not equal in form to terminal segment of right cercus 4
Left cercus always 2-segmented, terminal segment similar to that of right cercus in form and basal attachment..... 3
3. Terminalia with processes of tenth tergite slender, unarmed; median cleft of tenth tergite narrow: process of hypandrium (H) small, truncate Mesembia
Processes of tenth tergite broad, rounded, often bearing small hooks; median cleft of tenth tergite usually very broad (when narrow, it is basally forked), membranous; process of hypandrium prominent, broad, thumb-like Schizembia
4. Basal segment of right cercus cylindrical, not expanded basally, basal foramen simple; process of left hemitergite simple..... Anisembia
Basal segment of right cercus somewhat laterally compressed, greatly expanded basally to form a complexly margined foramen; process of left hemitergite complex..... Chelicerca

Genus SAUSSUREMBIA Davis

Saussurembia DAVIS, 1940a, p. 191.—ROSS, 1940b, p. 647.

Saussurella DAVIS, 1939d, p. 573 (name preoccupied).

Genotype.—*Embia ruficollis* Saussure, by original designation.⁶

Distribution.—Central America and Colombia.

This genus comprises two species, which may be separated from all others of the family by the nonechinulate left cercus. The writer now has evidence that *Oligotoma venosa* Banks, of Cuba, recently placed in this genus by Davis, belongs in *Anisembia* (see *infra*).

SAUSSUREMBIA RUFICOLLIS (Saussure)

Embia ruficollis SAUSSURE, 1896b, p. 353.

Oligotoma ruficollis (Saussure) KRAUSS, 1911, p. 42, pl. 2, fig. 10.—ENDLREIN,

1912, p. 91.—NAVÁS, 1924b, p. 62, fig. 4.**—FRIEDERICH, 1934, p. 417, fig. 6, a-b.*

Saussurella ruficollis (Saussure) DAVIS, 1939d, p. 573, figs. 1-4.**

Saussurembia ruficollis (Saussure) DAVIS, 1940a, p. 191.

⁶ Davis's concept of this species was based on a specimen, in the Paris Museum, from Costa Rica (Paul Serre, 1920).

Holotype.—Winged male, Muséum d'Histoire Naturelle, Geneva.
Type data.—Bugaba, Central America (Panama), 250–400 meters.

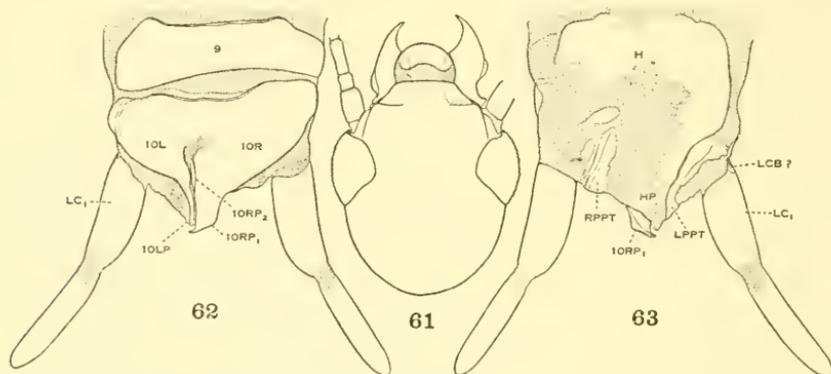
(See Krauss, 1911.)

Other records.—Mojica, Guanacaste, Río Blanco; Farm La Caja, near San José, Costa Rica (H. Schmidt) (Hamburg Museum)*; Costa Rica, 1921 (P. Serre).**

SAUSSUREMBIA SYMMETRICA, new species

FIGURES 61–63

Male holotype (on slide).—Head and basal antennal segment chocolate brown; first five succeeding antennal segments tan, terminal segments increasingly darker, becoming brown; mandibles medium brown,



FIGURES 61–63.—*Saussurembia symmetrica*, new species, holotype male (Colombia): 61, Head; 62, terminalia (dorsal); 63, terminalia (ventral). Explanation of symbols on p. 403.

tips golden brown; prothorax tan, pterothorax and hindlegs (other legs missing) medium brown; abdomen tan, terminalia only slightly darker, cerci pale tan. Length 5.5 mm.; forewing length 3.7 mm., breadth 0.9 mm.

Head (fig. 61, partially reconstructed—head capsule broken on right side): Elongate oval; eyes rather large, separated by interspace two eye widths wide, facets prominent, their interspaces unpigmented; sides behind eyes gradually, evenly arcuate behind, continuous with rounded caudal margin. Mandibles nearly equal in form, very acutely pointed apically, nondentate at tips or medially, outer basal angle abruptly rounded. Mentum unsclerotized, quadrate, slightly wider than long, sides weakly convergent behind. Antennae defective terminally.

Wings with typical anisembiid venation. Radius (R_1) gradually merging with costa, meeting it well before apex of wing. R_{2+3} and its petiole are the only remaining nonobsolete veins (except Cu_{1a}), the other veins being represented only by rows of macrotrichiae and

pigmented bands. One cross vein present between R_1 and R_{2+3} in forewings and hindwings, this located just beyond basal third of R_{2+3} . Hyaline stripes narrow, sharply defined.

Hind basitarsi with only one sole-bladder; ventral setae dense, long.

Terminalia (fig. 62, 63) relatively small, nearly symmetrical, weakly sclerotized and pigmented. Tenth tergite broadly triangular, divided submedially by a cleft, which becomes obsolete well before base of tergite, and forms two unequal hemitergites; left hemitergite (10 L) smallest, abruptly produced caudally on inner side as a narrow, acuminate, simple process (10 LP); right hemitergite (10 R) broad, large, gradually produced caudad as a broad, nearly parallel-sided process (10 RP_1), which is truncate, curved downward, and minutely hooked inward at apex; the inner margins of the two processes are nearly straight and closely parallel. Margin of basal half of 10 RP_1 with a narrow, simple, detached appendix (10 RP_2). Ninth sternite (H) greatly desclerotized, pigmented only across base and along left side, otherwise membranous; process (HP) obsolete, represented only as a membranous lobe, faintly pigmented on left side. Left paraproct (LPPT) elongate, inner margin lying close to margins of H and HP, outer margin irregular; right paraproct (RPPT) represented only as faintly pigmented, weakly wrinkled areas in membrane. Left cercus with basal segment (LC_1) unspecialized, cylindrical, without lobes or echinulations, slightly tapered distally, outer apical half membranous; a small sclerotized area at outer base may represent the left cercus basipodite (LCB?) fused to the cercus; terminal segment elongate, cylindrical, simple; right cercus similar to left cercus, the basal segment only slightly less pigmented.

Female.—Unknown.

Holotype.—Male, on slide, U.S.N.M. No. 56759.

Type data.—Río Frío, Colombia, February (W. M. Mann).

Remarks.—This remarkable species is tentatively assigned to *Saussurembia* Davis on the basis of its unmodified, nonechinulate left cercus. It may be separated at once from *Saussurembia ruficollis* (Saussure) by its incompletely cleft tenth tergite, the narrow left process (10 LP), the desclerotized ninth sternite, and the distally tapered LC_1 .

The abdominal terminalia of *symmetrica* are the most unspecialized of the Anisembiidae and rank with those of *Olothoda* as the most generalized of the order. They represent one more element in the pleasing phylogenetic series found in the Anisembiidae.

Genus MESEMBIA Ross

Mesembia Ross, 1940a, p. 12.—DAVIS, 1940d, p. 532.—ROSS, 1940b, p. 643.

Genotype.—*Oligotoma hospes* Myers, by original designation.

Distribution.—West Indies, Brazil.

The three species included in this genus have in common the simple, rather slender tergal processes of the terminalia; the short, simple, truncate process of the hypandrium; and the two-segmented left cercus with the basal segment inwardly lobed and echinulate. *M. aequalis* is only tentatively assigned to the genus. It probably is generically distinct, but a final conclusion must await further data.

KEY TO SPECIES OF MESEMBIA (MALES)

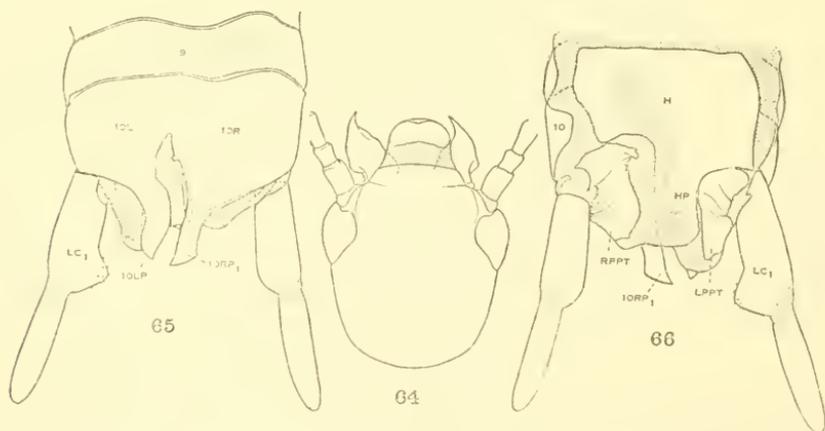
1. Left cercus with echinulate lobe located medially on inner side of basal segment; Cuba----- *hospes*
 Left cercus with echinulate lobe located distally on inner side of basal segment----- 2
2. Left tergal process very slender, abruptly directed mesad; tenth tergal cleft attaining base; Haiti----- *haitiana*
 Left tergal process as broad as or broader than the right process, slightly curved outward; tenth tergal cleft terminated just within basal half; southern Brazil----- *aequalis*

MESEMBIA AEQUALIS, new species

FIGURES 64-66

Male.—Color (in alcohol): Head and antennae black; legs, pterothorax, abdominal terminalia, and dorsal maculation mahogany brown; prothorax with yellowish intersclerotal areas, sclerites brown. Length 6.7 mm.; forewing length 4.0 mm.; breadth 1.0 mm.

Head (fig. 64) with eyes medium sized, scarcely inflated, separated by an interspace 3 eye widths wide; sides behind eyes $1\frac{1}{2}$ eye lengths long, nearly straight, gradually convergent; caudal margin abrupt, obtusely rounded. Mandibles small, sharply pointed; left mandible with inner margin biemarginate, the right with inner margin evenly arcuate. Occipital foramen rounded anteriorly. Antennae darkly pigmented throughout, 17-segmented (broken).



FIGURES 64-66.—*Mesembia aequalis*, new species, holotype male (Brazil): 64, Head; 65, terminalia (dorsal); 66, terminalia (ventral). Explanation of symbols on p. 403.

Wings light brown, hyaline stripes very narrow, sharply defined. R_1 narrow, paralleling costa but merging with it apically. One or two cross veins present between R_1 and R_{2+3} , one between R_{2+3} and R_{4+5} . Venation otherwise without peculiarities.

Terminalia (fig. 65, 66) with tenth tergite large, quadrate, simple; submedian cleft slightly to left of middle, terminating just within basal half; left process (10 LP) rather broad, parallel-sided, thin, simple, directed caudad but curved upward distad, abruptly pointed at apex; right hemitergite (10 R) large, its major process (10 RP_1) abruptly produced at inner apical angle, parallel-sided, sclerotic, slightly curved downward distad, apex slightly expanded, truncate, and slanted mesad; secondary process (10 RP_2) very narrow, paralleling, and lying partially beneath, inner margin of 10 R. Ninth sternite (H) quadrate, right apical area submembranous; process (HP) short, truncate, wrinkled, submembranous on right side basally. Composite left cercus-basipodite and left paraproct (LCB+LPPT) prominent, darkly pigmented, elongate, fused basally with H; composite RCB and RPPT equally prominent but of a different shape. Basal segment of left cercus (LC_1) cylindrical basally abruptly expanded distally on inner side to form a prominent, sparsely echinulate lobe; terminal segment of left cercus normal. Basal segment of right cercus simple, cylindrical, slightly swollen distad; basal foramen circular, simple; terminal segment similar to that of LC.

Female.—Unknown.

Holotype.—Male, on slide, U. S. N. M. No. 56581.

Type data.—Nova Teutonia, Santa Catharina, Brazil (F. Plau-mann).

Paratypes.—Two males, on slides, with holotype data; one deposited in the writer's collection, the other in the California Academy of Sciences.

Remarks.—This distinct species is the most southern and one of the most generalized of the family. Its characters, except for the echinulate lobe of the left cercus, are very similar to those of *Saussurembia ruficollis* (Saussure).

MESEMBIA HOSPEIS (Myers)

Oligotoma hospes MYERS, 1928, p. 89, fig. 1.

Mesembia hospes (Myers) ROSS, 1940a, p. 12.—DAVIS, 1940d, p. 532, figs. 20–23.—ROSS, 1940b, p. 644, figs. 14–16.

Holotype.—Winged male, in Museum of Comparative Zoology (type No. 523).

Type data.—Soledad, Santa Clara, Cuba, February 10, 1925 (J. G. Myers).

Other records.—Paratypes with same data.

MESEMBIA HAITIANA Ross

Mesembia haitiana Ross, 1940b, p. 646, figs. 17-19.

Holotype.—Winged male, on slide, U.S.N.M. No. 53132.

Type data.—Grosmore, Haiti, February 17, 1926 (C. H. Leonard).

Genus SCHIZEMBIA, new genus

Males.—Winged; small to moderate sized. Dark chocolate brown; prothorax yellow; wings dark brown. Head without maculation; eyes medium to large sized; mandibles small, without apical dentations, tips acutely pointed, inner margins evenly arcuate. Submentum quadrate, somewhat longer than broad, not heavily sclerotized; mentum distinct, pigmented. Wings with R_1 narrow, closely paralleling costal margin and meeting it before apex; radial sector, R_{2+3} . M_1 and Cu_{1a} simple. Hind basitarsi with only one bladder; plantar setae very fine. Terminalia with tenth tergite divided into hemitergites by a suture complete to basal margin; processes of each hemitergite short, broad, blunt, complex apically (fused apically in one species). Ninth sternite with a short, broad, rounded process. Composite left cercus-basipodite and left paraproct represented by a free triangular sclerite. Left cercus two-segmented; basal segment nodulose and echinulate on inner side apically. Right cercus two-segmented, basal segment cylindrical.

Female.—No specimens definitely associated with a male.

Genotype.—*Schizembia grandis*, new species.

Distribution.—Colombia, Venezuela, and Trinidad. This is the only genus of Embioptera, except *Mesembia* and *Saussurembia*, indigenous to South America that has oligotomoid wing venation (R_{1+5} simple).⁷ It can be separated at once from the introduced species of *Oligotoma*, which have similar venation, by its nondentate mandibles, echinulate left cercus, completely cleft tenth tergite, and the blunt, short process of the right hemitergite.

The three known species of *Schizembia* may be separated by means of the following key:

KEY TO SPECIES OF SCHIZEMBIA (MALES)

1. Tergal processes separated apically by a broad membranous cleft, which continues to base of tergite----- 2
- Tergal processes fused apically, membranous cleft narrow, Y-shaped, isolating a broad, medial sclerite; Trinidad----- callani
2. Size large (10 mm. long); process of hypandrium evenly rounded apically, marginal flange, narrow, even----- grandis
- Size small (6.5 mm. long); process of hypandrium acutely pointed apically, marginal flange greatly developed laterally----- minuta

⁷ *Calamoclostes albistriolatus* Enderlein of the Embiidae has R_{1+5} simple in the forewing and forked in the hindwing.

SCHIZEMBIA GRANDIS, new species

PLATE 19, B; FIGURES 67-69

Male.—Color (in alcohol): Pterothorax, abdomen, legs, wings, head, palpi, and basal antennal segment dark chocolate brown; prothorax reddish yellow; antennal segments 2-14 tan, terminal segments brown. Length 10 mm.; forewing length 8 mm.; breadth 1.8 mm.

Head (fig. 67) small but larger than terminalia; sides behind eyes straight, rather strongly convergent caudad, abruptly rounded and somewhat transverse behind. Eyes moderately large, inflated; interspace twice as wide as an eye width. Antennae with 23 segments (probably complete).

Wings (pl. 19, B) very large, broad. Radius unusually narrow; bordering bands very narrow, pigment granules small, dull red. Radial sector forked within basal half of wing; R_{2+3} pigmented to margin, R_{4+5} pigmented at extreme base only. M and Cu_{1a} each represented only by a row of setae. Cu_{1b} narrow. Anal vein present as a short basal rudiment, united by a cross vein to common base of cubitus and media. Cross veins absent in remainder of wing except for four between R_1 and R_{2+3} . Color uniform dark brown; hyaline stripes very narrow and sharply defined.

Terminalia (figs. 68, 69) very small in relation to other body proportions. Cleft of tenth tergite complete, very broad, membranous, microreticulate in caudal half. Process of left hemitergite (10 LP) broad, bearing a small hook at outer apical margin. Inner margin of right hemitergite (10 R) irregular, deeply notched at apical third; process (10 RP) complex. Ninth sternite (H) subquadrate, bearing long setae; process (HP) nearly symmetrical, short, broadly rounded, margined apically by an internal narrow flange, surface wrinkled. Composite left paraproct and left cercus-basipodite (LPPT+LCB) represented by a free, heavily sclerotized, narrow sclerite; right paraproct obsolete. Basal segment of left cercus (LC_1) gradually inflated terminally on inner side, bearing numerous echinulations. Basal segment of right cercus cylindrical.⁸ Terminal segments of both cerci equal.

Female.—No specimens definitely associated with a male.

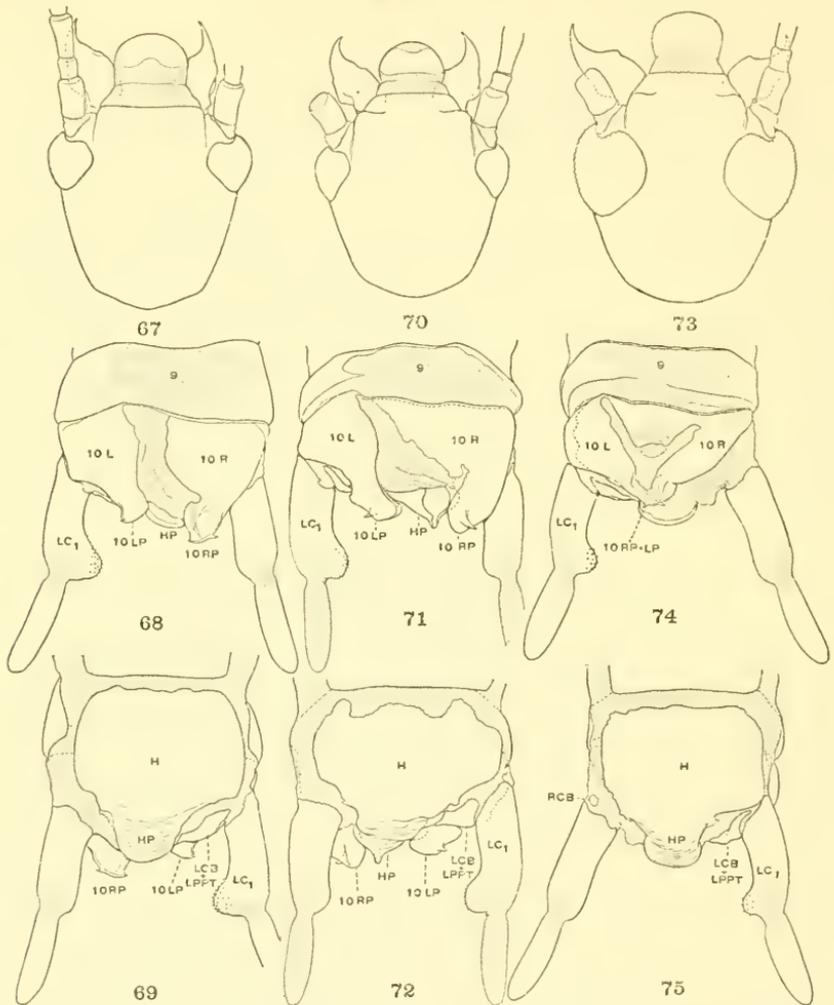
Holotype.—Winged male, on slide, U.S.N.M. No. 56044.

Type data.—Collected in a shipment of *Cattleya* from Caracas, Venezuela, in plant quarantine at Washington, D. C., May 4, 1939 (Inspectors Sanford and Adams).

Other records.—Three males, all collected in wild *Cattleya* in plant quarantine at Washington, D. C. — two of these in shipments from

⁸The inner surface of the basal segment of the right cercus of one of the available specimens bears four distinct peglike echinulations, which are absent in the other specimens at hand.

Caracas, Venezuela, June 9, 1938, and May 4, 1939, and one from Medellín, Colombia, May 4, 1939. One female was collected under similar circumstances in a shipment from Caracas, Venezuela, September 17, 1937. One male from Caracas is retained in the writer's



FIGURES 67-69.—*Schizembia grandis*, new genus and species, holotype male (Venezuela): 67, Head; 68, terminalia (dorsal); 69, terminalia (ventral).

FIGURES 70-72.—*Schizembia minuta*, new species, holotype male (Colombia): 70, Head; 71, terminalia (dorsal); 72, terminalia (ventral).

FIGURES 73-75.—*Schizembia callani*, new species, holotype male (Trinidad): 73, Head; 74, terminalia (dorsal); 75, terminalia (ventral). Explanation of symbols on p. 403.

collection; the other specimens are returned to the United States National Museum. None are made paratypes because of imperfect condition or slightly discrepant structure.

Remarks.—In general appearance, particularly by virtue of its yellow prothorax and size, this species resembles subspecies (?) of the *Pararhagadochir trinitatis* complex that occur in the same region. The female cited above, which appears to be of this species, can be separated from those of *Pararhagadochir* by the absence of a second hind basitarsal sole-bladder and the evenly pigmented basal segments of the cerci.

SCHIZEMBIA MINUTA, new species

FIGURES 70-72

Male.—Color (in alcohol): Head, antennae, pterothorax, and terminalia chocolate brown; wings and abdomen light brown; prothorax reddish yellow; femora bicolorous, basal three-fourths pale yellow, terminal fourth brown; cerci with apex of basal segment and entire terminal segment pale yellow. Length 6.5 mm.; forewing length 4 mm., breadth 1 mm.

Head (fig. 70) shorter and broader than in *grandis*; with sides slightly rounded, gradually convergent caudad, abruptly rounded and transverse behind. Eyes as in *grandis*. Antennae 19-segmented (apparently complete).

Wings relatively small. Radius with bordering bands, broad; not parallel to costal margin but converging toward it and meeting it well before apex of wing. Radial sector forked midway in wing. Venation otherwise similar to that of *grandis* except only one nearly obsolete cross vein is present between R_1 and R_{2+3} . Color uniform light brown; hyaline stripes very narrow and sharply defined.

Terminalia (figs. 71, 72) small; similar in general structure to that of *grandis*, but differing in details of tergal processes as illustrated, and the process of the ninth sternite (H), which is longer and narrower, with the corners of the apex strongly turned inward so as to nearly meet and form a tube; ventrally the apex of the process bears a small lobe. Composite left cercus-basipodite and left paraproct large, triangulate. Terminal segments of both cerci and apices of basal segments very pale yellow.

Female.—No specimens associated with male.

Holotype.—Winged male, on slide, U.S.N.M. No. 56045.

Type data.—With *Cattleya* in cargo from Medellín, Colombia, in plant quarantine at Hoboken, N. J., October 15, 1941 (Inspector Sanford).

Paratype.—Collected in an express shipment of wild orchids from Medellín, Colombia, in plant quarantine at Washington, D. C., August 28, 1936 (Inspector Adams), deposited in writer's collection.

SCHIZEMBIA CALLANI, new species

FIGURES 73-75

Male.—Color (on slide): Head and basal antennal segments dark chocolate brown; pterothorax, legs, and terminalia medium chocolate brown, abdomen and wings lighter; prothorax and forecoxae pale straw yellow; mandibles golden yellow. Length 7 mm.; forewing length 4.5 mm., breadth 1.2 mm.

Head (fig. 73) larger than terminalia; sides behind eyes gradually rounded and convergent, short; caudal margin broad, evenly arcuate. Eyes very large, inflated; facets prominent; interspace equal to an eye width.

Wings relatively large, broad. Radius narrow, converging toward costa and nearly merging with it before wing apex. Three cross veins present between R and R₂₊₃ in forewing and two in hindwing—absent elsewhere except one between Cu_{1b} and A. R₂₊₃ strongly represented to terminus. R₄₊₅ well represented at extreme base only, its terminal portion, as well as all other veins behind it (except Cu_{1b}), each represented only by a row of macrotrichiae. Color uniform; hyaline stripes very narrow and sharply defined.

Terminalia (figs. 74, 75) small. Tenth tergite with median cleft incomplete apically, processes fused; cleft forked, the left fork extending from middle at a 45° angle to basal margin, narrow; the right fork extending basad at same angle, but terminated well before basal margin; these clefts isolate a broad, median, basal area, truncate apically with the adjacent membrane granulate. Processes narrowly fused on inner side apically; with small lateral apical projections. Ninth sternite (H) quadrate, basal margin ragged; produced apically as a symmetrical, broadly rounded process (HP). Two rudimentary sclerites fused to either side of H at base of HP may represent the left and right paraprocts. A free, triangular sclerite in membrane between HP and base of left cercus may represent the composite left cercus-basipodite and left paraproct (LCB+LPPT). Right cercus-basipodite (RCB) represented by an isolated, small, circular, ventral sclerite. Basal segment of left cercus (LC₁) stout, slightly clavate on inner side apically, this nodule bearing a few scattered echinulations; terminal segment of left cercus large. Basal segment of right cercus cylindrical, darkly pigmented on inner side; terminal segment narrower and smaller than that of left cercus.

Female.—Unknown.

Holotype.—Male, on slide, deposited in the British Museum of Natural History.

Type data.—Collected at light, St. Augustine, Trinidad, June 4, 1939 (E. McC. Callan).

Oligotoma texana (Melander) ENDERLEIN, 1912, pp. 92, 109, fig. 62.—MILLS, 1932, p. 648, figs. 1-4.

Anisembia (Anisembia) texana (Melander) Ross, 1940b, p. 650, figs. 20-22, 28.

Holotype.—"Immature male" (or female?) in Museum of Comparative Zoology (type No. 1639).

Type data.—Austin, Tex. (A. L. Melander).

Plesiotypes.—Alate male, in United States National Museum, from Victoria, Tex.; and mature female, California Academy of Sciences, from Arroyo Salado, Starr County, Tex. Both designated and described by Ross (1940b).

Distribution.—Texas, Louisiana, Mississippi, and Arkansas.

New records.—TEXAS: San Antonio, New Braunfels, Sequin, Texarkana. LOUISIANA: Monroe. All collected by the writer.

Remarks.—This is a very common species and, although often encountered under stones, is oftenest found on the bark of trees, especially that of oaks with a rough surface. At Monroe, La., colonies of the insect were very conspicuous on the shaded surface of large oaks bordering the city streets.

The writer has recently had opportunity to study in detail the biology of this species in the field and in laboratory cultures. An interesting fact was noted in connection with the wingless condition of certain of the males. A careful examination of the thorax of the apterous male revealed that small wing pads are actually developed and a slight modification of the scuta of the mesothorax and metathorax is evident. It appears that the apterous condition in males of *texana* results from a halting of the wing development (probably at a stage comparable to the third instar of normal winged males), while other male features develop in a normal manner. This condition is precisely the same in apterous males of *Oligotoma japonica* Okajima, which the writer has studied in large numbers. This subapterous condition may prove to be characteristic of all species having dimorphic males, as males of those species which never have winged males have the scuta identical to the female, with no trace of wing pads.

ANISEMBIA (ANISEMBIA) VENOSA (Banks)

FIGURES 76-79

Oligotoma venosa BANKS, 1924, p. 421, pl. 1, figs. 10, 13.

Saussurella venosa (Banks) DAVIS, 1939d, p. 574, figs. 5-7.

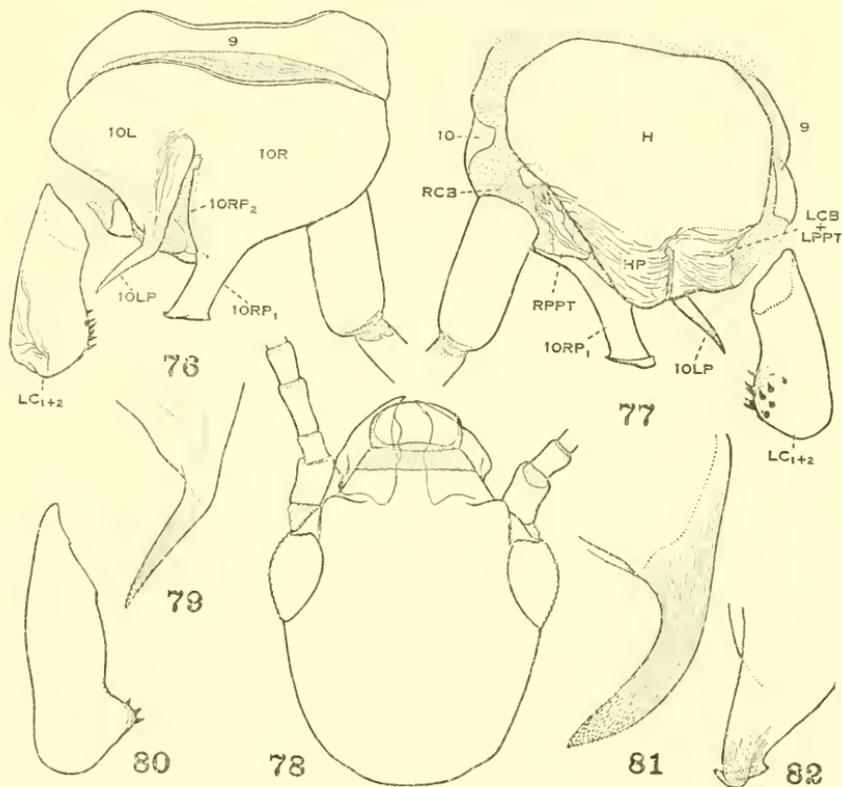
Saussurembia (?) *venosa* (Banks) Ross, 1940b, p. 648.

Anisembia (Anisembia) schwarzi Ross, 1940b, p. 652, figs. 2, 23-25 (Cayamas, Santa Clara, Cuba) (new synonym).

Holotype.—Male, on slide, Museum of Comparative Zoology (No. 14879).

Type data.—Santa Clara, Cuba (Baker).

Remarks.—The holotype of this species, mounted on a slide in balsam, was in such poor condition that Davis (1939d) was unable to establish with certainty the generic position of the species or adequately to redescribe the terminalia. Recently, through the kindness of Dr. Banks, the writer has been able to remount the fragmentary specimen after first treating the parts in KOH. Many essential details of the terminalia are now visible, and it is apparent, by comparing holotypes, that *Anisembia schwarzi* Ross is with little doubt a synonym of *venosa*. The details of the head and terminalia of the holotype of *venosa* are shown in the accompanying figures.



FIGURES 76-79.—*Anisembia venosa* (Banks), holotype male (Cuba): 76, Terminalia (dorsal); 77, terminalia (ventral); 78, head; 79, detail of left tergal process (10 LP).

FIGURES 80-82.—*Anisembia venosa* (Banks), holotype of synonym *schwarzi* Ross (Cuba): 80, Left cercus; 81, left tergal process; 82, tip of right tergal process (10 RP₁). Explanation of symbols on p. 403.

The holotypes of *venosa* and *schwarzi* differ in a number of striking details, which, however, because the specimens are from the same state of Cuba, are regarded as interspecific variation. The shape of the left tergal process (10 LP) is quite different and may not be due to the angle of view (cf. figs. 79 and 81). The lobe of the left cercus

is more pointed and has fewer teeth in the holotype of *schwarzi* and is broadly rounded with many more teeth in the holotype of *venosa*; in the figure of the latter structure (fig. 76) the cercus is foreshortened. The shape of the right tergal process (10 RP₁) is probably similar in the two specimens. That of the holotype of *schwarzi* (Ross, 1940b, fig. 24) is curved downward and inward (probably the true position) and thus presents a different appearance. A detail not noted in the description of *schwarzi* is that the terminal half of 10 LP is peculiarly roughened with hairlike projections of the derm as figured; this is evident also in the *venosa* holotype.

Subgenus BULBOCERCA Ross

Bulbocerca Ross, 1940b, p. 654.

ANISEMBIA (BULBOCERCA) SINI Chamberlin

Anisembia sini CHAMBERLIN, 1923, p. 346, figs. a-b.—DAVIS, 1940d, p. 532, fig. 19.
Anisembia (Bulbocerca) sini (Chamberlin) Ross, 1940b, p. 654, figs. 32-34.

Holotype.—Apterous male, on slide (No. 1245), and *allotype* female, on slide (No. 1246), California Academy of Sciences.

Type data.—Loreto, Baja California, Mexico.

Distribution.—Central Baja California, Mexico (supported by many records), and islands of Gulf of California (by occurrence of silk tunnels).

Genus CHELICERCA Ross

Chelicerca Ross, 1940b, p. 656 (subgenus of *Anisembia* Krauss).

Males.—Winged or apterous. Head dark, eyes small to large, occipital foramen rounded anteriorly. Terminalia with cleft of tenth tergite complete to base, right margin irregular, often excised; left tergal process (10 L) complex, outer apical margin twisted ventrad; right hemitergite (10 R) large, often terminated caudad in one or more talonlike hooks curved to right; process of hypandrium (HP) broad, complex apically, often armed with echinulations or nodules; left cercus usually one-segmented (except in one species); basal segment of right cercus somewhat laterally compressed, expanded basad, its basal foramen irregular, complex.

Genotype.—*Anisembia (Chelicerca) davisi* Ross, by original designation.

Distribution.—Mexico, Southwestern United States.

In this genus are found some of the most specialized species of the family. The discovery of *dampfi* from Chiapas, Mexico, with its two-segmented left cercus, gives cause for separating this series of species from that of the genus *Anisembia*. The terminalia of *dampfi* are nearly as complex as in *davisi* in spite of the more primi-

tive cercus, and since species of the genus *Anisembia* have much more generalized terminalia than any *Chelicerca*, it appears that the one-segmented condition was attained independently in the two genera.

The component subgenera, *Protochelicerca*, *Chelicerca*, and *Dactylocerca*, seem to form a very natural evolutionary series, exhibiting increasing specialization of the abdominal terminalia (e. g., the left cercus), which seems to be directly derived from more primitive genera of the south such as *Schizembia*.

The specialization of the left cercus corresponds with a serial specialization of other terminal abdominal structures in the species and with the degree of their geographic separation from the region of probable origin (northern South America). The most specialized species of the series, *rubra*, occurs in the Sonoran region of North America, which has probably presented more selective environmental changes than the Tropics.

KEY TO SUBGENERA AND SPECIES OF CHELICERCA (MALES)

1. Left cercus 1-segmented..... 2
 Left cercus 2-segmented..... C. (*Protochelicerca*) *dampfi*
2. Right hemitergite produced caudad as a distinct process bearing 1 or 2 outwardly curved, clawlike hooks; left cercus not greatly elongated or very strongly inwardly arcuate (subgenus *Chelicerca*, s. str.)..... 3
 Right hemitergite not produced caudad as a process and not bearing clawlike apical hooks; left cercus greatly elongated, strongly inwardly arcuate
 C. (*Dactylocerca*) *rubra*
3. Process of right hemitergite with but 1 outwardly curved, clawlike apical hook..... 4
 Process of right hemitergite with 2 such hooks.... C. (*Chelicerca*) *heymonsi*
4. Apical hook of process of right hemitergite arising on inner side of process and curving across its apex..... C. (*Chelicerca*) *wheeleri*
 Apical hook arising terminally, not overlapping any tergal structure..... 5
5. Left apical angle of process of hypandrium (HP) produced as a distinct, thumblike, densely echinulate knob..... C. (*Chelicerca*) *nodulosa*
 Left apical angle of process of hypandrium (HP) less strongly produced, pointed, without echinulations..... C. (*Chelicerca*) *davisi*

Subgenus PROTOCHELICERCA, new subgenus

Males.—Rather large, winged. Head larger than terminalia; eyes very large, inflated; occipital foramen evenly rounded apically. Wings large, broad; R_1 narrow, closely paralleling costal margin and meeting it apically, apex not joining R_{2+3} by means of a cross vein; three cross veins present between R_1 and R_{2+3} in forewing, two in hindwing. Terminalia very similar to those found in *Chelicerca*, s. str., but with the left cercus distinctly two-segmented, the terminal segment rather small, broad basally.

Type.—*Chelicerca* (*Protochelicerca*) *dampfi*, new species.

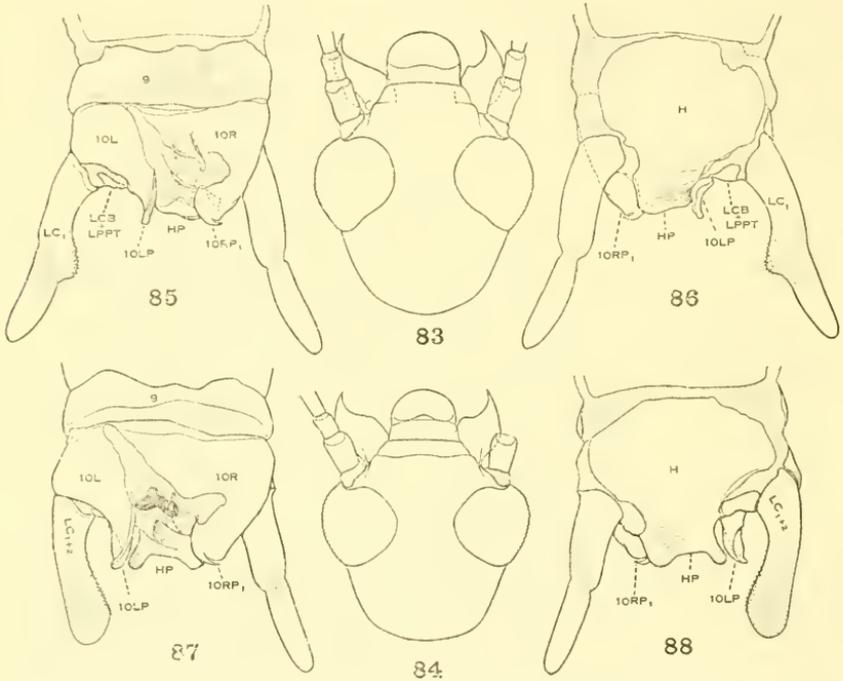
Distribution.—That of the single species.

CHELICERCA (PROTOCHELICERCA) DAMPFI, new species.

FIGURES 83, 85, 86

Male.—Color (on slide): Head, antennae, foretibiae, pterothorax, and terminalia medium brown; remainder of body and appendages, except prothorax, tan; prothorax pale straw yellow. Length 7.5 mm.; forewing length 5.8 mm., breadth 1.4 mm.

Head (fig. 83) with eyes very large, strongly inflated, separated by an interspace distinctly narrower than an eye width; sides behind eyes short, slightly arcuate, strongly convergent, continuous with the



FIGURES 83, 85, 86.—*Chelicerca (Protochelicerca) dampfi*, new subgenus and species, holotype male (Chiapas): 83, Head; 85, terminalia (dorsal); 86, terminalia (ventral).

FIGURES 84, 87, 88.—*Chelicerca (Chelicerca) nodulosa*, new species, holotype male (Veracruz): 84, Head; 87, terminalia (dorsal); 88, terminalia (ventral). Explanation of symbols on p. 405.

evenly rounded caudal margin. Mandibles moderate sized, apices very sharply pointed, inner margins evenly inwardly arcuate. Antennae strongly pigmented throughout.

Wings relatively broad, light brown; hyaline stripes narrow, sharply defined. Three cross veins present between R_1 and R_{2+3} in forewing and two in hindwing. Macrotrichiae following course of veins very dense.

Terminalia (figs. 85, 86) rather small. Submedian cleft of tenth tergite slanting basad toward left and meeting basal margin, narrow

basally but gradually divergent apically. Left hemitergite (10 L) darkly pigmented, quadrate; produced caudad as a broad, twisted process (10 LP) curled ventrad along outer apical margin. Right hemitergite (10 R) large equilaterally triangulate, weakly pigmented, especially along inner margin, which is deeply excised behind middle; process (10 RP) arcuate on inner and apical margin, produced as a short claw not extending far to right of outer margin of process. A narrow, darkly pigmented appendix, present in membrane of median cleft, is feebly connected basally and apically with 10 R.⁹ Ninth sternite (H) broad, developed as a broad, apically truncate process (HP) slanting to the right; right apical angle heavily sclerotized, microechinulate; left apical angle membranous. Composite left cercus-basipodite and left paraproct (LCB+LPPT) triangular, sclerotic, isolated. Right paraproct obsolete. Left cercus two-segmented; basal segment (LC₁) emarginated on inner side, clavate apically and bearing about 15 echinulations along inner apex; terminal segment short, tapered terminally, broadly united with basal segment. Right cercus with basal segment somewhat laterally compressed; margins of basal foramen greatly elongated, darkly pigmented; terminal segment cylindrical, longer and narrower than that of left cercus.

Female.—Unknown.

Holotype.—Male, on slide, U.S.N.M. No. 56760.

Type data.—Finca Esperanza, Chiapas, Mexico, at light, in a coffee plantation in a virgin forest, August 3, 1935 (A. Dampf).

Paratypes.—Two males on slides with holotype data but collected on March 12, 1938. One deposited in the writer's collection, the other in that of Dr. Alfons Dampf.

Remarks.—This species, named for Dr. Alfons Dampf, of the Escuela Nacional de Ciencias Biológicas, Mexico City, can be distinguished at once from all the other known *Chelicercas* by its two-segmented left cercus.

Subgenus *CHELICERCA*, sensu stricto

CHELICERCA (CHELICERCA) DAVISI (Ross), new combination

Anisembia (Chelicerca) davisi Ross, 1940b, p. 656, figs. 26–28.

Holotype.—Winged male, on slide, U.S.N.M. No. 53979.

Type data.—Collected in gardenias from near El Fortín, Veracruz, Mexico, in plant quarantine at Brownsville, Tex., January 16, 1937.

CHELICERCA (CHELICERCA) NODULOSA, new species

FIGURES 84, 87, 88

Male (on slide).—Head, antennae, foretibiae, and terminalia medium brown; prothorax pale straw yellow; pterothorax, wings, legs,

⁹ This is probably homologous to the isolated, sclerotic, heavily pigmented sclerite found in this position in *davisi* and *nodulosa*.

and abdomen light brown. Length 6.5 mm.; forewing length 4.2 mm., breadth 1.1 mm.

Head (fig. 84) with eyes very large, strongly inflated; interspace slightly narrower than an eye width; sides behind eyes short, slightly shorter than an eye length, straight, strongly convergent, abruptly rounded behind; caudal margin transverse, weakly arcuate. Mandibles moderate sized, sharply pointed, inner sides evenly emarginated. Antennae strongly pigmented throughout.

Wings moderately broad, light brown; hyaline stripes narrow, sharply defined. Three cross veins present between R_1 and R_{2+3} in forewing and four in this position in hindwing. Anal vein well defined basally in both wings, united by a cross vein to Cu_{1b} .

Terminalia (figs. 87, 88) similar to those of *davisi* with the following differences: Median cleft of tenth tergite broader and with differences in margins; 10 LP narrower, more strongly tapered apically; 10 RP broader, with apical claw not extending beyond outer margin of process. Process of hypandrium (HP) broader; with left apical angle produced as a prominent, thumblike nodule, which is densely echinulate.

Female (in alcohol).—Head, mesothorax, hindlegs, and abdomen reddish brown; antennae and prothorax light brown. Body length 8.5 mm. Head circular in outline, without dorsal pattern. Eighth sternite uniformly pigmented throughout. Ninth sternite with an obtuse, membranous, mediobasal angle similar to *texana* (Ross, 1940b, fig. 38), but more extensive.

Holotype and allotype.—Male and female, respectively, on slides, U.S.N.M. No. 56046.

Type data.—Collected at Matamoros, Mexico, in plant quarantine in a cargo of pineapples shipped from Isla, Veracruz, Mexico, June 15, 1940, by Inspectors Anderson, Parnell, and Reagan.

Paratype.—Topotypic female, deposited in the writer's collection.

Remarks.—*C. (C.) nodulosa* is closely related to *davisi* from the same state of Mexico. It may be separated by its much larger, inflated eyes, evenly emarginated mandibles, paler wings with cross veins, and particularly by the presence of the prominent, echinulate nodule of the left apical angle of the hypandrium process (HP).

CHELICERCA (CHELICERCA) WHEELERI (Melander), new combination

FIGURES 89-91

Olymtha wheeleri MELANDER, 1902, p. 17, fig. 1.

Anisembia wheeleri (Melander) KRAUSS, 1911, p. 70.—CHAMBERLIN, 1923, p. 346.—

DAVIS, 1940d, p. 532, figs. 15-18.

Huploembia wheeleri (Melander) ENDERLEIN, 1912, pp. 70, 109, fig. 41.

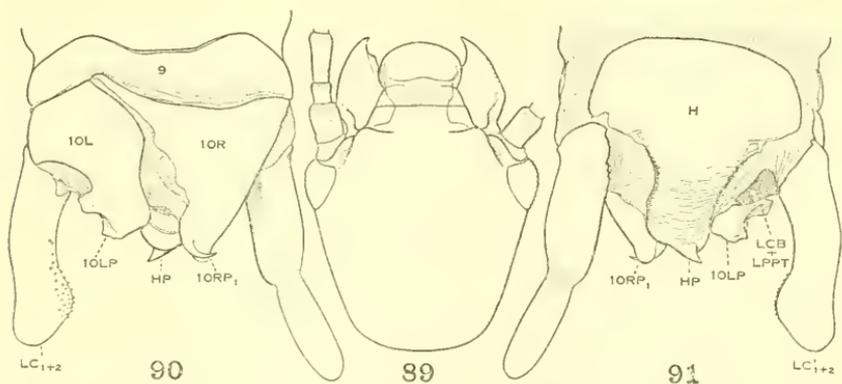
Anisembia (Chelicerca) wheeleri (Melander) ROSS, 1940b, p. 657, figs. 29, 30.

Holotype.—Apterous male, on slide, in Museum of Comparative Zoology (type No. 1638).

Type data.—Cuernavaca, Mexico, December 27, 1900 (W. M. Wheeler), collected while excavating a nest of *Leptogenys wheeleri* Forel.

This remarkable species is known only from the above type specimens. Since it was collected in the ground, it may be assumed that the species normally occurs under stones instead of in the bark of trees.

Previous descriptions (Melander; Davis) have been based on this specimen while preserved in alcohol. Since so many more details are visible in a properly cleared specimen the type has been treated in KOH and mounted on a slide. The writer is grateful to Prof. Nathan Banks for this privilege. The following brief redescription and the accompanying figures are based on the holotype mounted on a slide.



FIGURES 89-91.—*Chelicerca (Chelicerca) wheeleri* (Melander), holotype male (Mexico): 89, Head; 90, terminalia (dorsal); 91, terminalia (ventral). Explanation of symbols on p. 403.

Male (holotype, on slide).—Dark brown throughout, prothorax, legs, and terminalia somewhat darker, the head much darker; mandibles golden, apices mahogany brown. Length 8.75 mm. (after KOH treatment).

Head with outline as figured (fig. 89). Eyes small, facets without pigmented interspaces; occipital foramen equilaterally triangulate, sides slightly curved, anterior angle acute, slightly rounded; ventral bridge broad, as wide as foramen length; submentum nearly twice as wide as long, sides slightly curved, slightly sclerotized; mentum represented by a narrow sclerite, broadly divided medially; manibles without apical teeth, stout, left mandible with a flange behind apex which forms an obtuse tooth on inner mandibular margin, right mandible with inner margin evenly arcuate.

Thorax with mesothoracic and metathoracic scuta as in females of the order.¹⁰

Hind basitarsi with only a terminal sole-bladder; densely clothed with large plantar setae.

Terminalia nearly unicolorous, with structure as figured (figs. 90, 91). 10 LP strongly curved ventrad, yellowish distad; membrane of tenth tergal cleft "granular" in appearance medially, with only a faint thickening; an elongate sclerite, lying above hypandrium process (HP), is of undetermined homology, and may represent a terminal sclerotization of the ejaculation duct; 10 RP with a characteristic, yellowish "talon" crossing its rounded tip; HP sclerotized, without echinulations, with a marginal flange, apex produced as a conical point; left cercus (LC₁) with terminal lobe not distinctly submembranous; basal segment of right cercus with basal foramen complex, greatly produced ventrad, inner margin somewhat flattened and depressed basally.

C. wheeleri is not closely related to the other species of the subgenus *Chelicerca* seen by the writer (i. e., *davisi* and *nodulosa*). From the abundant distinctive features, the nature of the tip of 10 RP₁ and the apex of HP may be selected for the purpose of separating it from other species.

CHELICERCA (CHELICERCA) HEYMONSI (Enderlein), new combination

Oligotoma heymonsi ENDERLEIN, 1912, p. 114, figs. 74-76.

Anisembia (?) *heymonsi* (Enderlein) CHAMBERLIN, 1923, p. 346.

Anisembia heymonsi (Enderlein) DAVIS, 1940d, p. 532.

Anisembia (Chelicerca) heymonsi (Enderlein) ROSS, 1940b, p. 658, fig. 31.

Holotype.—Winged male in Berlin Zoologischen Museum.

Type data.—Sierra Mixteca (Oaxaca?), Mexico (C. A. Purpus).

Subgenus DACTYLOCERCA ROSS

Dactylocerca ROSS, 1940b, p. 659 (type: *Anisembia rubra* ROSS).

CHELICERCA (DACTYLOCERCA) RUBRA (ROSS), new combination

Anisembia (Dactylocerca) rubra ROSS, 1940b, p. 659, figs. 35-37.

Holotype.—Winged male, on slide (type No. 4931), and *allotype*, female, on slide (type No. 4932), California Academy of Sciences.

Type data.—Rosarito Beach, Baja California, Mexico, April 3-5, 1939 (Michener and Ross).

Distribution.—Northwestern Baja California, southern California, and southeastern Arizona. (See also p. 499.)

¹⁰ This appears to indicate that only apterous males may be expected in this species. As noted previously, when a species has both winged and wingless males [e. g., *Anisembia texana* (Melander)], the latter have rudimentary wing pads on the posterior angles of the scuta.

Family OLIGEMBIIDAE

Oligembiidae DAVIS, 1940e, p. 536; 1940f, p. 680; 1942, p. 116.

American Embioptera. The males with mandibles dentate apically; R_{4+5} forked in both wings, M and Cu_{1a} simple, all the above veins sub-obsolete, represented only by rows of macrotrichiae and intervenal hyaline stripes; tenth tergite not completely cleft to base (except in *Idioembia*); left cercus two-segmented, the basal segment without echinulations. Hind basitarsi with only one bladder.

Type genus.—*Oligembia* Davis.

Distribution.—Warm-temperate and tropical America.

Three genera are included in this family—*Oligembia* Davis, well known by virtue of its many species; the new genus *Idioembia*; and, tentatively, the poorly known genus *Diradius* Friederichs, based upon an inadequately described unique specimen.

KEY TO GENERA OF OLIGEMBIIDAE (MALES)

1. Left cercus-basipodite (LCB) not fused to left cercus; right process ($10 RP_1$) blunt distad..... *Diradius*
Left cercus-basipodite fused to basal segment of left cercus; right process sharply pointed distad..... 2
2. Right tergal process separated at base from tenth tergite by a clearly defined, complete, transverse suture; tenth tergite not longitudinally cleft. *Oligembia*
Right tergal process continuous with tenth tergite, without a complete transverse basal suture; tenth tergite narrowly, longitudinally cleft. *Idioembia*

IDIOEMBIA, new genus

Males.—Characters similar to those of the following genus, *Oligembia*, but with the tenth tergite completely cleft to base, the suture very narrow, extending diagonally on right side of tergite. Right tergal process ($10 RP_1$) continuous with right hemitergite ($10 R$), without a complete, basal, transverse suture as in *Oligembia*.

Female.—Unknown.

Genotype.—*Oligembia banksi* Davis, by present designation.

The definite longitudinal suture of the tenth tergite of this genus is occasionally represented in the apparently more highly specialized genus *Oligembia* by a slight depression or groove in a similar position. The absence of the complete transverse basal suture of the right tergal process is the most useful distinguishing character.

IDIOEMBIA BANKSI (Davis), new combination

FIGURES 92-94

Oligembia banksi Davis, 1939b, p. 221, figs. 13-20.

Holotype.—Male, Museum of Comparative Zoology (No. 23721).

Type data.—Villa Rica, Paraguay (F. Shade).

sides behind eyes slightly more than one eye length long, gradually convergent; caudal margin abruptly, evenly rounded laterad, feebly arcuate medially. Occipital foramen elongate, rounded anteriorly; gular bridge as wide as submentum. Submentum small, narrow behind; sides divergent, arcuate; anterior margin transverse, anterior angles rounded.

Wings: Fork of Rs well within basal half in forewing, at basal third in hindwing; fork of R_{4+5} within basal half in forewing, at basal third in hind. About six $C-R_1$ cross veins and six R_1-R_{2+3} cross veins in forewing; cross veins absent elsewhere. Hyaline stripes narrow, sharply defined.

Terminalia (figs. 96, 97) with basal projection of tenth tergite acute, extending to base of eighth tergite; tenth tergite diagonally divided on right side to form two very unequal hemitergites (10 L and 10 R), the cleft narrow, irregular, somewhat sclerotized distad; left tergal process (10 LP) broad, inner margin produced caudad as a stout, feebly curved talon, outer margin straight, apical margin angulate; major right tergal process (10 RP_1) with outer side continuous with 10 R, inner base separated by a circular membranous area, inner apical angle sclerotic and sharply produced. Hypandrium (H) quadrate, sides rounded, gradually, broadly produced caudad; this process (HP) truncate apically, left margin sclerotic. Left paraproct (LPPT) subobsolete, represented by sclerotic margin of HP and a submembranous apical sclerotization. Left cercus-basipodite (LCB) continuous with left cercus, ventrally produced on margin as two irregular projections; developed mesad as a lobe, which is gradually narrowed dorsad and bifurcate. Left cercus with basal segment (LC_1) dark, cylindrical basally but gradually expanded distad and greatly produced inward as a pointed lobe almost as long as LC_1 . Terminal segment of left cercus elongate, cylindrical. Basal segment of right cercus, gradually broadened basad; foramen irregular; terminal segment similar to that of left cercus.

Female.—Unknown.

Holotype.—Male, on slide, U. S. N. M. No. 56582.

Type data.—Nova Teutonia, Santa Catharina, Brazil (F. Plaumann).

Paratypes.—Four males with type data, deposited in the California Academy of Sciences, the Museum of Comparative Zoology, and the writer's collection.

Remarks.—This distinct species is readily recognized by its greatly produced left cercus. The circular membranous area at the base of the right tergal process suggests that the completely severed process of *Oligembia* is attained by an extension of this area to the right lateral margin.

IDIOEMBIA ARGENTINA (Navás)

Embia (Rhagadochir) argentina NAVÁS, 1918, p. 104, fig. 4.*

Embia argentina NAVÁS, 1919, p. 25; 1923a, p. 197**; 1924a, p. 10***; 1930, p. 72 (records); 1933, p. 97.****

Pararhagadochir argentina (Navás) DAVIS, 1940a, p. 186, figs. 67-75 (misidentifications).

Holotype ?.—Male, Navás collection.

Type data.—Santa Fé, Argentina, January 6, 1916 (P. Mühn, S. J.).

Additional records.—Punta Lara, near La Plata, Argentina, October 5, 1914 (La Plata Mus.)*; Prov. de Buenos Aires, October 13, 1915 (C. Bruch) (La Plata Mus.)*; Chaco de Santa Fé, Las Garzas, Bords du Río Las Garzas, 25 km. west of Ocampo, Argentina, 1903 (E. R. Wagner) (Paris Mus.)***; Gran Chaco, Bords du Río Tapenaga, Colonie Florencia, Argentina, 1930 (E. R. Wagner) (Paris Mus.)***; Alta Gracia, Córdoba, Argentina, December 25, 1921 and February 3, 1922, at light (Bruch)**; Buenos Aires, Argentina, March 13, 1930.****

Navás had specimens from three Argentina localities before him at the time of the original description of this species. (See above records.) Those from Punta Lara and Buenos Aires were apparently returned to the La Plata Museum; the other, from Santa Fé, was a part of the Navás collection. Although Davis (*l. c.*) has arbitrarily regarded the specimen from Punta Lara as the holotype, this does not appear to be the case. Dr. Biraben, of the La Plata Museum, has informed me, in a letter, that no specimen labeled as the type of *argentina* is deposited there; furthermore, it is evident that Navás's figures (fig. 4), with which his description agrees, were made from a specimen in his own collection (see "Col. m.", in the caption). No doubt this was the Santa Fé specimen. The writer thus feels it safe to conclude that the Santa Fé specimen should be regarded as the holotype.

Davis (*l. c.*) studied two males in the Paris Museum from Chaco de Santa Fé, Argentina, identified as *argentina* by Navás (1924a), and on the basis of these specimens he assigned the species to the genus *Pararhagadochir*. However, a careful examination of Navás's original description and figures indicates that these specimens were incorrectly identified by Navás and that *argentina* is in reality a member of the genus *Idioembia* and is, perhaps, closely related to the *I. producta* described above. The reasons for the present generic assignment are as follows:

1. Navás's figures and description of the wings of *argentina* correspond very well to *I. producta* and not to any known species of *Pararhagadochir*. His figures of the wings of *trachelia* and *birabeni*,

in the same paper, show that he was careful in his delineation of the cross veins characteristic of species of *Pararhagadochir* and thus probably would have indicated such had they been present in his type.

2. His figures and descriptions of LC_1 ("cerco sinistro articulo primo apice in lobum internum grandem longumque subcylindricum dilatato") and of $10 RP_1$ ("dextro in dentem longum triangularem styli-formem, apice bidentatum producto") are likewise descriptive of *pro-ducta*. The fact that no echinulations were mentioned as being on the lobe of LC_1 is also significant.

3. The measurements of the described specimen (length 5 mm., forewing length 4.8 mm., hindwing 4.0 mm.) are much less than those of the specimens of *Pararhagadochir* that have been erroneously assigned to the species.

Any other determinations of this species by Navás, even those of specimens at hand at the time of the description, are not to be trusted, as his specimens were uncleaned and thus did not fully exhibit the characters. There is a great need for a careful redescription of the holotype in order to confirm the present generic assignment and to determine its relationship to the other species of *Idioembia*.

Genus OLIGEMBIA Davis

Oligembia DAVIS, 1939b, p. 217.—ROSS, 1940b, p. 636.—DAVIS, 1942, p. 117.

At the time of the description of this genus only two component species, *hubbardi* (Hagen) and *oligotomoides* (Enderlein), were previously known, both of which had been erroneously placed generically. Davis's contributions (1939b, 1942) and that of the writer (1940b) have brought to light four additional new species. In the material now at hand 17 more have been discovered, bringing the total number of species to 23 and thus making *Oligembia* the largest American genus of the order, with potentialities of a still much greater increase in size.

A study of this lot of species, of which only three have not been seen by the writer (*oligotomoides*, *intricata*, and *rossi*), makes possible a more substantial evaluation of generic characters. The genus is accordingly redescribed as follows:

Males.—Alate, size generally small, usually pale in color. Head with eyes generally large and composed of large facets; mandibles small, with three apical dentations on left mandible and two on the right, apices often curved ventrad; mentum obsolete; submentum sclerotic, prominent, shieldlike, variable in shape. Wings usually pale; R_{4+5} forked; this, M, and Cu_{1a} represented only by rows of macrotrichiae; hyaline stripes broad. Hind basitarsus with only one sole-bladder; this, the terminal one, is very small, subobsolete. Terminalia

with tenth tergite (10) generally extensively produced forward beneath ninth tergite (9), uncleft basally, forming an uninterrupted tergal plate; left tergal process (10 LP) continuous with tergite, broad, complex apically; right process (10 RP₁) large, cultriform, separated from tergite at base by a thin, complete, transverse suture; bearing a short, narrow appendix (10 RP₂) at inner base. Right paraproct obsolete. Left paraproct (LPPT) present, fused along inner side with side of process of ninth sternite (HP). Left cercus-basipodite (LCB) well developed, complex, often sclerotic, bearing one or two inner lobes, one of which is usually minutely bifid terminally. Basal segment of left cercus nonechinulate, fused basally to LCB, sometimes deeply excised on inner side and apically clavate, or cylindrical. Right cercus with basal segment usually cylindrical but at times emarginated and sclerotic on inner side.

Females.—Very few species having female specimens associated with males are available in collections. All females so far known have only one hind basitarsal sole-bladder. Although it is very doubtful whether any facts of systematic importance can be gained by a study of the females, it is possible that their identification may be possible on the basis of color, size, head form, chaetotaxy of hind-tarsus, and pigmentation of the eighth and ninth sternites of the abdomen.

Genotype.—*Oligotoma hubbardi* Hagen, by original designation.

Distribution.—Warm-temperate and tropical America.

Habitat.—In bark of trees, at bases of epiphytes and saprophytes growing on trees. See notes concerning *melanura*, *lobata*, and *vandykei*.

Remarks.—The species of *Oligembia* compose a very natural and distinct genus, but they must often be separated by detailed characters of the terminalia which are difficult to clearly express in keys. The student will find such evidence as geographic distribution, combined with a comparison of the male terminalia with the published figures of each species, the simplest means of making determinations. The few and scattered records of species indicate that more thorough collecting should bring to light many additional new species.

The present study of the greatly increased number of known species of *Oligembia* reveals that at least two major groups of species are recognizable. These are at this time defined as subgenera. One species, however, *Oligembia rossi* Davis, of Panama, appears to possess such unusual characters that it is only tentatively assigned to the first subgenus on the basis of the left cercus-basipodite structure. Its tergal processes are unlike any other known species of the genus. *Oligembia oligotomoides* (Enderlein) appears to be a member of the

second subgenus, but it is so incompletely described, and without a definite type locality, that it cannot be distinguished without a re-description of the type.

Subgenus OLIGEMBIA, *sensu stricto*

Males.—Tips of mandibles usually curved ventrad; teeth small, blunt, inconspicuous. Terminalia with tenth tergite apodeme often not strongly produced forward beneath ninth tergite, usually broadly rounded; left tergal process (10 LP) elongate, apex stout, complex, inner margin (except in *melanura*) not developed as a "talon"; right tergal process (10 RP₁) with outer margin nearly straight, evenly slanted from base to apex; left paraproct (LPPT) narrow, greatly produced caudad, tip usually attaining that of 10 RP₁ in length; left cercus-basipodite (LCB) with only a single inner lobe, variable in development, generally with a pair of terminal "claws," occasionally simple; basal segment of left cercus (LC₁) seldom clavate, that of right cercus (RC₁) never lobed.

Type.—*Oligotoma hubbardi* Hagen.

Distribution.—That of the genus *Oligembia*.

This subgenus can be separated from the other subgenera principally on the basis of the great length of the left paraproct, the structure of the left tergal process, and the structure of the left cercus-basipodite. A great variety of structure in terminalia is exhibited by the 10 included species. One of these, *armata*, is so strikingly extreme in characters that it warrants a position in a separate group from the others. The subgenus is accordingly divided into 2 species groups in the following key:

KEY TO GROUPS AND SPECIES OF OLIGEMBIA (*s. str.*) (MALES)

1. Right tergal process (10 RP₁) with a prominent, domelike, densely echinulate nodule at inner base (Group II)..... *armata*
Right tergal process not as above (Group I)..... 2
2. Left tergal process (10 LP) with a narrow, longitudinal cleft, extending to within basal half of process; inner portion sclerotic, outer portion submembranous; Panama..... *rossi*
Left tergal process not as above, outer portion nearly as sclerotic as inner... 3
3. Color pale, usually tan; head light ferruginous..... 4
Color dark brown or blackish; head nearly black..... 7
4. Left cercus-basipodite (LCB) with inner lobe free, projecting mesad..... 5
Left cercus basipodite with inner lobe appressed to inner side of left cercus or obsolete..... 6
5. Left tergal process with a subapical notch on left side (fig. 101):
"claws" of left cercus-basipodite directed inward and upward; Virgin Islands..... *brevicauda*
Left tergal process with left side simple, unnotched (fig. 99); "claws" of LCB directed upward and curved back toward left cercus; Florida.... *hubbardi*

6. Head elongate, narrow, distance from eye to posterior margin more than one eye length; Central America----- **buscki**
 Head broad, circular, distance from eye to posterior margin less than one eye length; Peru----- **peruviana**
7. LCB with inner lobe simple, sclerotic, sharply pointed, caudally curved; 10 LP with a stout inner "talon" abruptly curved transversely across apex; Texas----- **melanura**
 LCB with inner lobe complex, usually stout with terminal clawlike processes; 10 LP not as above----- 8
8. 10 RP₁ with inner basal angle produced upward as a small, but prominent, non-echinulate lobe; 10 LP with inner apical angle strongly lobed; Dominican Republic----- **darlingtoni**
 10 RP₁ and 10 LP not as above----- 9
9. Pronotum light reddish brown, much paler than head and pterothorax; southern Brazil----- **bicolor**
 Pronotum, head, and pterothorax unicolorous dark brown; southern Brazil----- **unicolor**

GROUP I

OLIGEMBIA (OLIGEMBIA) HUBBARDI (Hagen)

FIGURES 98-100

Oligotoma hubbardi HAGEN, 1885, p. 142.—SCHWARZ, 1888, p. 94 (biology).—KRAUSS, 1911, p. 44.—ENDERLEIN, 1912, p. 91.

Embia (Oligotoma) hubbardi (Hagen) MELANDER, 1902, p. 21.

Oligembia hubbardi (Hagen) DAVIS, 1939b, p. 218, figs. 1-5.—ROSS, 1940b, p. 637, figs. 5-7.

Holotype.—Male, on slide, deposited in Museum of Comparative Zoology (type No. 153).

Type data.—Enterprise, Fla., May 24 (H. G. Hubbard).

Davis plesiotype.—Male, on slide, Royal Palm Park, Fla., March (W. S. Blatchley) (MCZ).

Ross plesiotype.—Male, on slide, St. Petersburg, Fla. (USNM).

Additional record.—Paradise Key, Fla., March 4, 1919 (H. S. Barber) (USNM), males and immature specimens.

Remarks.—Recently, through the kindness of Prof. Nathan Banks, the writer was permitted to treat Hagen's fragmentary type in KOH and to mount the parts in balsam for greater permanency and ease of examination. The accompanying figures of the head and of the terminalia are made from the type. Recent redescriptions of the species (Davis; Ross) appear to have been made from correctly identified specimens.

The terminalia, as noted by Davis, are in very poor condition, but the all-important processes (10 LP, 10 RP₁, and LCB) are present. In the course of preparing the terminalia it was noted that the terminal tarsal segment of some insect, probably the type itself, was lodged in the tenth tergal cleft with its claws overlapping the tip of

10 RP₁. This explains the statements made by Davis (1939b) concerning the presence of clawlike structures on this process (also see Ross, 1940b).

OLIGEMBIA (OLIGEMBIA) BREVICAUDA Ross

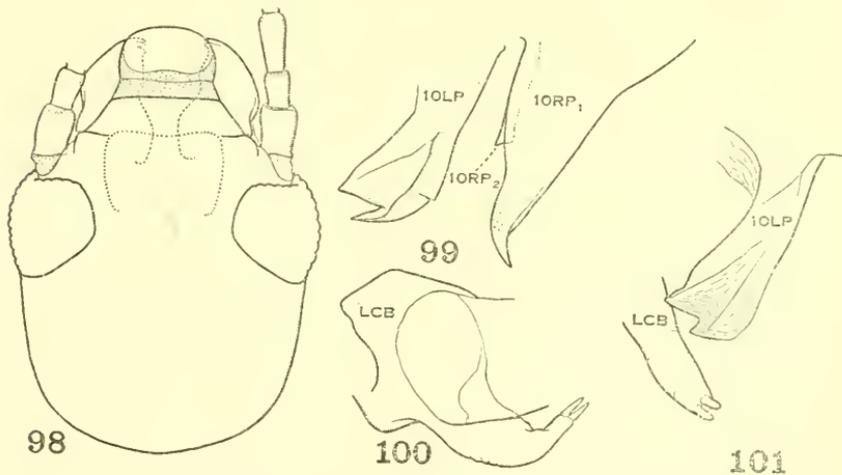
FIGURE 101

Oligembia brevicauda Ross, 1940b, p. 640, figs. 1, 8–10.

Holotype.—Male, U. S. N. M. No. 53980.

Type data.—St. Croix, Virgin Islands, June 20, 1939 (H. A. Beatty).

Remarks.—Recently an additional male specimen of this species was studied by the writer in the United States National Museum collection. It is labeled “under rubbish,” Lower Love, St. Croix, Virgin Islands, August 1940 (H. A. Beatty). This specimen reveals a noteworthy intraspecific variation and the fact that 10 LP of the holotype specimen had been broken off midway in its length.



FIGURES 98–100.—*Oligembia hubbardi* (Hagen), holotype male (Florida): 98, Head; 99, processes of tenth tergite; 100, left cercus-basipodite (subventral aspect).

FIGURE 101.—*Oligembia brevicauda* Ross (Virgin Islands): Left tergal process and process of left cercus-basipodite. Explanation of symbols on p. 403.

The left tergal process, 10 LP (fig. 101), is not short as originally described but is actually similar to that of *hubbardi*. The mesal process of the left cercus basipodite terminates as a pair of stout “claws,” also as in *hubbardi*, whereas this process tapers to an irregular point in the holotype.

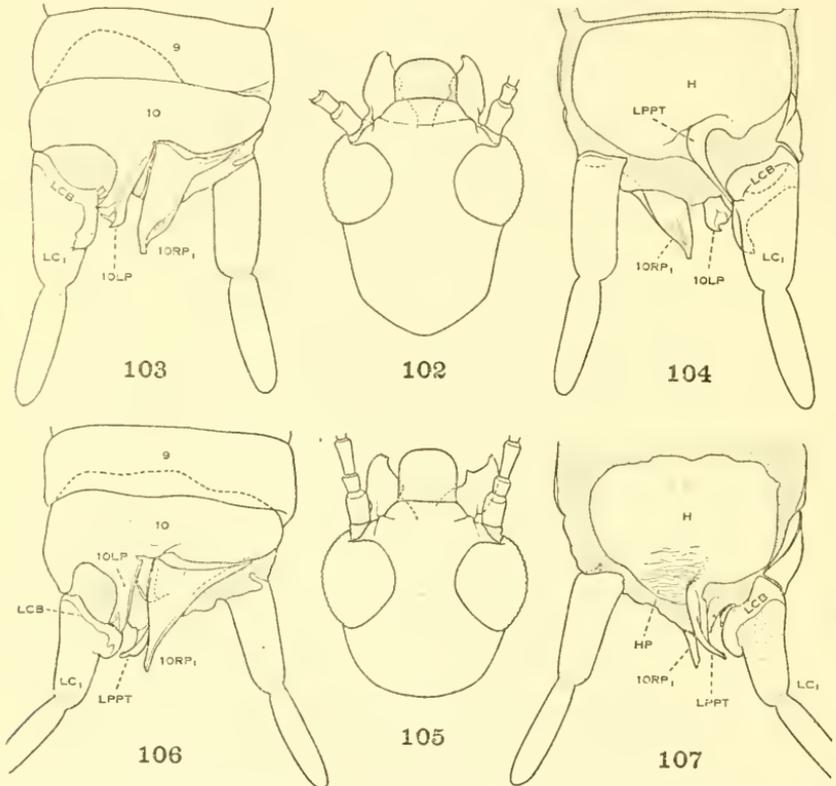
These findings give stronger evidence of the close relationship of *brevicauda* and *hubbardi*, although the two species are separable by means of numerous characters.

OLIGEMBIA (OLIGEMBIA) BUSCKI, new species

FIGURES 102-104

Male (on slide).—Head and antennae medium brown; processes of terminalia and mandibles straw yellow; body, legs, and wings light tan. Length 6 mm.; forewing length 4 mm., breadth 1 mm.

Head (fig. 102) with eyes and facets very large, inflated, separated



FIGURES 102-104.—*Oligembia buscki*, new species, holotype male (Panama): 102, Head; 103, terminalia (dorsal); 104, terminalia (ventral).

FIGURES 105-107.—*Oligembia peruviana*, new species, holotype male (Peru): 105, Head; 106, terminalia (dorsal); 107, terminalia (ventral). Explanation of symbols on p. 403.

by interspace equal to one eye width; sides behind eyes equal in length to the eyes, nearly straight, gradually convergent; caudal margin abruptly arcuate medially. Mandibles with apical teeth small, inconspicuous, curved downward, inner medial tooth of left mandible obtuse, that of right mandible rounded.

Wings pale, with hyaline lines, very broad, with marginal fringe long, otherwise without noteworthy specific features.

Terminalia (figs. 103, 104) with basal projection of tenth tergite short, rounded, extending halfway beneath ninth tergite, strongly transverse. Left tergal process (10 LP) sclerotic, parallel-sided, apically dilated; apical margin not cleft, with only a slight projection near inner angle. Right tergal process (10 RP₁) broad, not strongly convergent at basal third; apical third abruptly convergent, outer side rugose; apex with a small truncate projection curving outward; inner basal process (10 RP₂) with a long, narrow, sclerotic rod extending more than half length of 10 RP₁. Hypandrium (H) and process (HP) very weakly pigmented. Left paraproct (LPPT) narrow, shorter than 10 LP, hooked basally. Left cercus-basipodite (LCB) strongly sclerotized; inner projection curving caudad, lying close along inner side of basal segment of left cercus to the apical third, apex bearing a single spine. Basal segment of left cercus (LC₁) simple, unlobed; it, as well as other parts of left cerci, pale, unpigmented. Right cercus with a small, outer, half-ring cercus-basipodite.

Female.—Unknown.

Holotype.—Male, on slide, U.S.N.M. No. 56052.

Type data.—Cabima, Panama, May 21, 1911 (August Busck).

Additional specimen examined.—One male, at light, Cacao, Trece Aguas, Alta Vera Paz, Guatemala, March 30, 1906 (Schwarz and Barber) (USNM).

The additional specimen may prove to represent a distinct species. The head appears to be broader (somewhat crushed) it has two claws at tip of LCB instead of one; 10 LP has a much simpler appearing apex, much like that of *hubbardi*. The last-mentioned difference may be due to the angle of view as this process is somewhat curved downward in the holotype specimen.

The species is named after August Busck, of the United States Bureau of Entomology and Plant Quarantine.

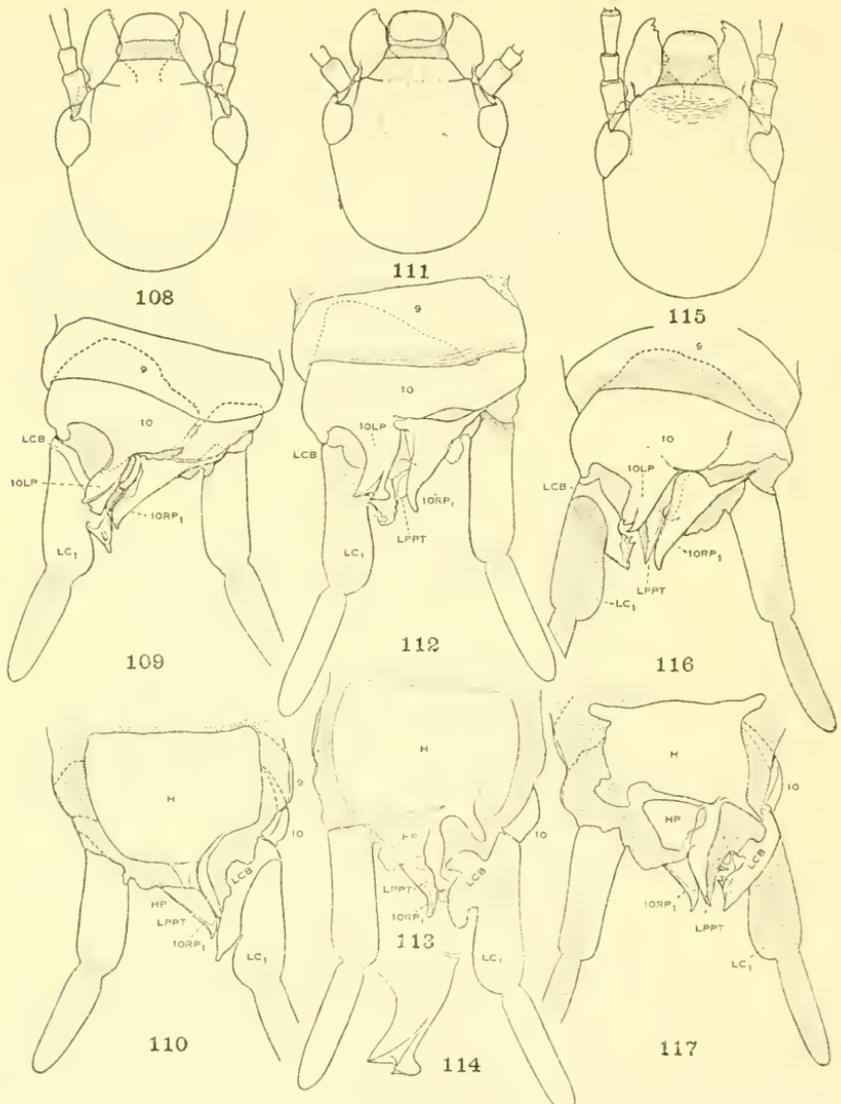
OLIGEMBIA (OLIGEMBIA) PERUVIANA, new species

FIGURES 105-107

Male.—Color (on slide): Body, legs, and wings very pale straw yellow; head and antennae light brown, mandibles and submentum reddish brown. Length 5.5 mm.; forewing length 3.9 mm., breadth 1 mm.

Head (fig. 105) with eyes very large, inflated, facets prominent; eyes separated by space less than an eye width wide. Sides behind eyes very short, continuous with the evenly arcuate caudal margin. Left mandible with apical dentations blunt, curved ventrad; dentations of right mandible blunt but not curved ventrad.

Wings very pale, R_1 paralleling costal margin and nearly attaining it apically; radial sector forked just within basal half of fore-



FIGURES 108-110.—*Oligembia bicolor*, new species, holotype male (southern Brazil): 108, Head; 109, terminalia (dorsal); 110, terminalia (ventral).

FIGURES 111-114.—*Oligembia darlingtoni*, new species, holotype male (Dominican Republic): 111, Head; 112, terminalia (dorsal); 113, terminalia (ventral); 114, detail of 10 LP.

FIGURES 115-117.—*Oligembia unicolor*, new species, holotype male (southern Brazil): 115, Head; 116, terminalia (dorsal); 117, terminalia (ventral). Explanation of symbols on p. 403.

wing, at basal third in hindwing; R_{4+5} forked at basal third in both wings; hyaline lines broadest in forepart of wing, not clearly defined.

Terminalia (figs. 106, 107) with tenth tergite extending basally only one-third beneath ninth tergite; not acutely produced basally. Left tergal process (10 LP) narrow, parallel-sided, nearly straight, only slightly projected to the left; apex scarcely expanded, rather simple, thickened, acutely, symmetrically cleft dorsally, subtended by irregular broad lobe. Right tergal process (10 RP_1) broad basally, abruptly narrowed apically, thence parallel-sided and sclerotic; tip acutely pointed. Inner flaplike process (10 RP_2) lying partially beneath base of 10 RP_1 , with a sclerotic rod submedially. Process of hypandrium (HP) and left paraproct (LPPT) fused, the latter developed caudad as a long dorsally curving process equal in length to 10 RP_1 . Left cercus basipodite (LCB) an irregular sclerotic ring, produced inward along base of left cercus as a blunt lobe, not bearing processes or clawlike hooks. Right cercus-basipodite present as a narrow, incomplete sclerotic ring on outer side of base of right cercus. Cerci pale, membranous.

Female.—No specimens available.

Holotype.—Male, on slide, U.S.N.M. No. 56053.

Type data.—Iquitos, Peru, March-April 1931 (R. C. Shaanon).

Remarks.—An additional specimen in the United States National Museum, badly damaged, also with the above data, is probably this species. It differs from the holotype in having 10 LP formed much as in *hubbardi* and *brevicauda* (that of the holotype may be broken) but with a stouter inner projection on its apical margin; 10 RP_1 has a sinuous outer margin and is more fleshy (this may be anomalous); LCB has a well-developed process suggestive of *buscki* with two "claws" (the condition in the holotype may be anomalous). In spite of this variation, the species is recognizable by its short, circular head with large eyes.

OLIGEMBIA (OLIGEMBIA) DARLINGTONI, new species

FIGURES 111-114

Male (holotype on slide).—Head dark brown, becoming more golden anteriorly; antennae brown; mandibles golden brown; submentum reddish brown; prothorax pale, tan; pterothorax, legs, wings, and abdomen light brown; terminalia largely dark brown, cerci pale. Length 6.6 mm.; forewing length 5.0 mm., breadth 1.25 mm.

Head (fig. 111) with form as illustrated; eyes with interspaces of facets slightly pigmented; occipital foramen rounded anteriorly; submentum outline indicated by dotted line in figure.

Body and legs with all hairs noticeably long. Wings as throughout the genus but with marginal fringe exceptionally long, especially toward base.

Terminalia (figs. 112-114) with basal apodeme of tenth tergite (10) acute, extended on right side beneath almost entire ninth tergite (9); left tergal process (10 LP) (fig. 114) broadly attached basally, very gradually narrowed distad, somewhat parallel-sided, inner apical angle abruptly expanded, acutely rounded, deeply, divergently furrowed dorsally, apex of process complex and thick (dorsoventrally); right tergal process (10 RP₁) with a prominent, vertical, naked nodule at inner basal angle, surface of 10 RP₂ sparsely echinulate, entire process somewhat swollen and (before preparation) strongly curved ventrad, apex sclerotic, golden, curled downward at tip, pointed. Hypandrium (H) weakly sclerotized, its process (HP) especially so, nearly membranous across base, subobsolete; left apical angle stronger, with a fingerlike projection pointed toward LCB. LPPT fused to H basally, elongate, greatly twisted distad. Left cercus-basipodite (LCB) sclerotic, with a single wrinkled, fingerlike, inner projection pointed dorsad, this terminating in a pair of claws; ventral margin with an acute, sclerotic lobe (probably homologous to that of *Dilobocerca*) covered with minute echinulations. Basal segment of left cercus (LC₁) submembranous except along inner margin, apex swollen; basal segment of right cercus cylindrical, well sclerotized, basal foramen slightly irregular and more heavily sclerotized; terminal segments of both cerci normal, similar. Both cerci are longer than those of most species.

Female.—Unknown.

Holotype.—Male, on slide, deposited in the Museum of Comparative Zoology, from Valle Nueva, near Constanza, Dominican Republic, 7,000 feet, August 1938 (P. J. Darlington) (MCZ).

Remarks.—This species, which can be separated at once from all known species by the peculiar shape of the left tergal process (10 LP), is named for the collector.

OLIGEMBIA (OLIGEMBIA) BICOLOR, new species

FIGURES 108-110

Male.—Color (in alcohol): Head black; pterothorax, foretibiae, mid and hind femora, and abdomen mahogany brown; prothorax and remainder of forelegs yellowish orange; basal half of antennae, midtibiae and hindtibiae, tarsi, and terminal segments of cerci straw yellow. Length 5.1 mm.; forewing length 3.0 mm., breadth 0.9 mm.

Head (fig. 108) circular, almost as broad as long; eyes small, separ-

ated by an interspace two and one-half eye widths wide; sides slightly arcuate and gradually convergent, posterior margin evenly rounded; submentum very large, dark, sides arcuate, abruptly so mesad, anterior margin broader than posterior, shallowly incurved. Mandibles with the basal tooth, of the three apical dentations, of the right mandible, larger; left mandible with the two apical teeth close together; both mandibles with medial angles rounded, strongly constricted behind middle.

Wings without specific peculiarities; fringe as in *darlingtoni*.

Terminalia (figs. 109, 110) with tenth tergite (10) very short, transverse; basal projection short, broadly rounded, extending just beyond middle of 9, reduced on right side and notched to right of middle. Left process (10 LP) constricted basad, expanded distad, outer side arcuate; apical margin shallowly, broadly emarginated; dorsal surface with a fine, diagonal carina extending from outer apical angle toward base of inner margin. Right process (10 RP₁) reduced, inner margin membranous, apex curved caudad and with a minute bulbous tip. Secondary process (10RP₂) dark, sclerotic. Hypandrium (H) pigmented throughout; its process (HP) small, strongly narrowed caudad, semidetached basally. Left paraproct (LPPT) fused on inner basal side to HP, very narrow, elongate, tip almost attaining that of 10 RP₁. Left cercus-basipodite (LCB) a dark sclerotic ring fused to LC₁, with two projections in outline of ventral margin; produced mesocaudad as a conical lobe. Basal segment of left cercus (LC₁) robust, immediately swollen behind LCB on inner side. Basal segment of right cercus cylindrical, not apically swollen, margin of foramen irregular. Terminal segments of both cerci similar, tapered distally, almost unpigmented.

Female.—Unknown.

Holotype.—Male, on slide, U.S.N.M. No. 56584.

Type data.—Nova Teutonia, Santa Catharina, Brazil (F. Plau-mann).

Paratypes.—Several males with above data deposited in the California Academy of Sciences, the Museum of Comparative Zoology, and the writer's collection.

OLIGEMBIA (OLIGEMBIA) UNICOLOR, new species

FIGURES 115-117

Male (in alcohol).—Mahogany brown throughout, abdomen somewhat lighter, head darker; antennae with two basal segments brown, six succeeding segments light yellow, remainder medium brown; cerci with terminal segments pale. Length 5.0 mm.; forewing length 3.2 mm., breadth 0.9 mm.

Head (fig. 115) elongate, narrow; eyes rather small, slightly inflated, facets large and outlined by pigmented interspaces; eye interspace equal to two and one-half eye widths; sides behind eyes two eye lengths long, nearly straight, scarcely convergent caudad; posterior margin broadly rounded; frontal region transversely rugose; occipital foramen small, narrowly rounded anteriorly. Submentum small, quadrate; sides slightly arcuate, gradually divergent from base; anterior angles rounded; anterior margin feebly arcuate. Mandibles with very broad bases, strongly narrowed distad: apical teeth short, broad, well defined; medial angles very sharp, prominent; inner margins of base greatly developed mesad, rounded.

Wings without notable features except hyaline stripes in hindwing are very broad and diffused, much more so than in forewing.

Terminalia (figs. 116, 117) with tenth tergite (10) transverse; basal projection broadly rounded, extending only halfway beneath ninth tergite; left tergal process (10 LP) very broad basally, gradually narrowed but still broad, distad, inner "talon" very feeble and short, outer portion angulate on apical margin; major right process (10 RP₁) with inner basal angle developed as a smooth broad dome, extreme apex evenly curved outward. Hypandrium (H) quadrate, each corner produced as a narrow, truncate projection; process (HP) separated from H by a narrow, transverse slit, broad basad, gradually narrowed and losing pigment distad. Left paraproct (LPPT) fused to H at base, very narrow; apex attaining that of 10 RP₁, very strongly acuminate. Left cercus-basipodite (LCB) a heavily sclerotized ring; inner projection sclerotic, with a dorsal pair of short serrations. Basal segment of left cercus (LC₁) slightly expanded distad, entirely unpigmented. Basal segment of right cercus cylindrical, slightly broadened basad, foramen with angular dorsal and ventral projections on margin; outer apical angle membranous. Terminal segments of both cerci entirely unpigmented.

Female.—Unknown.

Holotype.—Male, on slide, U.S.N.M. No. 56583.

Type data.—Nova Teutonia, Santa Catharina, Brazil (F. Plau-mann).

Paratypes.—Several males with above data deposited in the California Academy of Sciences, the Museum of Comparative Zoology, and the writer's collection.

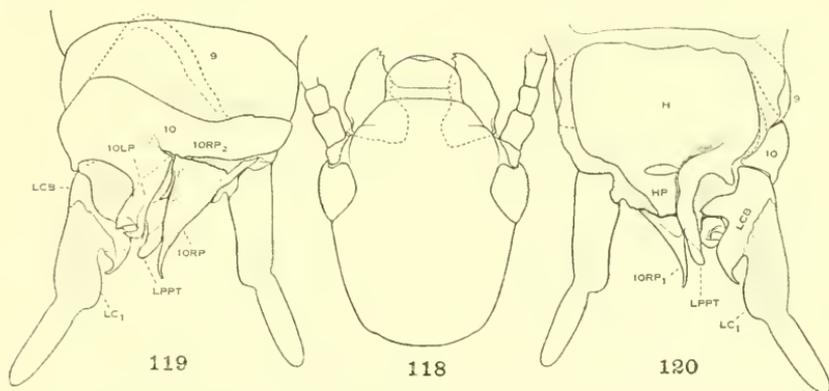
OLIGEMBA (OLIGEMBA) MELANURA, new species

FIGURES 118-120

Male.—Color (in alcohol): Sclerites very dark chocolate brown; intersclerotol membranes reddish brown. Head with clypeal region,

mandibles, and submentum reddish brown; antennae with basal two segments black, segments 3 and 4 yellowish brown, segments 5 and 6 darker, remainder dark brown. Abdominal terminalia with tenth tergite nearly black; tips of processes amber yellow.¹¹ Body length 5 mm.; forewing length 3.5 mm., breadth 0.8 mm.

Head (fig. 118) elongate; eyes rather small, slightly inflated, facets outlined by pigmented interspaces; distance between eyes equal to three eye widths; sides behind eyes two eye lengths long, slightly curved, gradually convergent; posterior margin arcuate. Occipital foramen as long as wide, evenly rounded anteriorly. Gular bridge extensive, one and one-half submentum lengths wide. Submentum quadrate, somewhat narrowed anteriorly; sides unevenly arcuate, corners rounded; anterior margin shallowly emarginated. Mandibles slightly curved ventrad at tips; apical teeth small.



FIGURES 118-120.—*Oligembia melanura*, new species, holotype male (Texas): 118, Head; 119, terminalia (dorsal); 120, terminalia (ventral). Explanation of symbols on p. 403.

Wings dark, interveinal hyaline stripes sharply defined. R_1 united at apex by a cross vein to R_{2+3} ; bordered throughout its length by reddish, granular lines. R_{2+3} represented by a pigmented vein; forked at basal third in forewing, at the basal fourth in hind; R_{4+5} forked medially.

Terminalia (figs. 119, 120) with tenth tergite (10) very dark, acutely angulate basally, produced forward beneath apex of eighth tergite; left process (10 LP) well developed, inner margin sinuous; apex deeply excised with a sharp left apical projection and a stout, irregular hook on right side, abruptly curved toward left; right process (10 RP_1) with inner margin nearly straight, outer margin gradually slanted mesad forming a very acute, sclerotic sharp point apically

¹¹ Some of the paratypes are entirely dark brown, with no part of the body or its appendages otherwise pigmented.

which curves slightly outward and ventrad at extreme tip; a small, narrow, subventral, inner process (10 RP₂) extends nearly halfway down the inner side of 10 RP₁. Ninth sternite (H) well pigmented, transverse; process (HP) narrow, truncate apically, narrowly united to H at outer third, separated from H mesad by a narrow, transverse membranous area. Left paraproct (LPPT) prominent, fused along entire inner side with H and HP; outer side produced at base as a narrow, fingerlike process projecting laterocaudad; apex produced caudad and nearly attaining tip of 10 RP₁. Left cercus-basipodite (LCB) strongly developed, more broadly sclerotic beneath, produced mesad as a broad, acute sclerite, and mesocaudad as a broad lobe, which is abruptly acuminate and sclerotic at apex—this tip minutely truncate and nonfurcate. Right cercus-basipodite obsolete. Left cercus (LC₁) membranous except on inner apical third, constricted basally; terminal segment cylindrical, similar to that of right cercus. Right cercus with basal segment gradually expanded toward base; basal foramen biemarginated dorsally, broadly and acutely produced ventrally.

Female (in alcohol).—Pigmented areas reddish brown on a golden yellow integument; head more reddish; tip of abdomen darker brown, venter yellowish. Length 6.5 mm.

Head relatively small, subcircular, characteristic basal pattern present; occipital foramen longer than broad, evenly arcuate anteriorly; gular bridge narrow. Mandibles with teeth large, acutely pointed. Antennae with basal segments lighter in color.

Hind basitarsi with only one sole-bladder; ventral setae large, irregular in size, sparse.

Abdominal sternites pale except seventh, eighth, and ninth: seventh with a small, circular pigmented area on each side, otherwise pale, membranous; eighth with pigmented areas covering entire lateral fourth, somewhat broadened caudad, membranous medially; ninth transverse, pale, but pigmented throughout except for a transverse, rectangular basal area.

Holotype, male (on slide), and *allotype*, female (on slide).—U. S. N. M. No. 56587, collected by the writer at New Braunfels, Tex., August 20, 1942. (See also p. 499.)

Paratypes.—Numerous topotype males and females with above data to be deposited in several major entomological collections.

Remarks.—*Oligembia melanura* is distinctly arboreal. Its preferred habitat appears to be the bark of trees sufficiently rough, or covered with moss and lichens, and protected from the sun to afford a moist, secluded environment. The type series was collected on trees growing on the shaded side of a narrow, rocky canyon cutting a

cedar-covered, limestone plateau. A number of species of trees present (*Sabina sabinoides*, *Quercus* spp., *Ulmus crassifolia*, etc.) harbored colonies of the insect. One old oak stump 15 feet high, with loose, deeply grooved bark, was found so thickly populated by the species that it glistened white with an almost continuous covering of silk. In general, however, the species seems to establish isolated colonies here and there on the trunk which are occupied by a single female and its brood of young. The species probably has an extensive range throughout much of the cedar-oak as well as in the post-oak associations of the region. It has not yet been found in the adjacent, mesquite-covered lowlands in spite of a careful search.

The food appears to be the lichens and moss through which the tunnels are spun. This is evidenced by the green color of the fecal pellets. The tunnels ramifying on the outer surface of the bark lead to a more protected retreat such as a crack in the bark or one between exfoliating bark flakes. Here the female constructs a larger, more densely spun tunnel, covered with feces, in which the eggs are laid.

As far as could be ascertained during the limited period of observation, the males and females are all in their penultimate instar late in July and early August and mature by the middle of August. The sex ratio seems to be 1:1. The eggs are laid during the remainder of August and early in September. Development probably begins during fall, and a considerable time may be spent in hibernation.

Anisembia texana (Melander) was found at times sharing the habitat of *melanura* but appeared to require the greater protection of loose, dead bark under which it could spin its tunnels. At the time *melanura* was maturing, *texana* had already mated, the males had died, and the young were in the first or second instars. Of the two species, *melanura* was by far the more abundant.

The species of the genus *Oligembia* heretofore have been known only from single specimens or very limited series. The discovery of *melanura* in large numbers affords the opportunity to examine more closely certain features of the complex male abdominal terminalia. All drawings of the terminalia were made for systematic purposes and drawn from somewhat distorted KOH-treated specimens. The untreated terminalia of this species reveal that all processes are concentrated toward the left to give length to the abdomen and sclerotic support to the ejaculatory duct. The greatly produced left paraproct forms the immediate ventral support of the duct and appears to be itself supported by the mesal process of the left cercus-basipodite which curves directly upward between the tips of the two tergal processes (10 RP₁ and 10 LP), which curve downward and apparently function

as hooks to insure the period of sexual union. The secondary right tergal process (10 RP₂) forms a dorsal flap over the anal opening and the process of the ninth sternite (HP) a ventral support of the anus.

An examination of the terminalia of a penultimate instar male just before the last ecdysis reveals the inner lobe of the structure, here regarded as the left cercus-basipodite, clearly forming within the cuticle of the left cercus. It is thus likely that much of this structure is derived directly from the basal segment of the left cercus. Perhaps only a small fused basal part is actually of basipodital origin.

OLIGEMBIA (?OLIGEMBIA) ROSSI Davis

Oligembia rossi DAVIS, 1939b, p. 219, figs. 6-12.

Holotype.—Male, on two slides, British Museum of Natural History.

Type data.—Barro Colorado Island, Panama Canal Zone (W. M. Wheeler).

GROUP II

OLIGEMBIA (OLIGEMBIA) ARMATA, new species

FIGURES 121-126

Male (on slide).—Body, legs, and wings tan; head and mandibles reddish brown; submentum orange; antennae chocolate brown. Length 5.4 mm.; forewing length 3.5 mm., breadth 0.85 mm.

Head (fig. 121) with eyes large, inflated, strongly convex, facets very large; eyes separated by a space one-third wider than an eye width; sides behind eyes longer than an eye length, subparallel for a short distance, thence gradually rounded and convergent, joining the evenly arcuate caudal margin. Mandibles with apical dentations small, blunt. Gular bridge very broad, slightly longer than an eye width.

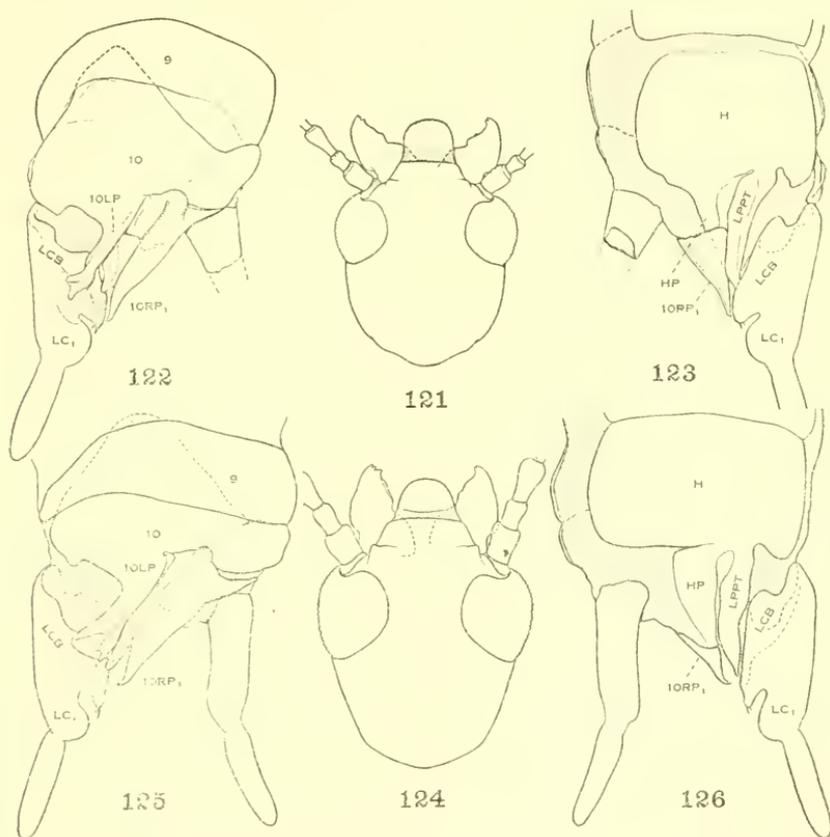
Wings similar to those of *peruviana*.

Terminalia (figs. 122, 123) with tenth tergite extensively produced forward beneath ninth tergite as an acute lobe nearly attaining basal margin of the ninth tergite. Left tergal process (10 LP) very long, sinuous, sclerotic, outer edge twisted downward, extending toward left at 45° and overlapping left cercus-basipodite; tip broadened, complex turned on edge (detail therefore not discernible from above). Right tergal process (10 RP₁) elongate, parallel to 10 LP and only slightly longer; tip curved caudad; bearing at inner basal margin a prominent, large, echinulate, rounded tubercle which is borne partially by the broadly sclerotized secondary right tergal process (10 RP₂). Left paraproct (LPPT) greatly developed caudally as an elongate sclerotized plate nearly as long as 10 RP₁, which is fused along inner basal half with the poorly developed process of the hypandrium (HP). Left cercus-basipodite (LCB) large, bearing a stout,

basally sclerotized lobe, which is microechinulate on inner face and bears at caudal angle a pair of minute clawlike hooks directed dorsad. Basal segment of left cercus (LC_1) bulbous apically, terminal segment short. Right cercus missing except for stump of basal segment.

Female.—Unknown.

Holotype.—Male, on slide, U.S.N.M. No. 56054.



FIGURES 121–123.—*Oligembia armata*, new species, holotype male (Trinidad): 121, Head; 122, terminalia (dorsal); 123, terminalia (ventral).

FIGURES 124–126—*Oligembia armata*, specimen from Quintana Roo, Mexico: 124, Head; 125, terminalia (dorsal); 126, terminalia (ventral). Explanation of symbols on p. 403.

Type data.—Port of Spain, Trinidad, October 22–24, 1918 (“A 840”) (Harold Morrison).

These records suggest that *armata* is a widespread species, perhaps ranging throughout the lowlands bordering the Caribbean Sea.

Paratype.—Male, on slide, collected at light, St. Augustine, Trinidad, May 15, 1939 (E. McC. Callan): deposited in the British Museum of Natural History.

Additional specimens examined.—One male, at light, Juan Mina Station, Canal Zone, April 15, 1939 (G. Fairchild) (MCZ); one male, at light, Santa Cruz de Bravo, Terr. Quintana Roo, Mexico, August 18, 1925 (A. Dampf).

Remarks.—The Canal Zone specimen differs from the holotype only in its smaller echinulate nodule at base of 10 RP₁, in its slightly longer sclerotic tip of 10 RP₁, and in having only one "claw" on the inner lobe of LCB. The Quintana Roo specimen (see figs. 124–126) may prove to be at least subspecifically distinct when adequate series are available. It has a slightly different head form and a less acute and produced basal apodeme of the tenth tergite. The apparent differences in form of 10 LP, as indicated in the figures, may be due to the angle from which it was viewed.

DILOBOCERCA, new subgenus

Males with mandibles not curved ventrad at tips; teeth rather large, well defined. Terminalia with tenth tergite apodeme usually acutely produced well forward beneath ninth tergite; left tergal process (10 LP) rather broad, short, apex divided into two greatly dissimilar portions, the inner portion sclerotic, elongate, talonlike, the outer portion broad, spatuliform, thin, with margins irregular; right tergal process (10 RP₁) with outer margin usually sinuous; left paraproct (LPPT) usually broad, short, seldom longer than HP; left cercus-basipodite (LCB) with two inner lobes, the ventral one usually shorter and broadly pointed, the upper lobe elongate with a terminal cleft forming rather long "claws" which may at times be fused together; basal segment of left cercus (LC₁) usually clavate distad that of right cercus with inner margin often sclerotic and lobed distad; basal foramen of right cercus often dilated and complex in outline.

Type.—*Oligembia (Dilobocerca) lobata*, new species.

Distribution.—That of the genus *Oligembia*.

This is a very natural subgenus with species spread over a wide area, and it is apparent that only a small fraction of its species are known. The accompanying figures demonstrate the great similarity of general structure in the terminalia but species differences will be found in the form of the left tergal process and of the left cercus-basipodite. Supplementing these characters of the terminalia, important differences occur in size, color, and head form. In the two species studied in large series (*lobata* and *vandykei*) the characters described and figured are very constant.

Although the species are identified most readily by comparing figures and by using distributional data, the following key may be of additional value:

KEY TO SPECIES OF DILOBOCERCA (MALES)¹²

1. Left cercus-basipodite (LCB) with ventral lobe short, shorter than dorsal lobe; fleshy or broadly pointed..... 2.
 LCB with ventral lobe longer than dorsal lobe; fingerlike or acutely pointed 10
2. LCB with dorsal lobe tapered to a sharp point, uneleft; British Guiana
 intricata..... 3
 LCB with dorsal lobe bearing a pair of distal "claws"..... 3
3. LCB with ventral lobe fleshy, membranous, rounded; Tres Marias Islands, Mexico pacifica
 LCB with ventral lobe sclerotized (at least ventrally), broadly pointed... 4
4. Left tergal process (10 LP) with outer margin deeply notched just behind apex; basal segment of right cercus strongly, acutely lobed inward at apex; Oaxaca, Mexico..... emarginata
 10 LP with outer margin straight, not notched; basal segment of right cercus only obtusely rounded distad, if at all lobed..... 5
5. Northern South America..... 6
 Guatemala northward..... 7
6. Head narrow, parallel-sided; eyes small, scarcely inflated; submentum as long as broad, sides strongly arcuate; color black; Venezuela..... nigrina
 Head with sides rather strongly convergent; eyes large, strongly inflated; submentum longer than broad, sides weakly arcuate; color brown; Venezuela gigantea
7. Basal foramen of right cercus with ventral margin obtusely angulate; Guatemala..... excisa
 Basal foramen of right cercus with ventral margin acutely angulate..... 8
8. Eyes small, scarcely inflated, interspace more than two eye widths wide; Brownsville, Tex..... lobata
 Eyes large, strongly inflated, interspace only one eye width wide..... 9
9. 10 LP with apical margin of outer portion bi-emarginated, acutely pointed medially; Veracruz, Mexico..... jalapae
 10 LP not as above; Chiapas, Mexico..... chiapae
10. Ventral lobe of LCB fingerlike in form, rounded distally; southern Brazil..... plaumanni
 Ventral lobe of LCB narrowly conical in form, sharply pointed distally.... 11
11. Right mandible with a medial tooth on inner margin; southeastern United States vandykei
 Right mandible without such a tooth; Cuba..... caribbeana

OLIGEMBIA (DILOBOCERCA) LOBATA, new species

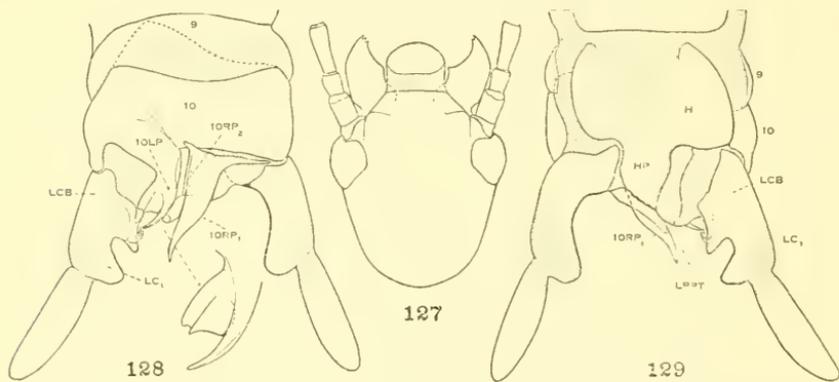
FIGURES 127-129

Male (in alcohol).—Sclerites smoky brown, intersclerotol membranes pale tan. Head and antennae black; mandibles amber yellow.

¹² *O. oligotomoides* (Enderlein) is not included, as, in the light of present knowledge, it is unrecognizable.

Abdominal terminalia with tenth tergite, right processes, and inner margins of cerci smoky black; left tergal process amber yellow. Body length 6.5 mm.; forewing length 4.4 mm., breadth 0.9 mm.

Head (fig. 127) elongate-oval; eyes medium sized, somewhat inflated; facets prominent, not outlined by pigmented interspaces; distance between eyes equal to two and one-half eye widths; sides behind eyes one and one-half eye lengths long, rather strongly convergent, evenly curved and united with the arcuate caudal margin. Occipital foramen as long as wide, somewhat acutely rounded anteriorly. Gular bridge as wide as submentum length. Submentum longer than wide; sides evenly arcuate, apical angles acute; anterior margin deeply emarginated. Mandibles not curved ventrad at tips, apical teeth small but distinct.



FIGURES 127-129.—*Oligembia lobata*, new species, holotype male (Texas): 127, Head; 128, terminalia (dorsal); 129, terminalia (ventral). Explanation of symbols on p. 403.

Wings large, broad, extending beyond tip of abdomen; medium brown, hyaline stripes well defined. Eight cross veins present between R_1 and costa in forewing, five in hindwing; three or four cross veins between R_1 and R_{2+3} in forewing, three in hindwing. R_1 united at apex by a cross vein to R_{2+3} , bordered throughout its length by reddish, granular lines. R_{2+3} represented by a pigmented vein throughout, forked just beyond basal third in both wings; R_{4+5} forked at basal third in both wings.

Terminalia (figs. 128, 129) with tenth tergite (10) very long on left side, produced basad beneath ninth tergite to its basal margin. Left process (10 LP) well developed, inner "talon" evenly arcuate, continuous with inner margin, sharp; outer spatulate portion broad, truncate apically, with a fine longitudinal carina to left of middle terminating as a minute point on apical margin. Right process (10 RP₁) with inner margin nearly straight, outer margin sinuate, apex

sharply pointed; inner process ($10 RP_2$) narrow, half as long as $10 RP_1$. Ninth sternite (H) pigmented at lateral thirds only, submembranous medially, quadrate, sides arcuate; process (HP) broad, prominent, parallel-sided, right side shorter than left, apical margin diagonal. Left paraproct (LPPT) large, well pigmented, longer than HP, fused along entire inner side to H and HP; apex acuminate, terminating as a small projection. Left cercus-basipodite (LCB) very large, greatly extended ventrad, bilobed mesad—the ventral lobe very dark, stout, acute; the upper projection sclerotic, directed dorsad, furcate from near base, the furcations closely paralleled. Basal segment of left cercus (LC_1) continuous with LCB, cylindrical basally but very abruptly produced inward as a large lobe apically; inner margin darkly pigmented; outer apical angle membranous. Terminal segment of left cercus large, cylindrical, gradually tapered, rounded distally. Basal segment of right cercus complex; basal foramen irregular, margin greatly produced ventrally; inner margin dark, very deeply emarginated, apex lobed internally; outer apical third membranous. Terminal segment of right cercus similar to that of left.

Female (in alcohol).—Pale brown throughout, intersclerotol membranes light straw yellow; head amber yellow with dorsal pattern prominent; antennae, except the two basal segments, chocolate brown. Length 5.0 mm.

Head and hind basitarsi similar to *melanura*.

Abdominal sternites: Seventh sternite faintly pigmented, lateral darker areas apparent but not prominent; eighth sternite without more strongly pigmented lateral areas; ninth sternite broadly, transversely emarginated as in *melanura*.

The female of *lobata*, though of a different subgenus, is structurally scarcely separable from *melanura*. This is additional evidence that females of the order are of little value in systematics.

Holotype.—Male, on slide (U.S.N.M. No. 56585), collected at Palm Grove, near Brownsville, Tex., September 29, 1942, and *allotype*, female, on slide, collected within the city limits of Brownsville, Tex., September 28, 1942; both collected by the writer.

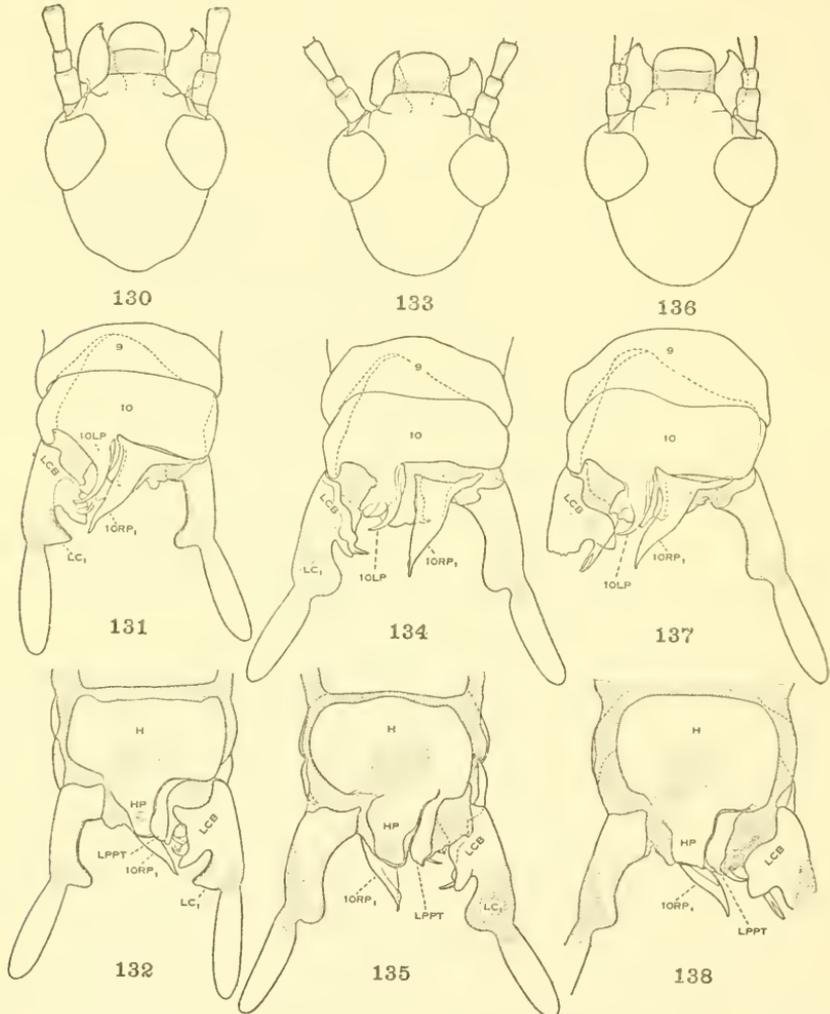
Paratypes.—Numerous males and females with above data, deposited in the California Academy of Sciences, the Museum of Comparative Zoology, and the writer's collection.

The type specimens, with young and eggs, were collected in small colonies on the bark of trees and under the flaky thin bark of dead limbs and trunks. In the latter situations the abandoned burrows of boring insects are apparently used as retreats from excessive heat and predators.

OLIGEMBIJA (DILOBOCERCA) JALAPAE, new species

FIGURES 136-138

This species is very similar to *chiapae* described below. It is quite possible that the study of more specimens will indicate that they are subspecies. Because of this similarity only a comparative description is given, as follows:



FIGURES 130-132.—*Oligembija emarginata*, new species, holotype male (Oaxaca, Mexico): 130, Head; 131, terminalia (dorsal); 132, terminalia (ventral).

FIGURES 133-135.—*Oligembija chiapae*, new species, holotype male (Chiapas, Mexico): 133, Head; 134, terminalia (dorsal); 135, terminalia (ventral).

FIGURES 136-138. *Oligembija jalapae*, new species, holotype male (Veracruz): 136, Head; 137, terminalia (dorsal); 138, terminalia (ventral). Explanation of symbols on p. 403.

Male.—Color (on slide): Similar to *chiapae*. Length 7 mm.; forewing length 5.7 mm., breadth 1.4 mm.

Head (fig. 136) as illustrated. Wings: R_{4+5} forked in basal third instead of basal fourth as in *chiapae*. Terminalia (figs. 137, 138) differing from *chiapae* as follows: Talonlike portion of left tergal process (10 LP) broader; outer broad portion only half as long as the "talon" instead of nearly equal, its apical margin transverse, biemarginate. Left cercus-basipodite with "claws" separate (not fused), directed caudad instead of mesad.

Female.—Unknown.

Holotype.—Male, on slide (U.S.N.M. No. 56761).

Type data.—Collected at light, Río Santiago (1,400 m.), Jalapa, Veracruz, Mexico, August 11, 1932 (R. Ruiz Sota).

Remarks.—The holotype specimen has most of the left cercus missing, but it is safe to assume that this appendage is similar to that of *chiapae* in view of the very close relationship of the two species. The holotype, as well as that of *chiapae*, was kindly sent to me for study by Dr. Alfons Dampf, of Mexico City.

OLIGEMBIA (DILOBOCERCA) CHIAPAE, new species

FIGURES 133-135

Male.—Color (on slide): Head, mouthparts, antennae, and inner margin of basal segment of right cercus chocolate brown; remainder of specimen tan, terminalia slightly darker. Length 6.5 mm.; forewing length 5.0 mm., breadth 1.3 mm.

Head (fig. 133) as illustrated.

Wings with R_{4+5} forked at basal fourth in forewings and hindwings.

Terminalia (figs. 134, 135) with basal projection of tenth tergite rounded, extending to basal third of ninth tergite. Left tergal process (10 LP) not strongly tilted; talonlike inner portion rather broad basally, only slightly longer than broad outer portion; outer portion abruptly emarginated basally on left side, apical margin with a single emargination to left of median projection which is blunt, margin to right of this projection simple, gradually slanting basad; cleft between inner and outer portions of 10 LP broad. Right tergal processes (10 RP_1 and 10 RP_2) simple, the major process very sharply pointed. Paraproct (LPPT) similar to *emarginata*. Left cercus-basipodite (LCB) with "claws" sclerotic, fused, directed dorsomesad; ventral lobe simple. Basal segment of left cercus (LC_1) strongly, broadly lobed apically on inner side; outer apical angle extensively membranous. Basal segment of right cercus with inner margin evenly, inwardly arcuate—this margin darkly pigmented; outer apical angle extensively membranous. Terminal segments of both cerci equal.

Female.—Unknown.

Holotype.—Male, on slide (U.S.N.M. No. 56762).

Type data.—Collected at light, Vergel, Chiapas, Mexico, May 20, 1935 (A. Dampf).

The holotype specimen has the right processes of the tenth tergite slightly dislocated owing to mounting technique. These structures are shown in their normal position in the figures of the other species of the subgenus.

OLIGEMBA (DILOBOCERCA) EXCISA, new species

FIGURES 139-141

Male.—Color (in alcohol): Head dark chocolate brown, basal pattern obsolete; eyes almost black; antennae with basal segment dark brown, other segments much lighter brown to tan. Thorax with sclerotized portions light brown, membranous areas pale. Wings faintly pigmented, tan. Forelegs light brown, middle legs and hind-legs light tan. Abdomen with all segments light tan except ninth sternite and tenth tergite which are brown; basal segments of cerci brown, terminal segments light tan. Length 5 mm.; forewing length 4.7 mm., breadth 1.2 mm.

Head (fig. 139) larger than terminalia, elongate; sides behind eyes strongly caudally convergent, nearly straight, narrowly rounded posteriorly. Eyes very large, strongly inflated, extending mesad one-third of width of head through eyes; inner margins irregularly, obtusely angulate; facets prominent. Antennae incomplete; maximum number of segments present, 16.

Wings much as in *brevicauda* but slenderer and with R_{4+5} forking well within basal half in both wings.

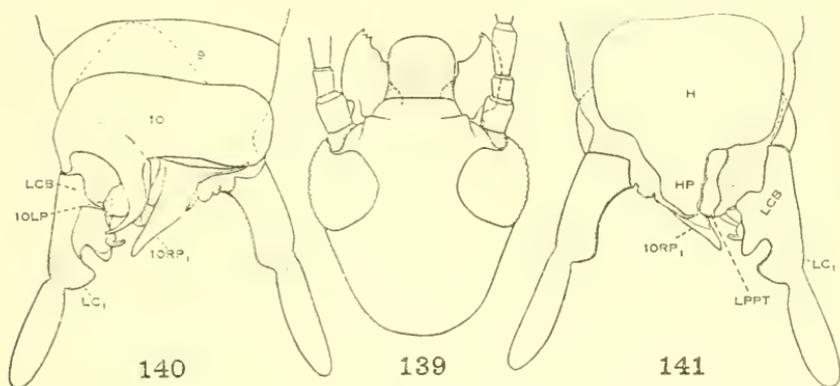
Terminalia (figs. 140, 141): Tenth tergite (10) produced forward beneath ninth tergite and terminating at its basal margin, not produced on right basal half. Left tergal process (10 LP) broad basally, continuous with tenth tergite; divided terminally, forming two dissimilar projections: the outer broad, quadrate, with apical margin to left of middle produced as a small sharp point; the inner projection narrow, very acutely pointed, talonlike, evenly curved toward basal segment of left cercus. Right tergal process (10 RP_1) fleshy, V-shaped, abruptly curved inward on outer margin. Ninth sternite (H) broad, quadrate; produced caudad as submedial, broad, truncate process (HP). Left paraproct (LPPT) loosely fused to right side of HP, longitudinal, emarginated on outer side and acutely pointed terminally. Left cercus-basipodite (LCB) with a short, inner, basal clawlike process, the "claws" arising almost without a basal projection; terminal to these, a short, blunt, sclerotic process is present; area be-

tween latter and the terminal sclerotized inner lobe of LC_1 deeply notched, partially membranous. Basal segment of right cercus large, inner margin evenly emarginated and strongly sclerotized. Terminal segments of both cerci similar.

Female.—No specimens.

Holotype.—Male, mounted on two slides, U.S.N.M. No. 56048.

Type data.—Intercepted in plant quarantine at San Francisco, Calif., April 25, 1938. Associated with 50 plants of *Stanhopea wardianum* shipped from Guatemala City, Guatemala.



FIGURES 139-141.—*Oligembia excisa*, new species, holotype male (Guatemala): 139, Head; 140, terminalia (dorsal); 141, terminalia (ventral). Explanation of symbols on p. 403.

OLIGEMBIA (DILOBOCERCA) EMARGINATA, new species

FIGURES 130-132

Male.—Color (on slide): Head, submentum, basal antennal segments, and inner margins of cerci chocolate brown; mandibles and apices of processes of tenth abdominal tergite golden brown; remainder of body light brown, terminalia darker. Length 5.7 mm.; forewing length 4.0 mm., breadth 0.9 mm.

Head (fig. 130) as illustrated.

Wings: R_{4+5} forked at basal third in left forewing and medially in left hindwing. Hyaline intervenal bands very broad anterior to M; behind M narrow.

Terminalia (figs. 131, 132) with tenth tergite elongated, basal projection obtuse, extending beneath ninth tergite and almost attaining its base. Left tergal process (10 LP) strongly tilted, outer margin lowest; inner portion strongly, outwardly curved (talonlike) overlapping LCB; outer, broad portion spatuliform, thin, its outer edge with a hemihexagonal apical notch, apical margin simple. Right tergal processes (10 RP_1 and 10 RP_2) simple. Hypandrium process (HP)

and left paraproct (LPPT) well defined, nearly equal in length. Left cercus-basipodite (LCB) with prominent inner dorsal "claws" projecting forward between 10 LP and 10 RP₁; ventral lobe simple. Basal segment of left cercus (LC₁) strongly, acutely lobed subapically, this lobe equal in length to inner lobes of LCB; darkly pigmented. Basal segment of right cercus deeply, abruptly emarginated, produced subapically as a large, blunt inner lobe. Terminal segments of both cerci simple, equal.

Female.—Color (on slide): Head straw yellow, antennae, mesothoracic, metathoracic, and abdominal sclerites light brown; prothorax and legs tan. Length 7 mm. Head broadly oval, occipital foramen broadly rounded anteriorly, as well as at posterior angles. Eighth sternite of abdomen pigmented at sides only, extensively membranous medially. Ninth sternite rather strongly pigmented basally, membranous along apical margin; very broadly, shallowly emarginated at base.

Holotype.—Male, on slide, U.S.N.M. No. 56047.

Type data.—Collected on pineapples from Loma Bonita, Oaxaca, Mexico, in plant quarantine at Nuevo Laredo, Mexico, June 12 1941 (H. R. Cary).

Allotype.—Female, on slide, U.S.N.M. No. 56047, with same data but collected on June 6, 1941, by V. L. Pearson.

Topotype.—Male, on slide, in the writer's collection. Condition too poor to permit paratype designation.

OLIGEMBIA (DILOBOCERCA) PACIFICA Ross

Oligembia pacifica Ross, 1940b, p. 640, figs. 11-13.

Holotype.—Male, on slide, in California Academy of Sciences, (type No. 4933).

Type data.—Magdalena Island, Tres Mariás Islands, Mexico, May 19, 1925 (H. H. Keifer).

OLIGEMBIA (DILOBOCERCA) INTRICATA Davis

Oligembia intricata DAVIS, 1942, p. 117, figs. 11-15.

Holotype.—Made, on slide, to be deposited in the British Museum of Natural History.

Type data.—"British Guiana, mile 18, Bartica-Partaro road," April 10, 1938 (E. McC. Callan).

Remarks.—Although a comparison of figures of terminalia of this species with those of the two Venezuela species described below might suggest a great similarity, the three species are quite distinct. They may be separated by their size and color as well as by the form of the head and processes of the terminalia.

OLIGEMBIIA (DILOBOCERCA) GIGANTEA, new species

PLATE 19A; FIGURES 145-147

Male.—Color (on slide): Body and legs light brown, wings lighter; head medium brown; mandibles reddish brown; basal two, and terminal, antennal segments brown, segments 3 to 5 straw yellow. Length 8 mm.; forewing length 5.8 mm., breadth 1.5 mm.

Head (fig. 145) with eyes moderately large, strongly inflated, convex, separated by a space one and one-half eye widths wide; facets moderately prominent. Head elongated behind eyes, sides nearly straight, convergent; caudal margin gradually rounded laterally, rather abruptly rounded medially. Mandibles with small, blunt, apical teeth; inner median points prominent, lying just before deep emarginations.

Wings (fig. 3) well pigmented. Five cross veins present between R_1 and R_{2+3} in forewing and six inconspicuous ones located apically between costal margin and R_1 ; hindwing with similar number but located more toward base and more widely spaced. Hyaline lines rather sharply defined.

Terminalia (figs. 146, 147) with basal projection of tenth tergite (10) reaching beneath ninth tergite (9) to the basal margin; apex of projection evenly rounded. Left tergal process (10 LP) broad, deeply cleft apically, the outer lobe short, spatuliform, the inner lobe slender, evenly, outwardly arcuate, talonlike. Right tergal process (10 RP_1) with extreme apex blunt. Ninth sternite (H) with process (HP) well pigmented, broad, truncate, half as long as 10 RP_1 . Left paraproct (LPPT) conspicuous, fused along inner margin with HP and of equal length. Left cercus-basipodite (LCB) well sclerotized, without membranous areas; inner projection bilobed, the large ventral lobe, gradually tapered, rounded apically, the dorsal projection slender, evenly curved, apically cleft, forming two nearly fused "claws" with a small, rounded, inner lobe present at its base. Basal segment of left cercus (LC_1) continuous with LCB; bearing a prominent, rounded, apical, inner lobe. Basal segment of right cercus with basal foramen complexly, irregularly outlined; inner margin emarginated and lobed apically, strongly pigmented. Terminal segments of both cerci equal, slender, cylindrical.

Female.—Unknown.

Holotype.—Winged male, on slide, U.S.N.M. No. 56051.

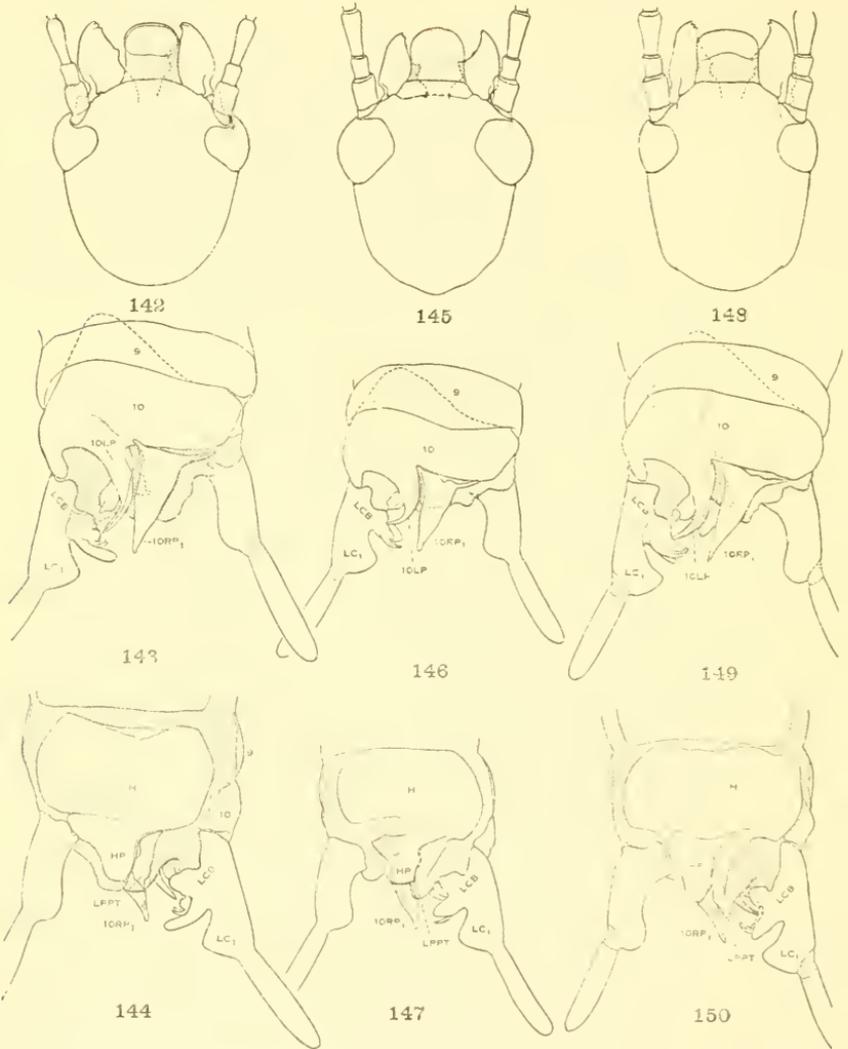
Type data.—"With wild *Cattleya* from Caracas, Venezuela," collected in plant quarantine at Washington, D. C., May 31, 1939 (Adams).

Paratype.—Male, on slide, with type data but collected on May 4, 1939; deposited in writer's collection.

OLIGEMBIA (DILOBOCERCA) NIGRINA, new species

FIGURES 148-150

Male (on slide).—Head behind eyes, antennae, body, legs, and terminalia (except 10 LP) very dark chocolate brown, nearly black; mandibles and clypeal region of head light reddish brown; submentum



FIGURES 142-144.—*Oligembia plaumanni*, new species, holotype male (southern Brazil): 142, Head; 143, terminalia (dorsal); 144, terminalia (ventral).

FIGURES 145-147.—*Oligembia gigantea*, new species, holotype male (Venezuela): 145, Head; 146, terminalia (dorsal); 147, terminalia (ventral).

FIGURES 148-150.—*Oligembia nigrina*, new species, holotype male (Venezuela): 148, Head; 149, terminalia (dorsal); 150, terminalia (ventral). Explanation of symbols on p. 403.

orange; 10 LP yellow. Length 7.5 mm.; forewing length 5.0 mm., breadth 1.2 mm.

Head (fig. 148) elongate, with eyes relatively small, not strongly inflated, separated by interspace equal to two and one-half eye widths; sides behind eyes two eye lengths long, scarcely convergent, subparallel, feebly arcuate; caudal margin abrupt, arcuate medially. Mandibles with apical teeth broad, blunt; inner medial angles very sharp, prominent.

Wings well pigmented; with four cross veins present between R_1 and R_{2+3} in forewing and seven between R_1 and costal margin; R_{2+3} , the only pigmented vein behind R_1 , nearly attaining terminus. Hindwing with two cross veins between R_1 and R_{2+3} and five between R_{2+3} and costal margin. R_1 very closely paralleling costa in both wings. Hyaline lines sharply defined, nearly equal in width throughout both wings.

Terminalia (figs. 149, 150) similar to *gigantea* but darker, with basal projection of tenth tergite more acute and extending partially beneath eighth tergite; left tergal process (10 LP) broader and with minor differences in form; right tergal process (10 RP_1) narrower, longer and more sharply pointed apically. Process of hypandrium (HP) and left paraproct (LPPT) longer and narrower, the latter longer than HP rather than subequal as in *gigantea*. Left cercus-basipodite (LCB) with ventral inner lobe narrower, shape irregular; dorsal lobe with "claws" distinctly separated, its basal lobe large, but not clearly delimited. Inner margin of basal segment of left cercus (LC_1) more deeply emarginated, apical inner lobe acute. Inner margin of right cercus also more deeply emarginated.

Female.—Unknown.

Holotype.—Male, on slide U.S.N.M. No. 56050.

Type data.—Collected at Hoboken, N. J., March 28, 1941, in plant quarantine by Inspector Sanford in a cargo case of *Cattleya* shipped from Caracas, Venezuela.

OLIGEMBIA (DILOBOCERCA) FLAUMANNI, new species

FIGURES 142-144

Male.—Color (in alcohol): Body and legs uniformly reddish brown; mid and hind tarsi and basal half of antennae tan; head amber yellow basad, darker in clypeal region. Length 7.1 mm.; forewing length 4.5 mm., breadth 1.2 mm.

Head (fig. 142) larger than terminalia; eyes rather small, short, rather strongly inflated; eye interspace broad, two and one-half eye widths wide; head outline behind eyes elongate-oval, sides strongly convergent, feebly arcuate, evenly rounded behind. Submentum

reddish brown, quadrate, sides arcuate, anterior angles rounded, apical margin shallowly emarginated. Mandibles with the apical dentations broad, blunt.

Wings pale brown; Rs forked just within basal half in forewing, at basal third in hindwing; R_{4+5} forked at basal fourth in forewing and at basal fifth in hind. Five R_1 - R_{2+3} crossveins in forewing, four such veins in hindwing. Hyaline stripes broad.

Terminalia (figs. 143, 144) with basal projection of tenth tergite (10) extending just beyond base of ninth tergite, acute; left process (10 LP) straw yellow, inner "talon" not strongly curved but well separated from the thin outer portion, which is parallel-sided, acutely pointed apically with a central carina extending beyond margin; major right process (10 RP_1) large, dark brown, inner basal angle acutely produced, distal apex blunt, straight. Hypandrium (H) well developed. Sides equal, right apical angle membranous, this area extending mesobasally but diminishing; process (HP) broad basally but abruptly narrowed midway distad, apex truncate. Left paraproct (LPPT) fused to HP on inner side, elongate, acuminate apically. Left cercus-basipodite (LCB) greatly produced mesad; upper lobe sclerotic, terminated by a pair of stout "claws" on a bulbous base; ventral lobe finger-shaped, elongate, well sclerotized beneath, membranous above; foramen with one dorsal, and two ventral projections on margin. Basal segment of left cercus (LC_1) continuous with LCB; abruptly, strongly, conically lobed inward at apex. Basal segment of right cercus short, basal foramen with margin irregular. Terminal segments of both cerci elongate, simple, equal.

Female.—Unknown.

Holotype.—Male, on slide U.S.N.M. No. 56586.

Type data.—Nova Teutonia, Santa Catharina, Brazil (F. Plaumann).

Paratypes.—Two males with above data deposited in the California Academy of Sciences and in the writer's collection.

OLIGEMBIA (DILOBOCERCA) VANDYKEI, new species

FIGURES 151-153

Male.—Color (alive): Head bicolorous, the anterior dorsal half and submentum yellowish orange, the posterior dorsal half and venter of head capsule medium brown; mandibles dark brown, becoming brown; antennae tan basally, becoming light brown distad. Thorax, wings, and legs largely light brown; abdomen tan with terminalia dark golden brown distally, inner margins reddish brown; palpi light brown, the cerci tan. Length 6.9 mm; forewing length 5.2 mm., breadth 1.5 mm.

Head (fig. 151, paratype) rather broad, eye interspace one and one-half eye widths wide, sides behind eyes one eye length long, weakly convergent, slightly arcuate; caudal margin broad, shallowly arcuate; eyes large, somewhat inflated, facets without pigmented interspaces; two prominent, reddish-brown lobes are present beneath antennal scape at outer base of mandibles. Mandibles with bases very large, greatly produced inward; inner medial angles abruptly angled; left mandible with three small dentations at inner apex, margin behind proximal tooth broadly, weakly arcuate; right mandible with two small, closely approximated apical teeth; inner margin with a characteristic tooth midway between proximal apical tooth and medial angle. Submentum narrow behind; sides divergent to apical third, thence parallel, apical angles strongly produced forward, rounded distally; anterior margin transverse, straight. Occipital foramen somewhat pointed anteriorly.

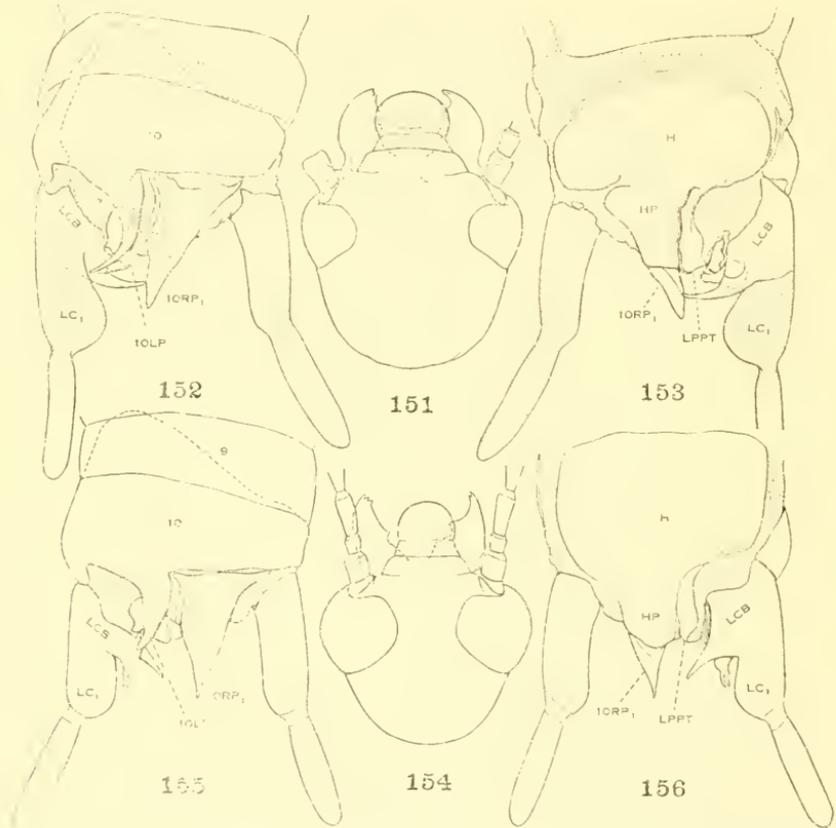
Wings large, broad, extending beyond tip of abdomen in living specimens. Venation without specific features. Forewing with seven C-R₁ cross veins in apical half, three R₁-R₂₊₃ cross veins and no others; hindwing with five C-R₁ and three R₁-R₂₊₃ cross veins.

Hind basitarsi elongate, with only the distal sole-bladder.

Terminalia (figs. 152, 153, paratype) with tenth tergite (10) acutely produced forward beneath ninth tergite nearly to its base, this projection weakly pigmented; exposed tergite without definite indications of sutures. Left process (10 LP) with a strong, evenly arcuate, talonlike projection continuous with inner margin; outer portion short, apical margin diagonal (from left to right), with a stout submedian projection. Major right process (10 RP₁) broad and unmodified basally, outer margin rather straight, inner margin sinuous; secondary right process (10 RP₂) darkly pigmented. Ninth sternite (H) with sides rounded, lateral areas pigmented but becoming broadly membranous medially; produced caudad as a broad process (HP), somewhat tapered but broadly truncate distally and "granulate" on left side. Left paraproct (LPPT) fused to side of HP, suture becoming somewhat expanded distad, apex pointed and notched subterminally on left side. Left cercus-basipodite (LCB) well pigmented, bilobed mesially; the dorsal lobe shortest, sclerotic, curved upward and cleft distally, forming two stout "claws"; ventral lobe sclerotic elongate, gradually tapered and slightly curved, projecting almost to central axis of body. Basal segment of left cercus (LC₁) weakly pigmented in basal half and along inner margin, membranous at outer apex, gradually swollen distad; terminal segment (LC₂) cylindrical, gradually tapered distad. Right cercus with basal segment dark, especially at base; very gradually tapered, unlobed at apex; terminal segment similar to that of left cercus.

Female.—Color (alive): Head reddish brown, antennae medium brown; remainder of body tan except mesothorax and metathorax, which are noticeably paler tan; cerci with terminal segment light brown. Body length 7.0 mm.

Head broad, circular, caudal margin evenly rounded, sides scarcely caudally convergent. Occipital foramen elongate, rounded anteriorly;



FIGURES 151–153.—*Oligembia vandykei*, new species, paratype male (Florida): 151, Head; 152, terminalia (dorsal); 153, terminalia (ventral).

FIGURES 154–156.—*Oligembia caribbeana*, new species, holotype male (Cuba): 154, Head; 155, terminalia (dorsal); 156, terminalia (ventral). Explanation of symbols on p. 403.

gular bridge narrow, only half as wide as submentum length. Body without apparent specific peculiarities. Hind basitarsus with 18 stout plantar bristles, with only the terminal sole-bladder, bladder of middle segment echinulate. Abdominal sternites very faintly pigmented; ninth sternite very broadly, shallowly, and transversely excised at base.

Holotype and allotype.—On slides (U.S.N.M. No. 56763).

Type data.—In bark, 5 miles northeast of Pensacola, Fla., on shores of Escambia Bay, February 9, 1943 (matured March 10) (E. S. Ross).

Paratypes.—Numerous males and females with above data; deposited in the Museum of Comparative Zoology, the California Academy of Sciences, and writer's collection. One male, St. Augustine, Fla., March 4, 1940. "beating vegetation" (E. C. Van Dyke) (CAS).

Additional records.—FLORIDA: Two males, Florida Fruit Fly Survey, Duval County, December 30, 1929 (L. L. Knight) (USNM); two males, Paradise Key, March 2, 1919 (H. S. Barber) (USNM). SOUTH CAROLINA: Several males and females, Sumter and vicinity, February 10, 1943 (E. S. Ross). (See also p. 499.)

Remarks.—This species is named for Dr. E. C. Van Dyke, who collected the first specimen to come before the writer.

O. (D.) vandykei is readily distinguished from other *Oligembias* by its medially toothed right mandible and the greatly produced, pointed ventral lobe of the left cercus-basipodite. It is apparently related to *caribbeana* of Cuba, which has a similar lobe but which has no medial tooth on the mandible. *O. hubbardi*, the only other known Florida *Oligembia*, is easily separated, by means of its single mesal lobe of the basipodite.

O. vandykei is apparently a widespread species, perhaps ranging throughout Florida, and along the Gulf shore at least as far as New Orleans, and up the Atlantic Coastal Plain probably as far as southeastern Virginia. In habits the species is identical to *melanura* of Texas, except that the colonies appear to occur mostly on the exposed sunny sides of isolated trees. At Pensacola, Fla., large numbers of colonies were found in the bark of live oaks, which had deeply grooved and extensively flaked bark. Few lichens were present. At Sumter, S. C., the colonies were abundant on the bark of both live and deciduous oaks. The tunnels were usually spun beneath lichens. In both localities the males were in the penultimate instar in early February perhaps indicating a cyclic development independent of seasons or geographic position.

An interesting case of predatism comparable to that of the Sclerogibbidae was noted at Pensacola. Numerous Embioptera were found dead in the tunnels in a soft, shriveled condition. Usually near such individuals small (3 mm.), pink fly larvae or pupae were found, the latter being enclosed in loose silken cocoons. Itonididae (formerly Cecidomyiidae) were reared from the pupae, which, according to C. T. Greene, appear to be either of the genus *Feltiella* Rübtsaamen or of *Lestodiplosis* Kieffer. This is the first record of Embioptera as hosts of these predatory fly larvae.

OLIGEMBIA (DILOBOCERCA) CARIBBEANA, new species

FIGURES 154-156

Male.—Color (before staining): Body, legs, and wings very pale straw yellow; head tan. Length 5.5 mm.; forewing length 3.7 mm., breadth 0.9 mm.

Head (fig. 154) with eyes very large, inflated, interspace slightly less than an eye width; facets very large; head behind eyes very short, sides and caudal margin evenly, continuously arcuate. Mandibles broad basally, acutely tapered apically; apical teeth small, but very sharp. Submentum quadrate, all sides nearly straight; somewhat narrower basally.

Wings without special features. Four cross veins present between R_1 and R_{2+3} in forewing, the terminal of these uniting apex of R_1 with R_{2+3} ; three cross veins in this position in hindwing.

Terminalia (figs. 155, 156) with basal margin of tenth tergite (10) produced on left side beneath ninth tergite (9) to its basal margin. Left tergal process (10 LP) very stout, heavily sclerotized, bilobed; the outer lobe strongly arcuate on outer margin basally, the inner lobe fingerlike. Right tergal process (10 RP_1) with extreme tip abruptly narrowed, sclerotic, minutely truncate. 10 RP_2 , hypandrium (H), its process (HP), and left paraproct (LPPT) without noteworthy features. Left cercus-basipodite (LCB) prominent, inner side with two well-developed sclerotic processes—a very slender, simple, ventral process pointed toward tip of 10 RP_1 and a caudally directed dorsal process with a pair of large, terminal, clawlike hooks. Cerci pale; basal segment of left cercus (LC_1) stout, short, bulbous; basal segment of right cercus elongate, cylindrical.

Female.—Unknown.

Holotype.—Male, on slide (stained with acid-fuchsin), U.S.N.M. No. 56049.

Type data.—"On dead vines," Cayamas, Santa Clara, Cuba, March 11, 1911 (E. A. Schwarz).

OLIGEMBIA (DILOBOCERCA) OLIGOTOMOIDES (Enderlein)

Rhagadochir oligotomoides ENDERLEIN, 1912, p. 61, figs. 36-37, pl. 3L.

Embia oligotomoides (Enderlein) NAVÁS, 1918, p. 101.

Oligembia oligotomoides (Enderlein) DAVIS, 1939b, p. 222, fig. 21.

Holotype.—Male, Berliner Zoologischen Museum.

Type data.—South America.

Paratype.—Male, South America (Stettiner Zool. Mus.).

Remarks.—This species could be placed in the genus *Idioembia* on the strength of Enderlein's original description and figures, which

give no indication of the transverse suture at the base of 10 RP₁ and 10 RP₂. It is quite likely that this was overlooked by Enderlein, as the types were probably not cleared; thus the tentative placement of the species in this group will probably prove to be correct when the details of the holotype are made known.

Genus DIRADIUS Friederichs

Diradius FRIEDERICHS, 1934, p. 419.—DAVIS, 1940d, p. 528.

Genotype.—*Diradius pusillus* Friederichs.

Distribution.—Southern Brazil.

This genus, known to date by only the unique holotype of its single species, has tentatively been placed in the Oligembiidae by Davis on the basis of its embioid wing venation with reduction of vein strength comparable to *Oligembia* and the nonechinulate left cercus. More detailed information concerning the structure of the male terminalia may prove that the species is congeneric with those of the more recently named genus *Oligembia*, thus compelling the use of the name *Diradius* in its place. It will be best, however, to retain the present status of these species until carefully identified specimens of *pusillus* are available, or until its type is redescribed and refigured in a more fact-revealing manner.

DIRADIUS PUSILLUS Friederichs

Diradius pusillus FRIEDERICHS, 1934, p. 419, fig. 7a-d.—DAVIS, 1940d, p. 528, figs. 4-7 (after Friederichs).

Holotype.—Male, Hamburg Museum.

Type data.—"1 ♂, gesammelt von W. Ehrhardt bei dem Ort Isabelle in Bezirk Humboldt des Staates Santa Catharina in Brasilien."

Family TERATEMBIIDAE

TeratembIIDae KRAUSS, 1911, p. 33.—ENDERLEIN, 1912, p. 38.—NAVÁS, 1918, p. 107.—DAVIS, 1940e, p. 536; 1940f, p. 680.

Type genus.—*Teratembia* Krauss.

Distribution.—Argentina.

This family and its component genus and species are based upon a single specimen. The wing-venational character, R₂₊₃ forked and R₄₊₅ simple, is unparalleled in the order, and, if not anomalous, would perhaps justify the retention of this distinct family. Collectors in Argentina are urged to secure more specimens of this species so that this interesting venational character can be verified and the details of the male terminalia can be more clearly revealed.

Genus *TERATEMBIA* Krauss

Teratembia KRAUSS, 1911, p. 33.—ENDERLEIN, 1912, p. 98.—NAVÁS, 1918, p. 107.—DAVIS, 1940d, p. 529.

Genotype.—*Teratembia geniculata* Krauss.

Distribution.—Argentina.

TERATEMBIA GENICULATA Krauss

Teratembia geniculata KRAUSS, 1911, p. 33, pl. 1, figs. 3, 3A-G.—ENDERLEIN, 1912, p. 98, figs. 63, 64.—NAVÁS, 1918, p. 108.—DAVIS, 1940d, p. 529, figs. 8-13.

Holotype.—Male, deposited in the Budapest Museum.

Type data.—Tucumán, Argentina. January 15, 1906 (Vezenyi).

Family OLIGOTOMIDAE

[Complete list of references not given.]

Oligotomidae ENDERLEIN, 1909, p. 190.

Old World Embioptera (except *Gynembia*) spread by man to the New World. Males (when winged) with R_{4+5} of both wings simple; the mandibles with distinct apical dentations, three on the right and two on the left mandible; hind basitarsi with one of two sole-bladders; basal segment of the left cercus cylindrical and nonechinulate; major process of right hemitergite ($10 RP_1$) long, V-shaped; similar to that of *Oligembia*.

Type genus.—*Oligotoma* Westwood.

Distribution.—Warm regions of the world.

The two genera of this family found in the New World may be separated by means of the following key:

KEY TO GENERA OF OLIGOTOMIDAE

1. Parthenogenetic females with two hind basitarsal sole-bladders; restricted to California and Arizona.....*Gynembia*
 Both sexes present; with only one basitarsal sole-bladder; widespread throughout warm regions of Americas.....*Oligotoma*

Genus OLIGOTOMA Westwood

[Complete list of references not given.]

Embia (*Oligotoma*) WESTWOOD, 1837, p. 373, figs.

Oligotoma Westwood, BURMEISTER, 1839, p. 770.

Aposthonia KRAUSS, 1911, p. 48 (genotype: *A. rosseleri* Krauss).

Genotype.—*Embia* (*Oligotoma*) *saunderii* Westwood.

Distribution.—Endemic to North Africa, Asia Minor, Asia, East Indies, and Australia. Three species, spread by man to the New World, are frequently collected and are at times commoner than the native species of an area. They are more fully treated and are

figured in other papers (Ross, 1940b, pp. 667-675; Davis, 1939a, 1940c). The lengthy bibliography of each species is here reduced to include only the names applied to each species and certain essential references.

KEY TO AMERICAN SPECIES OF OLIGOTOMA (MALES)

1. Major process of right hemitergite (10 RP₁) with a small but distinct subapical tooth on outer margin.....humbertiana
Major process without such a tooth..... 2
2. Process of left hemitergite (10 LP) broad, only about twice as long as broad; sclerotic spine of hypandrium process long, slender, sickle-shaped, lying horizontal beneath process (HP).....saundersii
Process of left hemitergite slender about 5 times longer than broad; sclerotic spine of hypandrium process short, stout, hooklike; bent ventrad..... nigra

OLIGOTOMA SAUNDERSII (Westwood)

Embia (Oligotoma) saundersii WESTWOOD, 1837, p. 373, pl. 2, fig. 2.

Oligotoma saundersii (Westwood) BURMEISTER, 1839, p. 770.—DAVIS, 1939a, p. 181, figs. 1-4 (establishes identity).—ROSS, 1940b, p. 668, figs. 40, 42-44.

Embia latreillii RAMBUR, 1842, p. 312.

Oligotoma latreillei (Rambur) ENDERLEIN, 1910, p. 56.—DAVIS, 1939a, p. 183 (spelled *latreillii*).

Olyntha cubana HAGEN (*nomen nudum*), 1866, pp. 221, 222.

Oligotoma cubana HAGEN, 1885, p. 141.—DAVIS, 1939a, p. 183 (establishes synonymy).

Oligotoma insularis McLACHLAN, 1883, p. 227.

Embia bramina SAUSSURE, 1896b, p. 352.

Oligotoma bramina (Saussure) KRAUSS, 1911, p. 37, pl. 1, fig. 6.—DAVIS, 1939a, p. 184 (suggests synonymy).

Embia hova SAUSSURE, 1896b, p. 354.

Oligotoma hova (Saussure) KRAUSS, 1911, p. 38.

Oligotoma rochai NAVÁS, 1917, p. 281.—KRAUSS, 1917, p. 316 (establishes synonymy).

Oligotoma inaequalis BANKS, 1924, p. 421.—DAVIS, 1939a, p. 184 (establishes synonymy).

Holotype.—Winged male (carded; terminalia mounted on slide); Hope Department of Entomology, Oxford University.

Type data.—"East Ind." (India) (W. S. Saunders).

Distribution.—Artificially tropicopolitan. In New World widespread from Texas, Florida, West Indies, and Mexico to temperate South America. Found especially near cities and towns.

OLIGOTOMA NIGRA Hagen

Embia nigra HAGEN (*nomen nudum*), 1866, p. 221.

Oligotoma nigra HAGEN, 1885, p. 174.—DAVIS, 1940c, p. 363, fig. 1 (treats lectotype).—ROSS, 1940b, p. 670, figs. 3, 41, 45-47.

Embia californica BANKS, 1906, p. 1, pl.—DAVIS, 1940c, p. 364.—ROSS, 1940b, p. 673.

Oligotoma californica (Banks) BANKS, 1924, p. 421, fig. (in part).

Oligotoma saundersii of NEEDHAM, 1909, p. 193 (misidentification, see Ross, 1940b, p. 670).

Oligotoma mesopotomica ESEEN-PETERSEN, 1929, p. 8.—DAVIS, 1940c, p. 364.

Lectotype.—Winged male, carded, Museum of Comparative Zoology.

Type data.—Island of Rhoda, Cairo, Egypt.

General distribution.—Date-growing regions of Old and New World (where palms were introduced by cuttings, i. e., Southwestern United States).

OLIGOTOMA HUBERTIANA (Saussure)

Embia humbertiana SAUSSURE, 1896b, p. 353.

Oligotoma humbertiana (Saussure) DAVIS, 1939a, p. 186, fig. 5.—Ross, 1940b, p. 674, figs. 48-50.

Oligotoma saundersii of KRAUSS, 1911, p. 39.—ET AL. (misidentifications).

Oligotoma californica of NAVÁS, 1923b, p. 31 (misidentification, see Davis, 1939a).

Holotype.—Male, Muséum d'Histoire Naturelle, Geneva.

Type data.—Ceylon.

Distribution.—Artificially tropicopolitan. In New World occurs sporadically from Mexico to temperate South America and is less frequently collected than *saundersii*.

Genus GYNEMBIA Ross

Gynembia Ross, 1940b, p. 664.

Genotype.—*Gynembia tarsalis* Ross.

Distribution.—California and Arizona.

GYNEMBIA TARSALIS Ross

Gynembia tarsalis Ross, 1940b, p. 664, figs. 4, 39.

Holotype.—Female, on slide, California Academy of Sciences (type No. 4934).

Type data.—Clayton, Contra Costa County, Calif., July 4, 1939 (E. S. Ross).

Distribution.—California, Arizona (one record).

Remarks.—This species is known only by parthenogenetic females, although many hundreds of individuals have been collected as well as reared through several generations in the laboratory. It is recognized at once by the fact that it is the only known North American species of the order possessing two basitarsal sole-bladders, as well as by its distribution.

At this time the writer is provisionally placing the genus and species in the family Oligotomidae because its general facies and

the chaetotaxy of the hindtarsi are almost identical to those of females of the oligotomid genus *Haploembia* of the Mediterranean region of the Old World. It is also interesting to note that *Gynembia* has habits identical to those reported for *Haploembia solieri* in Bulgaria (Táborský, 1938, as *grassii*). Fossils from Baltic amber (*Haploembia antiqua*) (Pictet) indicate that this genus ranged far to the north during Tertiary times, and it is possible that it extended eastward across Siberia as well. Thus it is suspected that the ancestors of *Gynembia* reached America at this time (as did so much Pacific coast biota) by means of the land bridge across the Bering Strait. With but this one exception, all other Embioptera that are present today in temperate North America can be directly derived from Neotropical ancestors. The possibility of its introduction by man from Europe must be considered, but such a happening seems unlikely in view of the wide distribution of the species in California and the fact that it is parthenogenetic, i. e., males are present in *Haploembia*.

UNRECOGNIZABLE SPECIES

The following four species are based upon specimens of the female sex or young and, in the light of present knowledge, are unrecognizable:

EMBIA (OLYNTHA) MULLERI Hagen

Embia (Olyntha) mulleri HAGEN, 1885, p. 206.—KRAUSS, 1911, p. 32.—ENDERLEIN, 1912, p. 52.—NAVÁS, 1918, p. 102.—DAVIS, 1940b, p. 352.

Holotype.—Female (dried and crushed), Museum of Comparative Zoology.

Type data.—"Itajahy, S. Cattarina, S. Brazil, collected 1879 by Dr. F. Muller."

This species is probably an *Embolynta*.

OLIGOTOMA BICINGILLATA Enderlein

Oligotoma bicingillata ENDERLEIN, 1909, p. 191.—KRAUSS, 1911, p. 45.—ENDERLEIN, 1912, p. 93, pl. 1R.—NAVÁS, 1918, p. 90.—DAVIS, 1940c, p. 384.

Holotype.—Female, in Stettiner Zoologischen Museum.

Type data.—"Brasilien, Para."

EMBIA PIQUETANA Navás

Embia piquetana NAVÁS, 1919, p. 25.—DAVIS, 1940b, p. 352.

Holotype.—Female, disposition unknown.

Type data.—Santa Fé, Argentina.

EMBIA KLUGI Rambur

Embia klugi RAMBUR, 1842, p. 313.—DAVIS, 1940b, p. 352 (*Embolynta* ?).

Holotype.—Male?

Type data.—Brazil (Delalande).

* * * * *

The following three species are based upon male holotypes that are inadequately described and perhaps lost; the recognition of these species must await redescription of their types if still preserved:

OLYNTHA RUFICAPILLA Burmeister

Olynta ruficapilla BURMEISTER, 1839, p. 770.—WALKER, 1853, p. 532.—DAVIS, 1940b, p. 348.

Embia (Olynta) ruficapilla (Burmeister) HAGEN, 1885, p. 196 (male—no positive identification).

Embia ruficapilla, (Burmeister) ENDERLEIN, 1912, p. 49, figs. (male—misidentified ?).—NAVÁS, 1918, p. 97.

Holotype.—Male, in Muséum du Jardin des Plantes, Paris (*see* Hagen), or Halle? (*see* Davis).

Type data.—Brazil (Delalande).

EMBIA KOTZBAUERI Navás

Embia kotzbaueri NAVÁS, 1925, p. 67, fig. 2.

Holotype.—Male, in Spain (lost ?).

Type data.—Nitheroy, near Rio de Janeiro, Brazil.

CONDYLOPALAMA AGILIS Sundevall

Condylopalama agilis SUNDEVALL, 1847, p. 255.—KRAUSS, 1899, p. 148 (*Olynta*).—ENDERLEIN, 1912, p. 29 (*Embia*).

(?) *Olynta agilis* (Sundevall) KRAUSS, 1911, p. 32.

Holotype.—Location unknown.

Type data.—Brazil ?

ADDENDA

The following records came to hand too late for incorporation in the body of this report:

Chelicerca (Dactylocerca) rubra (Ross) (see p. 454)

Additional record.—Fillmore, Utah, June 10, 1943. Two males collected by sweeping grass (G. F. Knowlton). Identified by H. K. Townes and not seen by the writer. This is the first record of the order from the State of Utah and the most northern record of the species.

Oligembia (Oligembia) melanura Ross (see p. 470)

Additional record.—New Orleans, La. (E. S. Ross), common on bark of live-oak trees in parks and bordering streets. Mature males present late in September and early in October. This represents a considerable extension of the known range of the species and indicates that it may occur throughout the Gulf Coastal Plain of Texas and Louisiana.

Oligembia (Dilobocerca) vandykei Ross (see p. 488)

Additional records.—FLORIDA: Jacksonville (Oriental Gardens), October 14, 1943; Jacksonville Beach, October 15, 1943; Palatka, October 15, 1943; Gainesville, October 16, 1943; Old Town, Dixie County, October 16, 1943; Tallahassee, October 18, 1943; St. Marks, Wakulla County, October 20, 1943. MISSISSIPPI: Pass Christian, September 20, 1943. LOUISIANA: Slidell, September 20, 1943. All collected by the writer. This widespread species is most common on the bark of live oak but is found also on cabbage-palm trunks and in the bark of juniper and baldcypress. Thus far the species has not been collected west of the Mississippi River.

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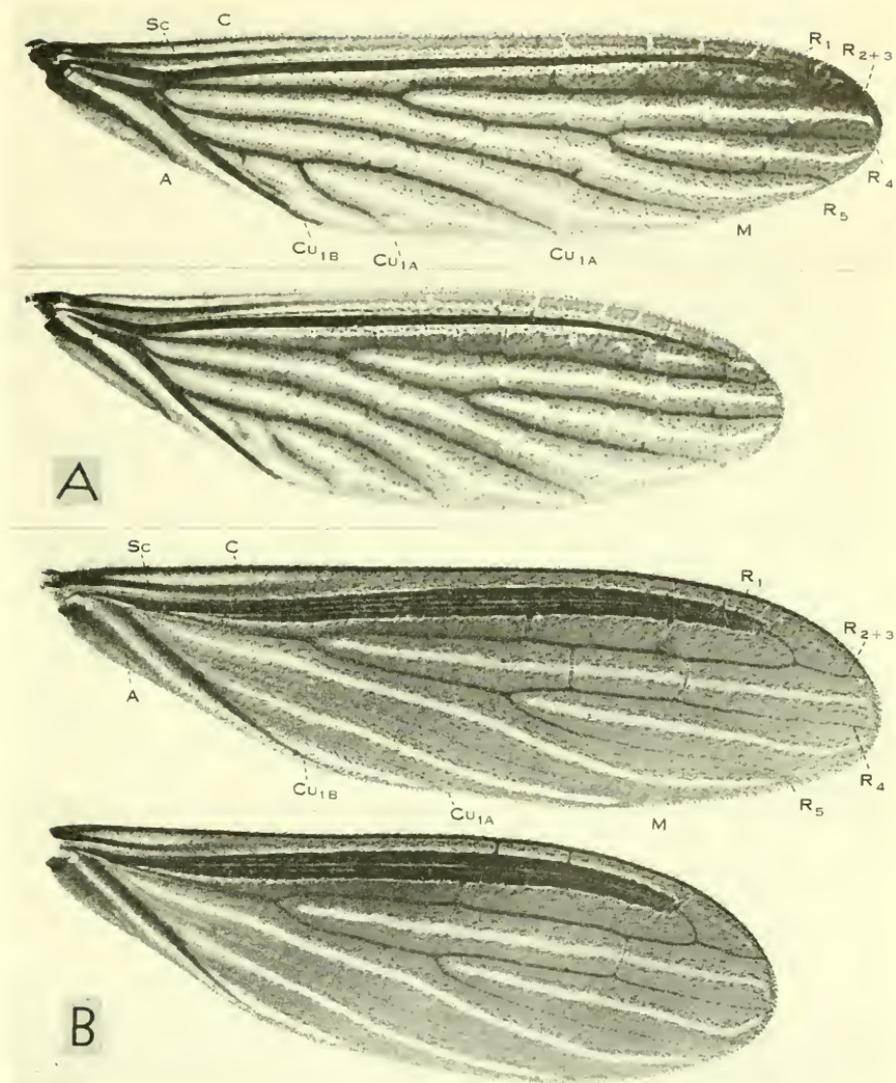
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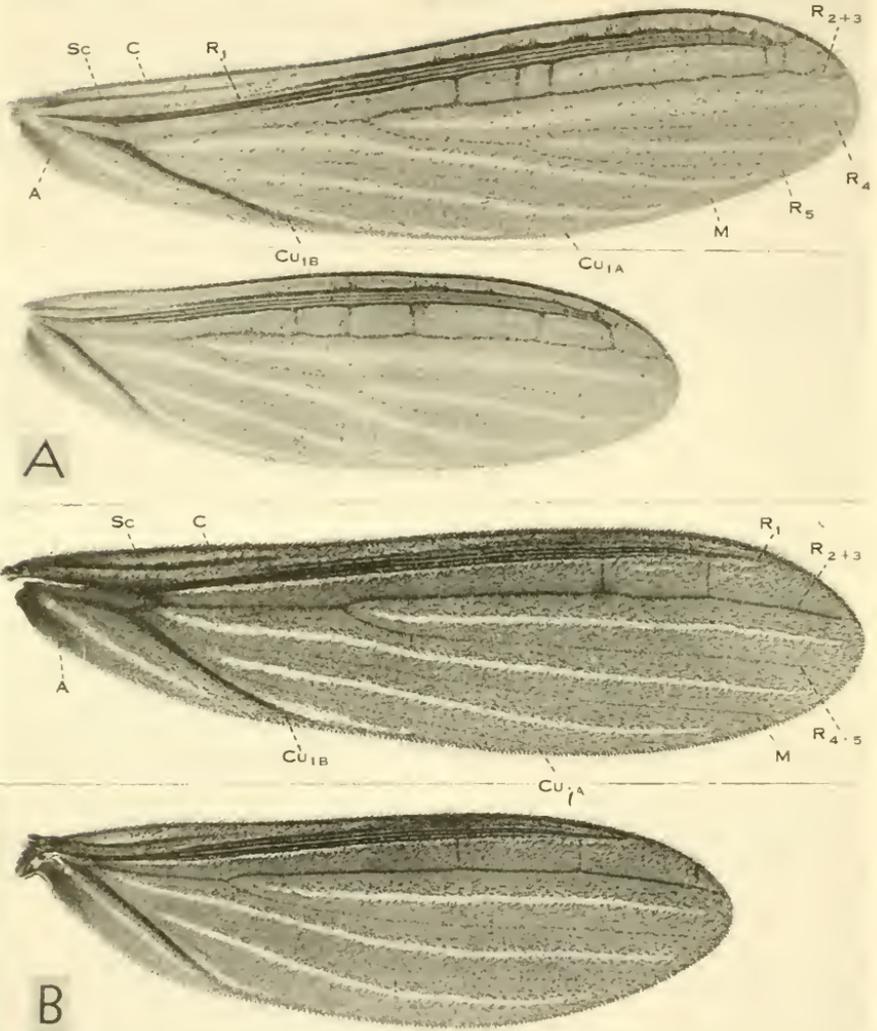
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A, *Clothoda urichi intermedia* (Davis), wings of plesiotype male; B, *Pararhagadochir trinitatis* (Saussure), wings of male from Medellín, Colombia.



A, *Oligembia gigantea*, new species, wings of paratype male; B, *Schizembia grandis*, new genus and species, wings of male.

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TWELVE NEW SPECIES OF CHINESE LEAF-KATYDIDS
OF THE GENUS *XIPHIDIOPSIS*

By ERNEST R. TINKHAM

THIS paper is based on a study of 52 specimens of Chinese leaf-katydids belonging to the genus *Xiphidiopsis* in the United States National Museum, and in the Hebard collection at the Academy of Natural Sciences of Philadelphia. Only one of them was found to belong to a previously described species; the remaining 51 specimens represent 12 species new to science, several of these being represented by unique types.

Family TETTIGONIIDAE

Genus *XIPHIDIOPSIS* Redtenbacher

Xiphidiopsis REDTENBACHER, 1891, p. 531.—HEBEARD, 1922, p. 273.—KARNY, 1923, p. 178; 1926, p. 130.—CHANG, 1935, p. 42.—TINKHAM, 1936, p. 410; 1941, p. —.

The genus *Xiphidiopsis* is one of several genera of small and interesting katydids comprising the subfamily Meconeminae, which Dr. H. Radcliffe Roberts (1941) has shown must be corrected to Meconematinae. The genus is remarkable for the specialization of the male supraanal plate and cerci and for the form of the female subgenital plate and eighth abdominal sternite. The cerci and supraanal plate are often of bizarre and intricate form and make the identity of males a

simple matter. Recent studies by the writer have shown that the females possess interesting specializations as well, for the subgenital plate and the eighth abdominal sternites have become adapted to the curious mating organs of the males. Thus we see that in *X. suzukii* Matsu-mura and Shiraki the subgenital plate is replaced by three pairs of downward-directed prongs. In three other species (*X. gurneyi*, *X. szechwanensis*, and *X. transversa*—all described hereinafter) the eighth abdominal sternite is specialized, and two other new species (*X. phyllocerca* and *X. emarginata*) have teeth at the apex of the ventral valvulae. Furthermore, color characteristics are identical in each sex and constant. In *X. spatulata* the dorsum of the head is reddish brown to the base of the fastigial cone, which is pale green, and in two other new species, *X. phyllocerca* and *X. megafurcula*, the dorsum of head and pronotum is dark reddish brown. Several species have a dorsolateral stripe running from the inner margin of the eye to the posterior margin of the pronotum, and in one species, *X. szechwanensis*, there are four stripes on the dorsum of the head, the two central ones uniting onto the fastigial cone. These constant color features in conjunction with the genitalic adaptations and the varying but constant length of the ovipositor should make the genus *Xiphidiopsis* a favorite among taxonomists.

In 1936 the writer surmised that practically every mountain range in south China had its indigenous species. In the present work seven new species have been described from Mount Omei, 11,000-foot sacred mountain of the Chinese in western Szechwan Province, and two other new species from another source come from that mountain. Even 9 species probably does not represent more than half of the *Xiphidiopsis* fauna of Mount Omei.

In 1933 Uvarov described the first species of the genus as *X. clavata* from southern Kansu Province, and in 1936 the writer described *X. hastaticercus* from Loh Fau Shan in central Kwangtung Province and recorded the Formosan *X. suzukii* for the first time from Hupeh Province in east-central China. In 1939 Ebner described *X. bituberculatus* from Chekiang Province, and in 1941 the writer added 5 new species mainly from Kiangsi and Chekiang to the China list. These came from the Heude Muesum in Shanghai. With the 12 new species described in the present paper, the number of Chinese species is raised to 21. An additional 14 species await description in material in the writer's collection. It is doubtful whether these 35 species represent more than half the number to be found in the Chinese fauna. In addition, there are at least 16 Malayan and 3 Philippine species of the genus described by Dr. H. H. Karny and Morgan Hebard.

KEY TO THE CHINESE SPECIES OF THE GENUS XIPHIDIOPSIS

MALES

1. Small brachypterous species..... 2
Small to large fully winged species..... 3
2. Color uniformly pale green; tegmina 2.7 mm.; cerci hastate in lateral outline, with internal basal uncinuate tooth..... *hastaticercus* Tinkham
Color green, with black on pleurites of thorax and abdomen; tegmina hidden under pronotum; cerci white, incurved with large internal basal tooth..... *grahami*, new species
3. Tegmina not surpassing apices of caudal femora; coloration mottled black; supraanal processes large, white, and strongly divergent; cerci very long and slender, black..... *pieli* Tinkham
Tegmina considerably surpassing apices of caudal femora; coloration foliage green in life, never mottled black..... 4
4. Supraanal plate transverse and entire, without trace of furcula..... 5
Supraanal plate with large or small paired processes..... 8
5. Dorsum of pronotum and head dark reddish brown to base of fastigial cone, which is pale green; tegmina with double row of infumate scattered spots apically; tympana dark; cerci simple, slightly spatulate in lateral outline..... *spatulata*, new species
Dorsum of head not solid brown to base of fastigial cone but pale, with or without stripes..... 6
6. Head with lateral stripe running from inner eye margin to posterior margin of pronotum..... 7
Head with 4 stripes, the 2 central ones converging onto dorsum of fastigial cone; tegmina unspotted; cerci short, slightly incurved, tufted with tawny hairs at internal base and apex..... *szechwanensis*, new species
7. Tegmina unspotted; cerci very long, slightly incurved distally, with small dorsal fin just beyond middle..... *capricercus* Tinkham
Tegmina spotted with single row of scattered dots; cerci short, incurved distally, with large, dorsal, median, finlike tooth.... *gurneyi*, new species
8. Paired supraanal processes short..... 9
Paired supraanal processes very large..... 12
9. Supraanal processes minute; cerci straight with apparently bifurcate apex in lateral profile..... *clavata* Uvarov
Supraanal processes small but prominently produced..... 10
10. Supraanal processes very broad, divergent, and partially fused at base; cerci very long, simple, and acuminate; size very large
kweichowensis, new species
Supraanal processes slender and parallel..... 11
11. Size very large; supraanal processes widely spaced and decurved; apical portions of cerci with foliaceous flanges apically, the dorsal with retrorse acute base; caudal femora with knees dark..... *phyllocerca*, new species
Size small; supraanal processes moderately spaced and slightly decurved; cerci short, with incurved apex and large rectangular internal basal plates with acute angles..... *kulingensis* Tinkham
12. Paired processes straight or decurved..... 13
Paired processes bent down at right angles in apical third; cerci with many prongs resembling deer antlers..... *cervicercus* Tinkham
13. Supraanal processes flat and deeply cleft terminating in inward projecting tooth; cerci somewhat spatulate, not extending to apex of supraanal

processes, with an inferior, apical, dorsal-projecting, attenuate tooth and a large, internal, basal prong; size large, dorsum of head and pronotum dark reddish brown; knees of caudal femora pale

megafurcula, new species

Supraanal processes cylindrical, decurved, with acute bifurcate apices; cerci spatulate, with apex terminating in an extremely long, incurved, acute spur; tegmina with row of scattered dots; size medium large----- *suzukii* Matsumura and Shiraki

FEMALES

1. Small brachyterous species----- 2
Small to very large fully winged species----- 5
2. Color uniformly green----- 3
Color green with pleurites of thorax and abdomen brownish; tegmina whitish and hidden under pronotum; size very small, body length 6.0 mm. ovipositor 4.0 mm.; subgenital plate triangular----- *grahami*, new species
3. Ovipositor heavy, 5.0 mm. long, with greatest depth at middle 1.0 mm.; body heavy, subgenital plate circular----- *yachowensis*, new species
Ovipositor light, 5.0 mm. long, with greatest depth at base and 0.7 mm. broad in middle; body light----- 4
4. Tegmina 2.7 mm.; length to tip ovipositor 15.0 mm----- *hastaticercus* Tinkham
Tegmina 1.0 mm.; length to tip ovipositor 11.3 mm.; subgenital plate semi-circular with 3 keels and setae----- *minutus* Tinkham
5. Coloration green; tegmina extending well beyond apices of caudal femora; size large to small----- 6
Coloration mottled black, tegmina not extending far beyond apices of caudal femora----- *pieli* Tinkham
6. Subgenital plate present----- 7
Subgenital plate absent but replaced by 3 pairs of downward-projecting prongs; tegmina with a single row of scattered dots
suzukii Matsumura and Shiraki
7. Apex of ventral valvulae of ovipositor without teeth----- 9
Apex of ventral valvulae of ovipositor with 5 to 7 teeth----- 8
8. Head and pronotum dark brown; knees of caudal femora dark; size very large, ovipositor 11.5 mm----- *phyllocerca*, new species
Head and pronotum uniformly green and unstriped; knees pale; size medium, ovipositor 10.0 mm----- *emarginata*, new species
9. Eighth abdominal sternite just cephalad of subgenital plate specialized-- 10
Eighth abdominal sternite normal and of same size and form as sternites 2 to 7----- 12
10. Eighth abdominal sternite narrow, with parallel lateral margins and a deep right-angle incision in posterior margin, thus producing an acute bitoothed process, which is attached only at base; ovipositor 6.8 mm.
gurneyi, new species
Eighth abdominal sternite triangular or rhomboidal----- 11
11. Eighth abdominal sternite rhomboidal, posterior margin squarely truncate and very broad, with lateral margins converging forward; subgenital plate rectangular, with gently convex posterior margin; dorsum of head with 4 stripes, the two central uniting on fastigial cone
szechwanensis, new species
Eighth abdominal sternite triangular with apex directed cephalad and larger than remaining sternites; subgenital plate transverse and very broad, with fore and hind margins concave; ovipositor 9.0 mm.
transversa, new species

12. Dorsum of head almost or completely solid brown..... 13
 Dorsum of head pale, with or without a narrow stripe caudad of each eye... 14
13. Dorsum of head solid brown; size large, ovipositor 9.5 mm.; subgenital plate narrowly triangular, with narrow truncate apex bearing median concave notch megafurcula, new species
 Dorsum of head reddish brown to base of fastigial cone, which is pale; tegmina with many scattered dots; size medium small, ovipositor 5.0 mm.
 spathulata, new species
14. Ovipositor very long, 13.0 mm.; head and pronotum unstriped; subgenital plate large, circularly rounded..... cervicerus Tinkham
 Ovipositor 10 mm. or less..... 15
15. Subgenital plate circular at base, with apex greatly produced into 2 long appendiculate processes; head and pronotum unstriped; size small, ovipositor 9.5 mm..... appendiculata, new species
 Subgenital plate without appendiculate process..... 16
16. Ovipositor 7.5 mm. long; size medium large..... sinensis, new species
 Ovipositor 9.5 to 10.0 mm. long..... 17
17. Size medium; head and pronotum with lateral stripe; subgenital plate small; transversely rectangular..... capricerus Tinkham
 Size small; pronotum only striped; subgenital plate of medium size with slightly concave truncate apex and with lateral constriction near base..... kulingensis Tinkham

XIPHIDIOPSIS YACHOWENSIS, new species

FIGURE 157, d

This small brachypterous species is distinguished from the two known brachypterous Chinese species, *X. hastaticercus* Tinkham, 1936, and *X. minutus* Tinkham, 1941, by its slightly larger size, much heavier build, and much broader ovipositor. In addition the ovipositor is less noticeably recurved than in those two species and the smaller tegmina are barely exposed from under the pronotum.

Holotype.—Female, near Yachow, Szechwan, western China, elevation 3,200–3,500 feet, August 29, 1930 (D. C. Graham). Measurements in millimeters: Body length 9.0; length to tip of ovipositor 14.0; pronotum 3.4; lateral length of tegmina 0.8; hindfemora 7.5 by 1.75; ovipositor 5.6 by 1.0. The unique type is U. S. N. M. No. 56293.

Description.—Size small, form of heavy build. Head broader than deep; eyes small, circular, slightly subglobose and widely separated by a distance two and one-half times the diameter of an eye. Vertex with a small bluntly conical prominence separating the large antennal scrobes. Pronotum not expanded on the metazona but of uniform breadth throughout, its length about two and one-half times its breadth. Dorsum of the pronotum flat with a shallow V-shaped suture just cephalad of center; dorsum angularly rounded into the shallow lateral lobes. Tegmina small, ovoid, its truncate rounded posterior margin only partly exposed from under the gently convex posterior margin of the pronotum. Leg spination as follows: Fore-

legs with forefemora unarmed; foretibiae with three pairs of small spines, the proximal pair about centrally placed beyond the tympanum, the apical pair minute. Middle legs with the mesofemora spineless but with a few short stiff bristles on the internal ventral keel; mesotibiae with five ventral pairs of small spines in the apical half. Caudal femora without teeth; caudal tibiae with 14-17 small external and 18-20 internal teeth on the dorsal keels; ventral keels spineless. *Supraanal plate very small, triangular; cerci short, slender, and conical. Ovipositor short, slightly recurved apically, its greatest depth about the middle. Subgenital plate triangular, with rounded truncate apex and gently convex sides, when viewed from the end scoop-shaped.

Coloration.—Unicolorous, bleached white by preservative, probably foliage green in life as common in the genus.

Remarks.—Nothing is known about the biology or habitat of this small species, which is known only from the type locality.

XIPHIDIOPSIS GRAHAMI, new species

FIGURE 157, a-c

This pretty little species is recognized in the male by its minute size, large pronotum, pale brownish coloration, and black sides, with the tegmina completely hidden under the pronotum. The female is distinguished from *X. yachowensis* by its smaller size, slighter build, narrower ovipositor, and the brownish markings on the pronotum; from *minutus* Tinkham by its hidden tegmina, markings on the pronotum, and less recurved ovipositor; and from *hastaticercus* Tinkham by smaller tegmina and the markings on the pronotum.

Holotype.—Male, Mount Omei, Shan Kai Si, Szechwan, western China, elevation 4,400 feet, August 6, 1929 (D. C. Graham). Measurements in millimeters: Body length 6.0; pronotum 3.7 by 1.8; hind-femora 7.0. U. S. N. M. No. 56292.

Description.—Size very small, head broader than deep, the greatest depth being at the level of the eyes. Eyes circular, prominently subglobular; vertex slightly greater than the diameter of an eye, with a small bluntly rounded fastigial cone. Pronotum large, very slightly broader on the metazona although appearing much broader because of the nature of the brown stripes on the dorsum of the pronotum. Posterior margin of the pronotum angularly rounded; the lateral lobes of the pronotum shallow. Tegmina small, completely hidden by the pronotum when viewed from above; the apical portions visible from the sides but not approximating the posterior margin of the pronotum. Leg spination as follows: Forelegs with forefemora unarmed; foretibiae with four pairs of long ventral spines. Middle legs with mesofemora unarmed; mesotibiae with five pairs of ventral

spines, the three proximal pairs the largest, the apical pair minute. Caudal femora unarmed on the inferior keels; caudal tibiae with 23–26 external and 26–28 internal black teeth on the dorsal keels, with the apical pair the largest; central keels unarmed. Cerci bifurcate, with a long, incurved outer arm and a much shorter straight internal basal prong. Subgenital plate small, triangular, with a minutely notched apex and two closely placed apical styli.

Coloration.—Head black above, paling below with the labrum and maxillary palpi whitish; occiput with trace of two narrow pale stripes converging forward. Pronotum with dorsum pale brownish margined posteriorly with dark brown broken stripes, which are narrowed in the anterior two-fifths. Lateral lobes black with a stripe of white, bordered on the posterior margin between the black of the lobes and the narrow brown dorsolateral stripes. The hidden tegmina are whitish. Thoracic pleurites black margined with whitish below. Abdomen pale brown above, pleurites black, lateroventral areas white, and sternites medium brown. Cerci white; subgenital plate blackish brown. Fore and middle legs pale brownish white; hindfemora pale, with muscular areas streaked with brown. Caudal tibiae very pale brown. Antennal scrobes and basal segments black, remainder of antennae whitish.

Allotype.—Female, same data as for the type but measurements as follows: Body length 6.0; length to tip of ovipositor 9.8; pronotum 4.2 by 1.9; hindfemora 8.6; ovipositor 4.0 mm. U.S.N.M. No. 56292.

Description.—Closely similar to the holotype in form and size. Leg spination as follows: Fore and middle legs as in the holotype; caudal femora unarmed; caudal tibiae with 28–30 external and 27–30 internal small black teeth, the apical pair much the largest. Ovipositor short, straight, and only very slightly recurved apically. Subgenital plate large and triangular with rounded apex.

Coloration.—Somewhat similar to the holotype but much paler. Head pale brownish, white below the kidney-brown eyes; vertex and occiput pale, with two median brown stripes converging forward to unite as one on the fastigial cone. A lateral stripe runs forward to the inner margin of each eye, then edging the inner margin of the antennal sockets. Antennal scrobe and first segment verona brown, remainder of the antennae testaceous. Dorsum of the pronotum as in the holotype but stripe slightly heavier especially on the metazona. Lateral lobes of the pronotum tinged with pale brown on the prozonal portion, the lower margin edged with dark brown. Pleurites of the abdomen pale brown, not much darker than the dorsum. Legs colored as in the holotype.

Paratype.—One male, same date as for the holotype. Measurements in millimeters: Body length 7.0; pronotum 4.0; hindfemur 7.0. A paratype deposited in the Tinkham collection. Coloration and features similar to holotype.

XIPHIDIOPSIS KWEICHOWENSIS, new species

FIGURE 157, *j*

This large, long-winged species is distinguished from other known Chinese species of the genus by its size and by the straight, simple, tapering cerci, which are slightly incurved at the tip. The subgenital plate is sharply triangular with subapical styli, and the supraanal plate bears a sharp bifurcate process.

Holotype.—Male, Shih Men Kan, Kweichow Province, western China, July 1934 (D. C. Graham). Measurements in millimeters: Body length 13.0; length 25.0 to tip of tegmina; pronotum 4.5; tegmina 20.8; hindfemur 11.7. The unique male is U.S.N.M. No. 56294.

Description.—Form typical of the genus. Coloration testaceous, in life uniformly foliage green. Eyes kidney brown. Vertex about one and one-half times the diameter of the eyes, which are circular and subglobular. Fastigial cone small and bluntly rounded. Pronotum with the posterior margin angularly rounded. Lateral lobes unusually deep, their depth about equal to the breadth of the prozona. Leg spination as follows: Forelegs with forefemora unarmed; foretibiae with five pairs of long spines. Middle legs with mesofemora unarmed; mesotibiae with six pairs of spines, the four proximal large, the two distal pairs small. Caudal femora unarmed on the inferior keels; caudal tibiae with 28–31 external and 28–32 internal black short teeth on the dorsal keels and 10 external and 3 internal apical pale ventral spines. Male supraanal plate transversed by a pair of median caudally projecting prongs, with their inner margins fused for two-thirds of their length, leaving the apical portions bifurcate. Cerci straight, cylindrical, rapidly tapering from a heavy base to the narrow slightly incurved apex. Subgenital plate triangular, with an acute apex below, subapical to which is a pair of minute styli, this feature being unique in the males of the known Chinese species. Only the unique male of this species is known.

XIPHIDIOPSIS PHYLLOCERCA, new species

FIGURE 157, *f, k*

A large and fully caudate species distinguished by the dark dorsum of the pronotum and the genicular areas of the caudal femora. The male cerci are peculiar in their leaflike form owing to the flanged enlargements especially developed on the internal apical margin of the cerci. The large size, dark dorsum of the pronotum and dark

genicular areas, and the small apical teeth on the ventral valvulae of the ovipositor will serve to distinguish the female from all other Chinese species.

Holotype.—Male, Kwanhsien, Szechwan, western China, July 12, 1930 (Hebard collection). Measurements in millimeters: Body length 12.0; length to tip of wings 26.0; pronotum 5.4 by 3.0; hind-femora 12.5. The type is deposited in the Hebard collection at the Academy of Natural Sciences of Philadelphia.

Description.—General form typical of the genus. Head about as broad as deep; eyes circular and subglobular. Vertex about one and three-quarters times the diameter of an eye. Fastigium with a small laterally compressed narrow cone, buttressed on each side by the flanged and raised inner margins of the antennal foveolae. Pronotum narrow on the prozona, considerably elevated and expanded on the metazona; the dorsum of the metazona slightly convex with traces of the lateral carinae; front of the metazona marked by a transverse sulcus. Seen in profile the plane of the prozona is considerably depressed below that of the metazona. Posterior margin of the pronotum broadly elliptical in outline. Lateral lobes slightly greater than the breadth of the prozona. Tegmina long and narrow, surpassing the apices of the caudal femora by two-thirds their length. Costal margin of the tegmina considerably expanded in the basal half; tympanal vein strongly developed. Wings very slightly longer than the tegmina. Leg spination as follows: Forelegs with forefemora unarmed and 6 external and 5 internal spines on the ventral margins of the foretibiae. Middle legs with mesofemora unarmed; mesotibiae with 6 external and 5 internal ventral spines. Caudal femora unarmed; caudal tibiae with 26–28 external and 28–32 internal teeth on the dorsal keels and 9–10 external and 3 internal apical spines on the ventral keels. Supraanal plate with two widely spaced short caudally projecting prongs. Cerci strongly cylindrical in the basal half; apical half sharply recurved with the upper margin flanged and elevated with the basal portion acutely produced proximally. Inner margin of apical half of cerci strongly flanged into an inward projecting plate. Subgenital plate narrow and deep, the apical portion lying normally between the bent arms of the cerci.

Coloration. General body color in life probably green, in the preserved specimen yellowish brown. Dorsum of head and pronotum dark reddish brown, paling on the posterior half of the metazona. Lateral margins of pronotum edged with piceous, these margins diverging from the prozona into the metazona; the area immediately below the dark margins whitish. Tympanal vein area of tegmen somewhat darkened. Genicular areas of the caudal femora and ex-

ternal bases of caudal tibiae very dark reddish brown. Eyes purplish gray. Antennae testaceous with widely spaced darkened joints.

Allotype.—Female, Kwanhsien, Szechwan, elevation 4,000 feet, October 13, 1934 (D. C. Graham). Measurements in millimeters: Body length, 15.0; length to tip of wings, 31.0; length to apex of ovipositor, 26.0; pronotum, 4.8; tegmina, 25.5; ovipositor, 11.0. U.S.N.M. No. 56295.

Description.—Size slightly larger than the holotype; head closely similar. Pronotum with the prozona broader than in the holotype, the constriction between the breadth of the prozona and metazona less than in the holotype; dorsal plane of metazona flatter and less elevated above that of the prozona than in type. Tegmina similar to type but costal margin and tegminal veins less developed. Fore and middle legs similar to the type. Caudal femora unarmed; caudal tibiae with 22–23 external and 24–26 internal teeth on the dorsal keels and 9–11 external and 3 internal small apical ventral spines. Ovipositor of moderate length and very slightly recurved. Ventral valvulae with 1 large and 6 minute subapical teeth; this feature separating this species in the female sex from all other females of the Chinese species. Subgenital plate broad with the posterior margin rounded and bearing a shallow median concavity.

Coloration.—Closely similar to the holotype but somewhat bleached by preservative fluid.

Paratypes.—One female, Mount Omei, Szechwan, altitude 4,500 feet, July 28, 1929 (D. C. Graham; Hebard collection). One female, Mount Omei, 4,400 feet, July 13, 1931 (D. C. Graham; Hebard collection). One female, Shin Kai Si, Mount Omei, 4,400 feet, August 4–6, 1929 (D. C. Graham; U.S.N.M.). One female, near Mupin, China, Szechwan, 2,000–2,800 feet, July, 1929 (D. C. Graham; U.S.N.M.). Range in measurements in millimeters: Body length 14.0–15.0; pronotum 4.5–4.8; tegmina 24.5–25.5; hindfemora 14.5–15.0; ovipositor 10.5–11.5. Paratypes similar to the allotype in coloration and features, and deposited in the United States National Museum, Hebard and Tinkham collections.

XIPHIDIOPSIS MEGAFURCULA, new species

FIGURE 157, *g*, 8

A moderately large, fully winged species distinguished from all other Chinese males of the genus by the very long, separated, dorso-ventrally flattened, furculalike processes of the supraanal plate and in the female by the long, narrowly triangular subgenital plate, the apex of which bears a minute triangular notch.

Holotype.—Male, Maan Chi Shan, Kwangtung, South China, X-XII, 1921 (C. W. Howard). Measurements in millimeters: Body length 14.0 to apex of supraanal process; length to tip of tegmina 20.5;

pronotum 3.8; length to wing tips 25.5; tegmina 17.0 by 1.5; hindfemora 12.7. Holotype in the Hebard collection in Philadelphia.

Description.—A moderately large-sized species of slender build and yellowish coloration. Head narrow, its breadth less than depth. Eyes large, circular, and strongly subglobular, separated by a breadth one and one-half times an eye diameter. Fastigial cone very small and narrow projecting forward from between the antennal foveolae. Pronotum long and rather narrow, the metazone only a shade broader than the prozona; posterior margin broadly elliptical. Lateral lobes slightly deeper than the breadth of the prozona. Tegmina long and narrow, margins slightly subparallel, gently converging toward the apex. Wings projecting about 5 mm. beyond the apex of the tegmina. Leg spination as follows: Forelegs with femora unarmed, foretibiae with 9 external and 7 internal spines, the proximal 6 largest and unpaired, the apical ones minute and paired. Middle legs with femora unarmed; mesotibiae with 7 external and 8 internal small spines. Caudal femora unarmed; caudal tibiae with 31–33 external and 31 internal yellow teeth on the dorsal keels and 10 or 11 external and 3 or 4 internal apical spines on the ventral keels. Supraanal plate enormously produced into two broad, dorsoventrally flattened, furculalike processes, separated by a space slightly less than the breadth of one of the processes; this cleft or space continuing to the very base of the plate. The apices of the supraanal processes are slightly deflexed and bear a conspicuous inward-projecting tooth. The cerci lie below and are shorter than the supraanal processes and in lateral profile appear somewhat spatulate, with the apical portions strongly incurved and bearing at their inferior apical angle a long upturned spine. Subgenital plate very small, roughly triangular with a pair of apical styli.

Coloration.—The nonalcoholic preserved type has a decided yellowish-brown cast, the caudal tibiae being definitely yellowish brown although the natural color may be greenish or yellowish. The dorsum of the head is dark reddish brown, this band continuing on the dorsum of the pronotum with only very slight broadening on the metazona; the band is parallel-sided on the prozona. Cells of the tegmina pale purplish brown, with the veins contrastingly pale. Wings partially infumate with purplish brown. Internal surface of basal antennal segment and fastigial cone piceous; remainder of the antennae very dark reddish brown. Eyes purplish brown or pale kidney brown. Remainder of the body, other than the dorsum of head and pronotum and the antennae, uniformly pale yellowish brown.

Allotype.—Female, same data as for the holotype. Measurements in millimeters: Body length 12.0; length to tip of tegmina 22.0; length to wing tips 28.0; length to tip of ovipositor 22.0; tegmina

18.5 by 1.6; pronotum 3.7 by 1.2; ovipositor 9.5. Allotype deposited in the Hebard collection.

Description.—Closely similar to the holotype in coloration but slightly larger. Leg spination similar. Ovipositor of medium length and only slightly recurved in the apical half. Subgenital plate contrastingly different from all the other female plates of known Chinese species, being isosceles-triangular in form with a narrowly truncate apex bearing a small median circular notch.

Male paratypes.—One, same data as for the holotype and measuring: Body length 12.5; length to tip of tegmina 20.0; length to wing tips 25.0; pronotum 3.6; tegmina 17.4; wing 20.0; hindfemora 12.6 mm. One, Szechwan, China, June–September 1934 (D. C. Graham; U. S. N. M.) and measuring: Body length 14.0; pronotum 3.6; length to tip of tegmina 20.5; length to wing tip 25.0 mm.; no legs on this specimen. One, Tseo Jia Geo, south of Suifu, 1,400–2,000 feet (D. C. Graham; U. S. N. M.); measurements: Body length 12.0; length to tip of tegmina 21.0; length to wing tips 25.5; pronotum 3.8 mm.; no caudal femora on this specimen.

Female paratypes.—Six, Tseo Jia Geo, south of Suifu, Szechwan, August 1929 (D. C. Graham). One, Chengtu, September 14–18, 1933, 1,700 feet (D. C. Graham; U.S.N.M.). One, Suifu, Szechwan, 1,000–2,000 feet, September 20, 1929 (D. C. Graham; U.S.N.M.). Two,

FIGURE 157.—NEW CHINESE SPECIES OF XIPHIDIOPSIS Redtenbacher

- a-c*, *X. grahami*: *a*, Male, holotype, from Mount Omei, Szechwan, lateral view; *b*, dorsal view of right cercus of same; *c*, female, allotype, from same locality, ventral view of subgenital plate.
- d*, *X. yachowensis*: Female, holotype, from near Yachow, Szechwan, ventral view of subgenital plate.
- e*, *X. emarginata*: Female, holotype, from Tseo Jia Geo, south of Suifu, Szechwan, ventral view of subgenital plate.
- f, k*, *X. phyllocerca*: *f*, Male, holotype, from Kwansien, Szechwan, lateral view of genitalia; *k*, female, allotype, from same locality, ventral view of subgenital plate.
- g, s*, *X. megafurcula*: *g*, Male, holotype, from Maan Chi Shan, Kwangtung, lateral view of genitalia; *s*, female, allotype, from same locality, ventral view of subgenital plate.
- h, i*, *X. spathulata*: *h*, Male, holotype, from Shin Kai Si, Mount Omei, Szechwan, lateral view of genitalia; *i*, female, allotype, from Tseo Jia Geo, south of Suifu, Szechwan, ventral view of genital plate.
- j*, *X. kweichowensis*: Male, holotype, from Shih Men Kan, Kweichow, ventral view of genitalia.
- l-n*, *X. gurneyi*: *l*, Male, holotype, from Mount Omei, Szechwan, lateral view of genitalia; *m*, dorsal view of left cercus of same; *n*, female, allotype, from Si Gi Pin, Szechwan, ventral view of subgenital plate and eighth abdominal sternite.
- o*, *X. transversa*: Female, holotype, from Shin Kai Si, Mount Omei, Szechwan, ventral view of subgenital plate and eighth abdominal sternite.
- p-r*, *X. szechwanensis*: *p*, Male, holotype, from Suifu, Szechwan, lateral view of genitalia; *q*, dorsal view of left cercus of same; *r*, female, allotype, from Shin Kai Si, Mount Omei, Szechwan, ventral view of subgenital plate.
- t*, *X. appendiculata*: Female, holotype, from Tseo Jia Geo, south of Suifu, Szechwan, ventral view of subgenital plate.

Szechwan, September 1933–June 1934 (D. C. Graham; U.S.N.M.). Range in measurements in millimeters: Body length 10.0–11.0; length to tip of ovipositor 20.0–21.0; to tip of tegmen 21.0–22.0; to tip of wings 26.0–27.0; pronotum 3.3–3.5; tegmen 18.0–19.0; hindfemur 12.3; ovipositor 9.5 mm. Female paratypes identical to the allotype in coloration and features and deposited in the United States National Museum (No. 56296) and the Tinkham collection.

XIPHIDIOPSIS SUZUKII (Matsumura and Shiraki)

Teratura suzukii MATSUMURA and SHIRAKI, 1908, p. 48, pl. 1, fig. 4.

Teratura? suzukii TINKHAM, 1935, p. 213 (Hupeh).

Xiphidiopsis suzukii TINKHAM, 1941, p. ?.

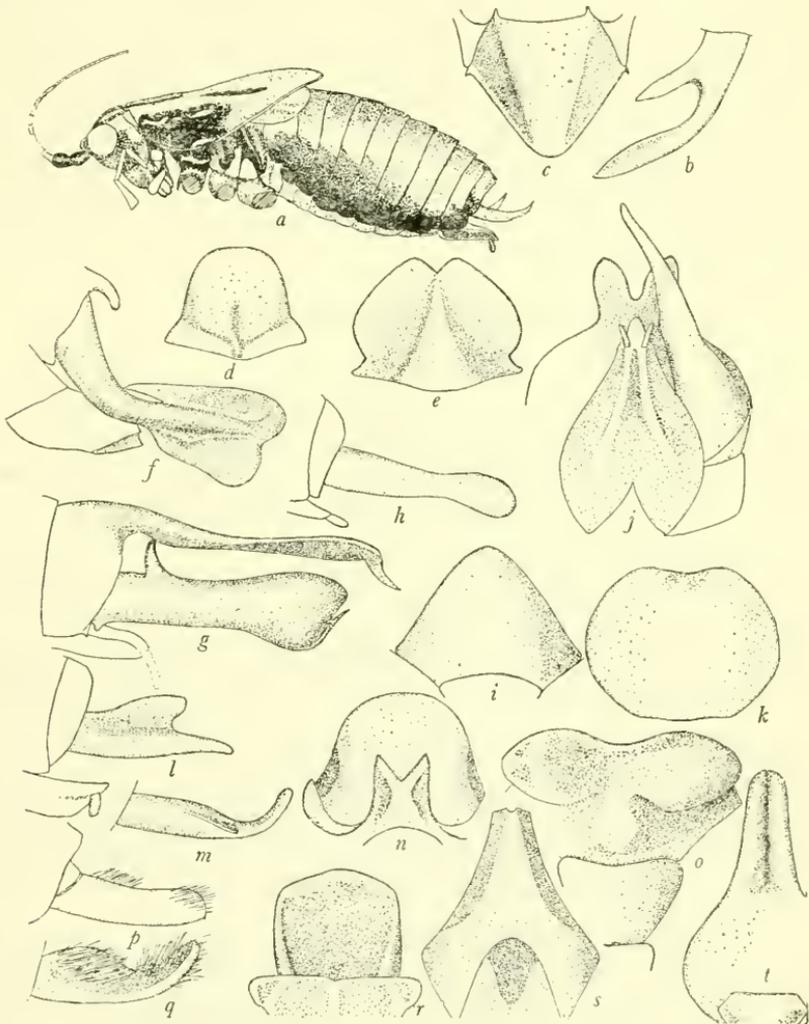


FIGURE 157.—For explanation see opposite page.

Described from Formosa in 1908, this species was first reported by the author from Hupeh Province in 1935. In 1941 additional specimens from the Heude Museum, Shanghai, were recorded from Shanghai and Ihing, Kiangsu Province.

An additional female from Suifu, Szechwan, western China, altitude 1,000 to 1,500 feet, collected by Dr. D. C. Graham, "10, 1930" (probably meaning October 1930), represents the first record of this widely distributed species from western China.

The female of *suzukii* is recognized by its pale green coloration in life (pale brown when preserved), with a few fine dots scattered over the central portion of the tegmina. The ovipositor is short, very gently recurved, with three pairs of downward-projecting prongs at the ventral base of the ovipositor. One pair belongs to the eighth abdominal sternite; the middle pair represents the specialization of the ninth abdominal sternite; and the third and caudal pair pertains to the external basal portion of the ventral valvulae. This character of the three pairs of prongs situated at the ventral base of the ovipositor quickly separates the females of *suzukii* from the females of all other Chinese species described and undescribed. The male of *suzukii* is also quickly recognized by the bizarre form of the supraanal plate and cerci of its genitalia.

XIPHIDIOPSIS SZECHWANENSIS, new species

FIGURE 157, p-r

A spotted-winged species distinguished from the spotted-winged *X. suzukii* and other fully winged species by the fastigial cone streaked with brown and the four brown stripes on the dorsum of the occiput. The male supraanal plate is entire, squarely transverse, and the cerci are simple, heavy with tufts of tawny hair near the apex and the internal base, which characters will serve to distinguish this species. The female subgenital plate is small, quadrate, with the sternite cephalad narrow and broadly transverse, rhomboid in outline, with the lateral margins converging strongly cephalad, a character not possessed by other females of the genus. Nearest relationship appears to be with *X. cyclolabia* Karny, 1923, from Malaya.

Holotype.—Male, Suifu, Szechwan, altitude 1,000 feet, October 15-17, 1929 (D. C. Graham). Measurements in millimeters: Body length to tip of cercus 9.7; length to tip of tegmina 22.0; pronotum 4.0 by 1.7; tegmina 1.5 by 2.0; hindfemora 11.2; cercus 1.5. U. S. N. M. No. 56298.

Description.—Size medium and form typical of the genus. Head broader than deep; eyes large, ovalish, subglobular. Vertex about one and one-half times the lateral diameter of an eye as seen from above. Foremargin of the pronotum slightly convex; posterior margin

strongly hyperbolic or angularly rounded. Metazona not broader than the prozona; its length slightly less than the length of the prozona. In profile metazona raised slightly above the plane of the prozona. Lateral lobes of the pronotum slightly broader than deep. Tegmina and wings extending considerably beyond the apices of the caudal femora. Leg spination as follows: Forelegs with forefemora unarmed; foretibiae with four large pairs of spines beyond the tympana and two small apical external spines; tympana with both faces apert. Middle legs with mesofemora unarmed; mesotibiae with four large and two small apical external spines and two large subapical spines and one small apical internal spine. Caudal femora unarmed; caudal tibiae not complete but probably closely similar in spination to that of the allotype, description of which is to follow. Supraanal plate entire, squarely truncate; cerci short and heavy at base with the apical half gently incurved with internal apical surface excavate. Tufts of tawny hairs clothe the internal basal half and the apical region of the cercus. Subgenital plate rather large with long truncate apex bearing long lateral, widely separated, subapical styli.

Coloration.—Testaceous in preserved alcoholic specimens but foliage green in life, with a few large infumate spots in a row in the basal half and scattered roughly in two rows in the apical portions. Pronotum with a band of brown occupying two-thirds of the dorsum with the margins darker; the band somewhat constricted medianly. Dorsum of head with the fastigial cone streaked with dark brown, which divides into two narrow dark brown stripes crossing the occiput and laterad with another dark brown stripe on each side extending from the inner margin of the eye to the posterior margin of the occiput; these four stripes on the dorsum of the head quickly identify this species.

Allotype.—Female, Shin Kai Si, Mount Omei, Szechwan, 4,400 feet, August 4-6, 1929 (D. C. Graham). Measurements in millimeters: Body length 9.5; length to apex of tegmen 22.0; length to apex of wings 23.0; pronotum 3.8; tegmen 19.0 by 2.0; ovipositor 8.5. U.S.N.M. No. 56298.

Description.—Closely similar to the holotype in size and coloration. Leg spination as follows: Forelegs with forefemora unarmed; foretibiae with four large pairs of spines and two external and small apical spines. Middle legs with mesofemora unarmed; mesotibiae with five pairs of spines, the basal largest and an additional basal external spine. Caudal femora unarmed; caudal tibiae with 31-33 external and 32 or 33 internal short dorsal teeth, the distal ones largest and 8 or 9 external and four internal ventral spines. Ovipositor moderately long, gently recurved apically. Subgenital plate quadrate, with parallel and rolled lateral margins and convex posterior margin. Sternite cephalad of the subgenital plate, rhomboid, with the posterior

margin squarely truncate and much broader than the subgenital plate and rest of the abdominal sternites; the lateral margins converging strongly cephalad as shown in figure 157, *r*.

Paratype.—One male, Mount Omei, Szechwan, 11,000 feet; August 19, 1934 (D. C. Graham; U.S.N.M.). Measurements in millimeters: Body length 9.5; hindfemora 11.0; pronotum 4.0; tegmina with apex missing. Paratype in the Tinkham collection. Closely similar to the holotype in size, form, and coloration.

XIPHIDIOPSIS SPATHULATA, new species

FIGURE 157, *h, i*

A small species, with spotted tegmina, dorsum of pronotum dark brown, and occiput of head dark brown except for the pale-colored fastigial cone and darkened tympana, these being features that are quite distinctive. The male cerci are long, simple, and spathulate, and the female ovipositor is short, more recurved than usual, with triangular subgenital plate. Nearest relationships appear to be with *X. szechwanensis* Tinkham.

Holotype.—Male, Shin Kai Si, Mount Omei, Szechwan, altitude 4,400 feet, July 1929 (D. C. Graham). Measurements in millimeters: Body length 7.3; length to tip cerci 9.0; pronotum 3.0; length to tip of tegmina 17.0; tegmina 14.0; cercus 1.7; hindfemora 8.4. U.S.N.M. No. 56297.

Description.—Size rather small and form typical of genus. Head much broader than deep; eyes subcircular and subglobular; fastigial cone prominent. Pronotum with foremargin slightly convex; posterior margin broadly angularly rounded. Prozona slightly broader than the metazona; lateral lobes broader than deep. Tegmina and wings extending considerably beyond the apices of the caudal femora. Leg spination as follows: Forelegs with forefemora unarmed; foretibiae with four pairs of large spines between the tympana and the apical third. Middle legs with mesofemora unarmed; mesotibiae with four pairs of long spines and one small external apical spine. Caudal femora unarmed; caudal tibiae with 31–33 external and 32 internal dorsal teeth and 4–7 external and 3 internal apical ventral spines. Genitalia with supraanal plate squarely truncate and entire; cerci long, simple, heavy at base, with apical half slightly spathulate and gently incurved, the inner surface of the apical half excavate. Subgenital plate very small; posterior margin squarely truncate, with widely spaced submarginal styli.

Coloration.—Testaceous in the preserved specimen: foliage green in the living specimen, with the dorsum of the pronotum possessing a median band of dark brown extending onto the head as far as the base of the fastigial cone; eyes dark brown. Fastigial cone green in

life; tympanal areas of foretibiae piceous. The dark color of the dorsum of the head caudad of the fastigial cone and the darkened tympanal areas serve immediately to separate this species from others. Median area of tegmina with a few scattered infumate spots and stridulating field and anal margin areas reddish tinged where the margins are attinent; wings slightly infumate.

Allotype.—Female, Tseo Jia Geo, south of Suifu, Szechwan, 1,400–2,000 feet (D. C. Graham). Measurements in millimeters: Body length 8.5; length to tip of tegmina 20.0; length to wing tips 21.5; length to tip of ovipositor 14.0; pronotum 3.5; tegmina 17.5 by 1.8; ovipositor 5.0 mm. The hindfemora are missing in the allotype. U.S.N.M. No. 56297.

Description.—Similar in form, size, and coloration to the holotype. Leg spination as follows: Forelegs with forefemora unarmed; foretibiae with four large pairs of spines and one external apical small spine. Middle legs with mesofemora unarmed; mesotibiae with five external and four internal large spines. Hindlegs missing in allotype and female paratype but probably similar to the spination in the holotype. Ovipositor short, moderately stout, and moderately recurved in the apical half. Subgenital plate large and roundly triangular.

Paratype.—One female, Kuanshien, Szechwan, August 1–4, 1934 (D. C. Graham; U.S.N.M.). Measurements in millimeters: Body length 9.0; length to tip ovipositor 14.0; length to wing tips 21.5; length to tegminal tips 20.5; tegmina 17.0; pronotum 3.4; ovipositor 5.0. Hindfemora missing. Deposited in the Tinkham collection. Paratype identical to the allotype.

XIPHIDIOPSIS GURNEYI, new species

FIGURE 157, 1–n

A small species recognized by the squarely truncate and entire supraanal plate, by the short simple incurved cerci bearing a median dorsal fin, and by the diacritical bipronged eighth abdominal sternite lying just cephalad of the large and somewhat rounded subgenital plate. The male appears to be most nearly related to *X. capricercus* Tinkham.

Holotype.—Male, Mount Omei, Baian-Kara-Ula Range, Szechwan, altitude 4,500 feet, July 26, 1929 (D. C. Graham). Measurements in millimeters: Body length 10.0; length to cercus tip 11.5; length to tip of tegmina 17.5; length to wing tips 19.0; pronotum 3.2 by 2.3; hindfemora 8.0. Deposited in the Hebard collection in Philadelphia.

Description.—Size small and form typical of genus. Head not much broader than deep, eyes subcircular and subglobular. Pronotum with foremargin gently convex; posterior margin hyperbolically

rounded. Tegmina and wings extending considerably beyond the apices of the caudal femora. Leg spination as follows: Forelegs with forefemora unarmed; foretibiae with four large pairs of spines and one minute apical pair. Middle legs with mesofemora unarmed; mesotibiae with four large and two minute apical external spines and three large and two minute apical internal spines. Caudal femora unarmed; caudal tibiae with 29–32 short black external and 26–29 black internal dorsal teeth and 9–11 external and 3 internal apical small spines. Supraanal plate transverse and entire. Cerci short, heavy in the basal two-thirds, with the apical third incurved; the cerci bear a median dorsal finlike tooth that characterizes the species. Subgenital plate of moderate size, longer than broad, with parallel lateral margins and moderately convex posterior margin with two small, lateral, widely spaced marginal styli.

Coloration.—Uniformly foliage green in life, with a narrow lateral brown stripe on the margins of the pronotum and a trace of a stripe at the posterior angles of the eye not extending to the posterior margin of the head. Fastigial cone with a pale brown dorsal stripe; rest of head green. Dorsum of pronotum between the lateral stripes brownish yellow. Tibial teeth of hindlegs black.

Allotype.—Female, Si Gi Pin, Szechwan, 6,000–7,000 feet, August 8, 1929 (D. C. Graham). Measurements in millimeters: Body length 10.0; length to apex of ovipositor 17.0; length to wing tips 21.0; length to tegmen tips 20.0; pronotum 3.0; hindfemora 10.0; ovipositor 6.8. U.S.N.M. No. 56299.

Description.—Closely similar to the holotype in size, form, and coloration. Leg spination as follows: Forelegs with forefemora unarmed; foretibiae with six external spines, the four basal the largest, and four large internal and one pair of minute apical spines. Middle legs with mesofemora unarmed; mesotibiae with six external and five internal spines, the four basal the largest. Caudal femora unarmed; caudal tibiae with 25–28 external and 26–29 internal short black dorsal teeth and 8 or 9 external and 3 or 4 internal pale ventral spines. Ovipositor moderately short, heavy, and moderately recurved apically. Subgenital plate with moderately convex posterior margin and lateral margins divergent to their broad base. Eighth abdominal sternite, just cephalad of the subgenital plate with subparallel lateral margins, the apex deeply notched by a right-angle incision as shown in figure 157, *n*. This character serves to readily distinguish *X. gurneyi* from the known females of the Chinese species.

Male paratypes.—One, Shin Kai Si, Mount Omei, Szechwan, 4,400 feet, July 1–17, 1922 (D. C. Graham; U.S.N.M.). One, south of Suifu, Szechwan, September 6, 1929 (D. C. Graham; U.S.N.M.). One, Shin Kai Si, Mount Omei, August 7, 1929 (D. C. Graham; U.S.N.M.).

Two, Mount Omei, Baian-Kara-Ula Range, Szechwan, 4,500 feet, August 14-15, 1929 (D. C. Graham; Hebard Collection). One, Si Gi Pin, Szechwan, August 8, 1929 (D. C. Graham; U.S.N.M.). Range in measurements in millimeters: Body length 8.5-9.5; pronotum 3.2-3.4; length to wing tips 18.0-19.5; tegmina 15.5-17.0; hindfemora 8.5 mm. Male paratypes identical to the holotype in every respect.

Female paratype.—One, Mount Omei, 11,000 feet, August 19, 1934 (D. C. Graham; U. S. N. M.). Measurements in millimeters: Body length 9.0; length to wing tips 21.0; pronotum 3.3; hindfemur 9.0; ovipositor 6.5. Identical to the allotype. Paratypes deposited in the United States National Museum, Hebard, and Tinkham collections.

This species is named in honor of Dr. A. B. Gurney, of the U. S. Bureau of Entomology and Plant Quarantine, who has kindly arranged the loan of the specimens of *Xiphidiopsis* belonging to the U. S. National Museum.

XIPHIDIOPSIS APPENDICULATA, new species

FIGURE 157, *t*

This medium-sized species, known only in the female sex, is recognized by its uniform green coloration, without markings of any sort, the rather long and slender ovipositor, and the triangular subgenital plate with the apex produced into a narrow appendiculate process.

Holotype.—Female, Tseo Jia Geo, south of Suifu, Szechwan, altitude 1,400-2,000 feet, August 1929 (D. C. Graham). Measurements in millimeters: Body length 8.5; length to tip of ovipositor 17.0; length to wing tips 20.5; length to tip of tegmina 19.5; pronotum 3.5; tegmen 17.8; ovipositor 9.5. U. S. N. M. No. 56300.

Description.—Size medium and form typical of the genus. Head broader than deep; eyes subcircular and subglobular. Pronotum with the foremargin gently convex; posterior margin hyperbolically rounded; lateral lobes broader than deep. Tegmina and wings reaching far beyond the apices of the caudal femora but little beyond the tip of the ovipositor. Leg spination as follows: Forelegs with forefemora unarmed; foretibiae with four pairs of long infumate spines beyond the tympana, the internal ones the largest. Middle legs with mesofemora unarmed; mesotibiae with four external and three internal large spines and two minute apical pairs of spines. Caudal femora unarmed; caudal tibiae with 27 external and internal small black dorsal teeth and 7 external and 3 internal apical small ventral spines. Ovipositor long and practically straight, with only a slight reflexion apically. Subgenital plate circularly rounded, with the apical area extended into an appendiculate process as shown in figure 157, *t*. Pleurites of the ninth abdominal segment with posterior margins strengthened but not confluent below.

Coloration.—Uniformly pale foliage green in life, testaceous when poorly preserved. Spines of the foretibiae somewhat infumate as is also the drum of the tympanum.

Paratype.—One female, Beh Luh Din, 30 miles north of Chengtu, Szechwan, 6,000 feet, September 20–28, 1934 (D. C. Graham; U. S. N. M.). Measurements in millimeters: Body length 10.0; length to tip of tegmina 19.5; length to wing tips 20.0; pronotum 3.2; hindfemora 9.0; ovipositor 8.0. Closely similar to the holotype and deposited in the Tinkham collection.

XIPHIDIOPSIS SINENSIS, new species

A moderately large species, known only in the female sex, that is recognized by its uniform coloration, narrow lateral stripes on the pronotum extending to the inner angle of the eyes, rounded subgenital plate, and constricted eighth abdominal sternite. These characters separate this new species from *X. gurneyi* and other known species. Relationships, until the male is discovered, are uncertain.

Holotype.—Female, Shin Kai Si, Mount Omei, Szechwan, 4,400 feet, August 20, 1934 (D. C. Graham). Measurements in millimeters: Body length 9.5; length to ovipositor tip 17.0; length to wing tips 26.0; length to tips of tegmina 25.0; pronotum 4.0 by 2.0; hindfemora 11.5; ovipositor 7.5. U. S. N. M. No. 56303.

Description.—Size moderately large and form typical of the genus. Head broader than deep; eyes subcircular and subglobular. Dorsum of the pronotum rather broad; anterior margin gently convex; posterior margin hyperbolically rounded; lateral lobes broader than deep. Tegmina and wings far surpassing the apices of the caudal femora and tip of the ovipositor. Leg spination as follows: Forelegs with forefemora unarmed; foretibiae with five pairs of very large spines and a minute apical pair. Middle legs with mesofemora unarmed; mesotibiae with five smaller pairs of spines and a minute apical pair. Caudal femora unarmed; caudal tibiae with 30 or 31 external and 28–30 internal short dorsal teeth and 12 external and 3 internal apical ventral spines. Ovipositor short, heavy, moderately recurved in the apical half, 7.3 mm. long. Subgenital plate moderately large and broadly rounded. Eighth abdominal sternite constricted in the center to hourglass shape.

Coloration.—Testaceous, foliage green in life, with dark brown lateral stripes running from the inner margin of the eye to the posterior margin of the pronotum, the dorsal areas of the pronotum between the stripes yellow-brown.

Paratypes.—Three females, near Mupin, Szechwan, July 1929 (D. C. Graham; U. S. N. M.). One female, Shin Kai Si, Mount Omei, Szechwan, 4,400 feet, August 4–6, 1929 (D. C. Graham; U. S. N. M.). One female, Mount Omei, Baian-Kara-Ula Range, 4,500 feet, August

6, 1929 (D. C. Graham; Hebard collection). Range in measurements in millimeters: Body length 11.0–13.0; pronotum 4.0; length to tip of ovipositor 18.0–19.8; length to wing tips 24.0–25.4; hind femora 10.5–10.8; ovipositor 7.0. Paratypes identical to the holotype and deposited in the United States National Museum, Hebard, and Tinkham collections.

XIPHIDIOPSIS TRANSVERSA, new species

FIGURE 157, o

A medium-large species, known only in the female and quickly recognized among the females of all the known species by the very broad and transverse subgenital plate, with the eighth abdominal sternite specialized and enlarged, triangular in form with the apex directed cephalad. The species is not large enough to be the female of *X. kweichowensis* and in addition possesses dorsolateral stripes on the pronotum.

Holotype.—Female, Shin Kai Si. Mount Omei, Szechwan, 4,500 feet (D. C. Graham). Measurements in millimeters: Body length 10.5; length to ovipositor tip 20.5; length to tegmen tip approximately 25.0 (tip frayed); pronotum 4.0 by 2.0; tegmen approximately 21.5 by 2.8; caudal femur 11.6; ovipositor 9.7. U.S.N.M. No. 56301.

Description.—Size fairly large and form typical of the genus. Head slightly broader than deep; eyes subcircular and subglobular. Fastigial cone prominent, with slight upward tilt. Pronotum with foremargin very slightly convex; posterior margin somewhat circularly rounded; lateral lobes much broader than deep. Leg spination as follows: Foreleg with forefemur unarmed; foretibiae with five external and five internal infunrate spines, of which the proximal is small and dorsad of tympanum, the remainder much larger than the external ones. Middle legs missing. Caudal femur unarmed; caudal tibiae with 31 external and internal short black dorsal teeth and 9 external and 3 internal apical small spines. Tegmina and wings far surpassing apex of caudal femur. Ovipositor long and slender, very slightly recurved, with apex considerably passing knee of caudal femur. Subgenital plate very broad and transverse, lateral margins strongly convex, posterior margin gently concave and slightly deflexed. Anterior margin fused to a short base making somewhat of a T joint. Eighth abdominal sternite larger than remaining abdominal sternites, triangular, with truncate posterior margin and apex directed cephalad.

Coloration.—Foliage green in life, testaceous in death, with a slight dorsolateral stripe of brown on the dorsum of the pronotum.

The type is unique, and the species is named from the very broad and transverse nature of the subgenital plate.

XIPHIDIOPSIS EMARGINATA, new species

FIGURE 157, c

A medium-sized species, known only in the female sex and distinguished from all other species of the genus by its large and emarginated subgenital plate and the long straight ovipositor, with the tip of the ventral valvulae bearing about five distinct teeth. This character separates it immediately from all females of the Chinese species except *X. phyllocerca*, which is very large, with the head and pronotum dark reddish brown.

Holotype.—Female, Tseo Jia Geo, south of Suifu, Szechwan, western China, August 1929 (D. C. Graham). Measurements in millimeters: Body length 9.0; length to ovipositor tip 19.0; length to apex of tegmen 21.0; pronotum 3.5 by 1.9; tegmen 18.0 by 2.0; hindfemur 10.0; ovipositor 10.0. U.S.N.M. No. 56302.

Description.—Size medium and form typical of the genus. Head slightly broader than deep; eyes subcircular and subglobular. Fastigial cone slightly below the upper margins of the eyes. Pronotum with the anterior margin very slightly convex; posterior margin angularly rounded; lateral lobes much broader than deep. Tegmina and wings considerably surpassing apices of caudal femora but extending very slightly beyond the apex of the ovipositor. Leg spination as follows: Forelegs with forefemora unarmed; foretibiae with five external and four internal spines. Middle legs with mesofemora unarmed; mesotibiae with six external and four internal spines. Caudal femora unarmed; caudal tibiae with 27 external and 31 internal small black dorsal teeth and nine external and one internal very pale small apical spines. Ovipositor very long and straight, with very slight reflexion in the distal fourth; ventral valvulae with five small distinct teeth at the extreme apex. Subgenital plate very large, semicircularly rounded, with a distinct triangular apical incision and a slight emargination near each lateral base.

Coloration.—Uniformly foliage green in life, uniformly testaceous in the preserved specimen. The species is known from only the unique type.

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PARASITIC COPEPODS IN THE UNITED STATES
NATIONAL MUSEUM

By CHARLES BRANCH WILSON ¹

THIS report completes the identification and description of all the parasitic copepods in the United States National Museum collection. During the progress of identification 14 species and 1 variety were found to be new to science, and 6 of these required the establishment of new genera for their reception. This material also contained the missing sex of 6 other species of which one sex had already been described and figured. In addition one new name has been bestowed. These 22 additions to the parasitic copepods previously known are described and discussed in systematic order as follows:

CALIGOIDA

<i>Dysgamus atlanticus</i> Steenstrup and Lütken.....	New female...	p. 531
<i>Lepeophtheirus christianensis</i> , new species.....	Both sexes.....	p. 533
<i>Lepeophtheirus eminens</i> , new species.....	Both sexes.....	p. 535
<i>Lepeophtheirus marcepes</i> , new species.....	Female only..	p. 536
<i>Achtheinus dentatus</i> Wilson.....	New male....	p. 537

HARPACTICOIDA

<i>Unicalteutha ovalis</i> , new genus and species.....	Both sexes....	p. 541
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CYCLOPOIDA

<i>Ostrincola gracilis</i> , new genus and species.....	Both sexes....	p. 543
<i>Parmulodes verrucosa</i> , new genus and species.....	Female only..	p. 545
<i>Pestifer agilis</i> , new genus and species.....	Female only..	p. 546

¹ Dr. Wilson died on August 18, 1941, a few weeks after the manuscript of this paper was submitted.—EDITOR.

LERNAEOPODOIDA

<i>Brachiella squali</i> , new species.....	Female only..	p. 547
<i>Lernaeosolca lycodis</i> , new genus, new species.....	Female only..	p. 548
<i>Krøyerina elongata</i> Wilson.....	New male....	p. 549
<i>Paenodes exiguus</i> , new genus, new species.....	Both sexes....	p. 550

ARGULOIDA

<i>Argulus indicus</i> Weber.....	New male....	p. 552
<i>Argulus intectus</i> , new species.....	Both sexes....	p. 553
<i>Argulus longicaudatus</i> , new species.....	Both sexes....	p. 555
<i>Argulus lunatus</i> , new species.....	Both sexes....	p. 557
<i>Argulus latus</i> Smith.....	New male....	p. 560
<i>Argulus megalops spinosus</i> , new variety.....	Both sexes....	p. 563
<i>Argulus rotundus</i> , new species.....	Female only..	p. 564
<i>Argulus trilineatus</i> Wilson.....	New male....	p. 566
<i>Argulus diversus</i> , new name.....	Both sexes....	p. 572

Fourteen other species are dealt with in this paper:

CALIGOIDA

<i>Dysgamus rhinodontis</i> (Wright).....	p. 533
<i>Achtheinus dentatus</i> Wilson.....	p. 537
<i>Teredicola typica</i> Wilson.....	p. 539

CYCLOPOIDA

<i>Asterocheres lilljeborgii</i> Boeck.....	p. 547
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ARGULOIDA

<i>Argulus japonicus</i> Thiele.....	p. 553
<i>Argulus melanostictus</i> Wilson.....	p. 565
<i>Argulus biramosus</i> Bere.....	p. 568
<i>Argulus canadensis</i> Wilson.....	p. 568
<i>Argulus niger</i> Wilson.....	p. 569
<i>Argulus varians</i> Bere.....	p. 570
<i>Argulus maculosus</i> Wilson.....	p. 570
<i>Argulus paulensis</i> Wilson.....	p. 572
<i>Argulus nattereri</i> Heller.....	p. 573
<i>Argulus salminci</i> Krøyer.....	p. 574

Order COPEPODA
Suborder CALIGOIDA
Family CALIGIDAE

Genus *DYSGAMUS* Steenstrup and Lütken, 1861

DYSGAMUS ATLANTICUS Steenstrup and Lütken

PLATE 29, FIGURES 139-148

Dysgamus atlanticus STEENSTRUP and LÜTKEN, 1861, p. 368, pl. 4, fig. 8.—SCOTT, 1912, p. 579, figs. 1-4, pl. 13, fig. 13.

Steenstrup and Lütken established a new genus and species of parasitic copepods upon 10 male specimens captured swimming freely in the plankton of the north Atlantic. Scott's specimens were also all males obtained in the plankton of the Atlantic both north and south of the Equator. A second species, *Nogagus murrayi*, was described and figured by Brady (1883, p. 136), who failed to recognize it as belonging to the genus *Dysgamus*, a fact discovered by Leigh-Sharpe (1934, p. 28). The latter considered a third species, *D. ariommus* (Wilson, 1907a, p. 713), to be synonymous with Brady's species, admitting differences that the present author believes may distinguish the two. The fourth known representative of this genus is *D. longifurcatus* (Wilson, 1923, p. 11).

In every instance the specimens upon which the species were established were males captured in the surface plankton. In the copepods the characteristics of the female form the basis for generic and specific distinctions and the characteristics of the male are regarded as secondary. As a result the validity of the genus and its four species has remained more or less tentative during the 80 years since the first was established. Now, however, examination of a dozen females taken by Dr. L. Howell Rivero from the skin of a whale shark (*Rhincodon typus*) off Habana, Cuba, substantiates the validity of the genus and its type species, *D. atlanticus*. This discovery also increased the possibility of making valid the other three species by suggesting that further search may reveal the females of some or even all of them. The female allotype and paratypes of this species have been deposited in the Museum of Comparative Zoology at Harvard University.

Female.—Carapace almost circular, slightly wider than long, with a short and narrow lobe at each posterior corner tipped with a small spine. The frontal plates are long and wide with convex anterior and posterior margins; the lateral lobes are widened posteriorly and partially divided at the center. The median posterior lobe is a little less than half the width of the carapace and reaches slightly beyond the tips of the lateral lobes. The fourth segment is free and one-fourth as wide as the carapace, with convex lateral margins. The median

posterior lobe of the carapace and the free fourth segment each carry a pair of dorsolateral plates. Those on the posterior lobe are sub-circular in outline, inclined ventrally and have a smooth margin. Those on the fourth segment are oblong with a smooth anterior margin and a toothed posterior margin, which is covered by the anterior shoulders of the genital segment. In the dorsal view (fig. 139) the lateral projections between these two pairs of plates are the basipods of the third legs, the rami being turned inward and invisible. The genital segment is half as long and two-thirds as wide as the carapace, with a short and broad lobe at each posterior corner bearing on its ventral surface a fifth leg tipped with five setae and extending beyond the posterior margin of the lobe. The abdomen is relatively small, one-sixth as wide and long as the genital segment and made up of a single segment. It has a posterior median sinus, which reaches beyond the center, and a lobe on each side of the sinus that reaches the center of the caudal ramus. The caudal rami are rodlike, four times as long as wide and inclined inward, each tipped with four setae.

The first antennae are 2-segmented, the basal segment stout and covered with short spines, the end segment cylindrical, shorter than the basal segment and tipped with four hairlike setae. The second antenna is made up of two segments and a terminal claw. The basal segment is stout and curved strongly backward with a rodlike seta in the hollow of the curve and the second segment is very short and unarmed. The terminal claw is curved forward giving the whole appendage a pronounced S-curve and carries an accessory spine on its outer margin near the base. The second maxilla is 3-segmented, the basal segment unarmed, the second segment with spines and a knob at its distal end, the terminal segment flattened with a corrugated margin, a curved spine at the tip and a row of acicular spines along the central surface. The maxilliped has a stout basal segment and a strong curved claw with a small spine on its inner margin near the base. The four pairs of legs are all biramose and the rami are 2-segmented, with the spines and setae arranged as follows: First endopod 0-0:1-3, exopod 1-0:4-3; second endopod 1-1:1-8, exopod 1-1:4-6; third endopod 1-1:0-6; exopod 1-1:3-6; fourth endopod 1-0:5-0; exopod 6-0:9-0. In the first and fourth legs the endopods are two-thirds as long as the exopods; in the other two pairs of legs the rami are equal. Total length, 6 mm. Carapace, 3.7 mm. long.

Remarks.—The discovery of a female confirms the validity of the genus and since the original generic diagnosis was based upon males only we may add the following from these females: Carapace and free segment like those of the male but with a pair of small dorsal plates on the third and fourth segments. Genital segment large, more than half the size of the carapace; abdomen 1-segmented, at-

tached to the ventral surface of the genital segment and more or less covered by the latter. The males have always been found swimming freely in the plankton, as active as any of the pelagic forms, but the females, like those of all the other Caligidae, are fixed to their host and are never taken in the tow. The size and scarcity of their hosts help to explain why no females have hitherto been secured.

It is worthy of repetition here that Bassett-Smith (1899, p. 460) declared he had personally examined many specimens of both sexes of *Dysgamus* in the British Museum.

DYSGAMUS RHINODONTIS (Wright)

Stasiotes rhinodontis WRIGHT, 1876, p. 583, pl. 35, figs. 1-14.

Wright established a new genus and species of copepods upon female specimens taken from the gills of a "shark (*Rhinodon typicus*)," collected in the Seychelles northeast of Madagascar. The name *Stasiotes* was used 12 years previously by Jan for a snake genus, and a new name was suggested by the present author (1907c, p. 439). Comparison of Wright's original description and figures with those given above for *Dysgamus atlanticus* proves that the two species are congeneric. The two species cannot be regarded as synonymous, however, as there are many differences in the proportions and markings of the body regions and in the details of the appendages, especially the second antennae, the maxillipeds, and the fourth legs. Accordingly Wright's specimens retain the original specific name and will be known as *Dysgamus rhinodontis* (Wright).

Genus LEPEOPHTHEIRUS Norman, 1832

LEPEOPHTHEIRUS CHRISTIANENSIS, new species

PLATE 28, FIGURES 124-131

Thirty specimens, including both sexes, were obtained from a sea catfish (*Galeichthys* sp.) at Pass Christian, Miss. The female holotype and male allotype are U.S.N.M. No. 60548.

Female.—Carapace circular in outline, as wide as long and highly vaulted dorsally; median posterior lobe more than half the carapace width and scarcely projecting behind the lateral lobes. The latter are very short, curved inward, and bluntly rounded at their tips. The central longitudinal ribs are widely separated and diverge anteriorly. The free segment is reduced to a fourth of the width of the carapace and is contracted to a short neck anteriorly. The genital segment is acorn-shaped, three-fourths as long and five-eighths as wide as the carapace, narrowed into a short neck anteriorly and almost squarely truncated posteriorly. Abdomen 1-segmented, one-fourth as long

and wide as the genital segment; caudal rami very short, each tipped with three setae. The abdomen is on a level with the dorsal surface of the genital segment and is much thinner than the latter.

First antennae long and slender, the end segment tipped with three setae of equal length. Second antenna 3-segmented and tipped with a long claw, bent at right angles near its tip, which is very acuminate. First maxilla in the form of a simple, straight, and slender spine with an acuminate, not a bipartite, tip. Maxilliped with a long and slender basal segment, which is twice the length of the terminal claw. The latter is rather weak but well curved with an accessory spine on the concave margin near its center. The basipod of the first leg carries the rudiment of an endopod at the distal posterior corner, which is club-shaped and covered with short hairs. The fourth leg is 4-segmented, the basal segment swollen but little, the three terminal segments combined about as long as the basal segment, each with a long slender spine at its outer distal corner and the end segment with two other longer terminal spines and a very short one at the inner corner. There are rudimentary fifth legs on the ventral surface of the genital segment in front of the bases of the egg strings. Each consists of a small semicircular knob tipped with 3 setae and a short distance outside the knob on the ventral surface of the genital segment is another single seta. Total length, 3.50 mm. Carapace, 1.60 mm. long and wide. Egg strings, 1.80 mm.

Male.—Carapace a little more than half the entire length, which is much less than in the female and as long as wide. The lobes and dorsal markings are like those of the female except that the lateral lobes are relatively wider. The free segment is a fifth as long and wide as the carapace and the genital segment is barrel-shaped, nearly half as long as the carapace, the anterior end narrowed more than the posterior, the sides strongly convex. There are two pairs of leg rudiments, one just behind the center of the segment and the other at the posterior corners. The abdomen is 1-segmented, two-fifths as long, half as wide, and fully as thick as the genital segment. The caudal rami are small, well separated and divergent, each with three setae.

The antennae, mouth parts, and swimming legs are like those of the female except that the claw on the second antenna is very much stouter with a strongly swollen base and three blunt coarse spines on the concave margin. The first three pairs of legs are like those of the female, but the fourth pair are relatively longer and nearly reach the posterior margin of the genital segment. Total length, 2.50 mm. Carapace, 1.30 mm. long and wide.

Remarks.—This new species can be readily distinguished by the general proportion of the body regions, the peculiar grooving of the dorsal surface of the carapace, and the conspicuous testes in the male.

LEPEOPHTHEIRUS EMINENS,² new species

PLATE 28, FIGURES 132-138; PLATE 29, FIGURE 149

Seven females and 14 males were taken from the outside surface of a black marlin (*Makaira ampla marlina*) captured at Ventura Bay on the coast of Baja California. The female holotype and male allotype are U.S.N.M. No. 79636.

Female.—Carapace elliptical, narrowed a little anteriorly and widened posteriorly, the anterior margin evenly rounded, with a well-defined sinus at the center. Median posterior lobe half the width of the carapace and extending slightly back of the lateral lobes, the latter broad and evenly rounded. Free segment less than a third as wide as the carapace with strongly convex lateral margins. Urosome a little more than half as long as the metasome; genital segment wider than long and half as wide as the carapace, with parallel sides and rounded lobes at its posterior corners. Abdomen longer than the genital segment and two-fifths as wide, made up of two segments, which are more or less fused with each other and with the caudal rami. The latter are nearly as wide as long and each is armed with five setae, the middle one the longest.

Antennae and mouth parts of the usual type for the genus; the second maxillae have a long terminal segment swollen at its center and armed there with a small spine on the inner margin. The terminal portion beyond the swelling is divided longitudinally and the slender halves are curved and bluntly rounded at their tips. The terminal claw of the maxillipeds is stout, strongly curved, and acuminate. The furca is shaped like the letter H, the sides straight and parallel, the distal portion longer than the proximal. The basipod of the first legs has a 2-segmented rudimentary endopod attached to its posterior distal corner. The end segment of the exopod is tipped with four curved claws of about the same size. The fourth leg is stout and 4-segmented, the basal segment longer than the three terminal segments combined, the latter about equal in length, each tipped with a claw. Total length, 6 mm. Carapace, 3.95 mm. long, 3 mm. wide.

Male.—Carapace elliptical, one-sixth longer than wide, the anterior margin rather flat with a central sinus larger than in the female. The median lobe is narrower and extends farther behind the lateral lobes. The free segment is little more than a fourth the width of the carapace, its lateral margins protruding strongly. The genital segment is elliptical, a little longer than wide, without posterior lobes or even corners. The abdomen is nearly as long as the genital segment and half as wide and is made up of two segments. As in

² *Eminens*, protruding, with reference to the corners of the genital segments.

the female, the two abdominal segments and the caudal rami are more or less completely fused.

The antennae, mouth parts, and swimming legs are like those of the female except for the fourth legs. These are stout and the three terminal segments combined are longer than the basal segment. The spine at the distal corner of the second segment is short and strongly curved and the three terminal spines are very unequal in length. Total length, 6 mm. Carapace, 3.66 mm. long, 3.15 mm. wide.

Remarks.—The presence of lobes at the posterior corners of the genital segment in the female and the more or less complete fusion of the two abdominal segments with each other and with the caudal rami in both sexes are the best characters for identification.

LEPEOPHTHEIRUS MARCEPES,³ new species

PLATE 33, FIGURES 192-195

Forty specimens, all females, were taken by Dr. Waldo L. Schmitt from the gills and under surface of a lemon sole (*Pleuronectes quadrilateralis*) caught in Alitak Bay, Kodiak Island, Alaska. One, U.S.N.M. No. 79687, has been selected to serve as the type of this new species.

Female.—Carapace elliptical, 10 percent longer than wide, the lateral lobes narrowly rounded and not reaching the posterior margin of the median lobe. Front of the carapace broad and flattened, with a median incision. Fourth segment one-third as wide as the carapace, its sides strongly convex. Genital segment longer and wider than the carapace, narrowed anteriorly to the width of the fourth segment, the posterior corners broadly rounded and the posterior margin concave. Abdomen longer than the genital segment but only a fourth as wide and 2-segmented, the proximal segment 12 times as long as the anal with parallel sides.

The antennae and mouth parts are of the usual type for this genus, without specific characters. The first legs are short and rather stout, the end segment with three terminal claws diminishing in size backward and three large plumose setae on the posterior margin. The second and third legs are of the typical biramous form, but the fourth legs are very exceptional for this genus. Although the adult female averages 6 mm. in length these fourth legs are only 0.16 mm. long and easily escape any but the most careful examination. When sufficiently magnified, however, they are revealed as 3-segmented, the basal segment with a seta at the anterior distal corner, the second segment diagonal with a stout spine at its outer corner, and the third segment with two very unequal terminal spines. The egg strings are

³ From *marcco*, to shrink or shrivel.

narrower than the abdomen and vary in length from 1.75 mm. to 5 mm.

The two segments of the abdomen are more or less fused but the joint is plainly indicated by lateral invaginations. The anal segment has a shallow invagination at the center of the posterior margin, the corners on either side protruding in a rounded process. The caudal rami are about as wide as long, are inclined toward each other and rounded at their tips, each with four unequal setae on the tip and outer margin. Type, 6.50 mm. long. Carapace, 1.50 mm. long, 1.35 mm. wide. Genital segment, 2 mm. long, 2.50 mm. wide. Abdomen, 2.20 mm. long, 0.52 mm. wide. Egg strings, about 2.50 mm. long, eggs rather thick.

Remarks.—The greatly shriveled fourth legs are such an exceptional character that every one of the specimens was examined to make sure they were all alike. None were found with larger legs but two or three had smaller ones and these legs thus furnish the most convenient means of identifying the species. The shriveling is all the more noticeable in contrast with the size of the adult and has suggested the specific name. Other specific characters are the unusual proportions of the body regions and the great dissimilarity in the size of the abdominal segments.

Family PANDARIDAE

Genus *ACHTHEINUS* Wilson, 1908

ACHTHEINUS DENTATUS Wilson

PLATE 33, FIGURES 196-208

Achtheinus dentatus WILSON, 1911, p. 630, pl. 67, figs. 22-31; 1921, p. 6 (except male described on p. 8), pl. 3, figs. 20-27.

Thirty females were taken from the outside surface of a hammer-head shark (*Sphyrna zygaena*) caught at Estero de la Luna in the Gulf of California. Of these females, 18 carried a male attached in sexual union and one female had two attached males. The ventral surfaces of the two sexes were together and the anterior margin of the male carapace was pushed as far forward as possible under the fourth legs of the female. A male, U.S.N.M. No. 79701, attached to a female, has been selected as the allotype.

Male.—Carapace subovate, considerably narrowed anteriorly and reentrant on the frontal margin, as wide as long, the posterior lobes reaching the fourth segment. Two pairs of dorsal plates on the thorax behind the carapace, much smaller than in the female and confined to the lateral margins of the segments. Genital segment quadrangular, without a dorsal plate but with a rudimentary fifth

leg at each posterior corner. Between this leg and the side of the abdomen a flat rounded lamina is attached on each side to the posterior margin of the genital segment on a level with its dorsal surface. The abdomen is triangular, 1-segmented, with the apex posterior; the caudal rami are curved, widely separated and nearly as long as the abdomen, each armed with four setae of about the same size.

The first antennae are 2-segmented and elongate, the segments of equal length and armed with stout spines. The second antennae are smaller than those of the female, the terminal claw strongly curved and transversely wrinkled at its base but without any trace of teeth. The mouth tube is short and pointed; the inside mandibles are slender and flattened, with a row of 10 or 12 curved teeth along the inner margin at the tip. The outside first maxillae are conical, each tipped with a stout spine and having 2 small slender spines on the anterior margin. The second maxilla has a slender and curved terminal segment one and a half times as long as the stout basal segment and bipartite at its tip. The maxilliped has a swollen basal segment and a stout and slightly curved terminal claw.

The first four pairs of legs are biramose, the rami of the first three pairs 2-segmented, of the fourth pair 1-segmented, the setae distributed as in figures 205 to 208. In the first and fourth pairs the exopod is considerably longer than the endopod, in the second and third pairs the rami are about equal. Total length, 3 mm. Carapace, 2 mm. long, 1.86 mm. wide.

Remarks.—Inasmuch as every one of the present males was attached to a female in sexual union, it is absolutely certain that they are the true males of the species and as such are the first to be described for the genus. In two other instances, however, other males have unfortunately been ascribed by the present author to species of this genus. The opportunity is taken here to make the necessary corrections:

1. Wilson (1912, p. 235): Two males of a lot of two males and three females that were obtained from the pectoral fin of a sawfish off the Cape of Good Hope. Since these five specimens were associated upon the same host with no other parasitic copepods present, the author assumed that they were the two sexes of the same species and so described them under the name *Achtheinus pinguis*. The three females were correctly diagnosed and they still remain the types of the species *pinguis*, but a comparison of the males with those here described discloses the fact that they do not belong to the genus *Achtheinus* but that they must be referred to the genus *Nesippus*.

2. Wilson (1921, p. 6): Two males of a lot of six females and three males that were taken from the outside skin of *Mustelus lunulatus* off southern California. These were referred to the present

species, *Achtheinus dentatus*, and were so described and figured. The two males of this original lot were mistakenly considered immature females and the supposedly unique male described as the male type of *A. dentatus*. However, if the description and figures of those so-called immature females be compared with the figures of the females here described it is at once apparent that they are not females but the true males of the species *A. dentatus*. The single male first described as the type male of this species differs radically from the males that correctly represent this species.

The males here described having now been established as true males, it becomes necessary to replace the male generic diagnosis of the genus *Achtheinus* previously given:

Male diagnosis: Carapace elliptical, without conspicilla; posterior lobes conical, without accessory lobes. Free thorax comparatively wide, its two pairs of dorsal plates confined to the lateral margins; genital segment without a dorsal plate, but with fifth leg rudiments. Abdomen triangular, wholly visible dorsally. Second antennae stout, blunt, and without teeth. Maxillae conical, maxilliped with a strong terminal claw. Four pairs of biramose swimming legs, rami of first three pairs 2-segmented, of the fourth pair 1-segmented.

Genus TEREDICOLA Wilson, 1942

TEREDICOLA TYPICA Wilson

PLATE 31, FIGURES 172-179

Teredicola typica WILSON, 1942, p. 60, fig. 1.

This species was described from a dozen specimens including both sexes taken from the body cavities of Teredos in Honolulu Harbor, Oahu, Hawaii, by Dr. C. H. Edmondson. A single male and a female were selected to serve as types of the genus and species, U.S.N.M. No. 79639. The original diagnosis was as follows:

Female: First three thoracic segments more or less fused with the head and with one another to form a cylindrical body a little more than twice as long as wide. Fourth and fifth segments reduced to a third of the width of the first and second segments, the fifth segment twice as long as the fourth. Genital segment about the same size as the fifth segment and subspherical in form. Abdomen 3-segmented, the first and third segments about the same width and length, the second segment shorter and a trifle narrower. Caudal rami narrow cylindrical, as long as the anal segment and widely divergent, each with two terminal setae as long as the ramus itself.

First antennae 6-segmented, the two basal segments considerably widened, the third segment the longest and the fifth segment the shortest, all except the basal segment bearing setae. The second maxilla and maxilliped are each made up of a single stout segment tipped with a strong claw, the one on the maxilla acute and curved into a semicircle, the one on the maxilliped blunt and nearly straight. Two pairs of biramose swimming legs, the rami 2-segmented and of approximately the same length. Each end segment is armed with many setae

of different lengths; each basal exopod segment has two small setae at its outer distal corner, while the basal endopod segments are unarmed.

Total length 4.43 mm. Enlarged cylindrical body 3.20 mm long, 1.50 mm wide.

Male: Much smaller than the female, the body made up of ten segments, the first three considerably widened, the remaining seven regularly tapering a little backward. The head is fused with the first thoracic segment, which carries a lateral plate or lamella on each side. The next three segments also carry lateral plates diminishing in size to become mere knobs on the fourth segment. The fifth segment, genital segment, and the four abdominal segments have convex lateral margins and differ but little in length. The caudal rami are like those of the female except that each has four terminal setae, the two outer ones very short, the middle ones as long as the ramus.

The first antennae arise from the dorsal surface of the head close to the anterior margin and are strongly curved backward. The mouth parts and swimming legs are like those of the female.

Total length 2.35 mm. Width of first segment, including wings, 1 mm.

Remarks.—So far as known, this represents the first occurrence of internal copepod parasites reported from the shipworm, *Teredo*. In view of the large number of Teredos that have been handled in the course of many studies of these destructive mollusks, the copepod parasite here described cannot be very common or it would have been found before. Concerning its occurrence, Dr. Edmondson has written me as follows:

“The copepod was first observed during the fall of 1939, when fully 75 percent of the specimens of *Teredo milleri* Dall, Bartsch, and Rehder (1938) over 30 mm in length recovered from Honolulu Harbor were found to be parasitized. The parasite has appeared in shipworms at three additional localities about Oahu, and also in Hilo Harbor, Hawaii, and at Kahului, Maui.

“Six shipworms, five species of *Teredo* and one of *Bankia*, in Hawaiian waters are known to serve as hosts of the parasite.

“The female clings tightly to the lining of the infrabranchial cavity of the host by means of stout, sharp mouthparts, while the male is likely to be unattached in the cavity and when released from the host is capable of swimming quite freely. Because of the greatly inflated body the female is capable of but slight movement when detached from the shipworm.”

Suborder HARPACTICOIDA

Family PELTIDIIDAE

UNICALTEUTHA,⁴ new genus

Body broadly oval and considerably flattened, the carapace followed by three dorsal epimeral plates turned ventrally on their

⁴ From *unicus*, singular, especially in its habitat, + *Alteutha*.

lateral margins. The fifth segment with a small dorsal plate not wide enough to reach the lateral margins and concealed in dorsal view beneath the epimeral plate of the fourth segment. Genital segment more or less divided transversely, the halves with a conical process at each posterior corner. Caudal rami wider than long, the second inner seta greatly elongated.

First antennae 9-segmented in the female, 6-segmented in the male and geniculate, the terminal part made up of two segments. Mandibular palp biramose; maxilliped chelate. First four pairs of legs biramose, the rami 3-segmented, fifth legs uniramous, 2-segmented.

Remarks.—This genus is closely related to *Alteutha* but differs enough from it in the body proportions, the dorsal epimeral plates, the first and fifth legs, and the male antennae to be established as a separate genus.

Genotype.—*Unicalteutha ovalis*, new species.

UNICALTEUTHA OVALIS, new species

PLATE 34, FIGURES 209-218

Eighteen females and 4 males were obtained by Prof. W. Templeman from the outside surface of lobsters in Placentia Bay, Newfoundland, late in June 1939, while he was carrying on investigations for the Fisheries Research Institute at St. John's. A female and a male have been selected as holotype and allotype, respectively, of the new species, U.S.N.M. No. 79695.

Female.—Body elliptical and strongly depressed and expanded laterally as in *Alteutha*. Head fused with the first segment and covered with a carapace one-fourth wider than the length on the midline, its lateral margins turned down with acute posterior corners. The first three segments behind the carapace are covered with short dorsal epimeral plates, the first one as wide as the carapace, the other two successively narrower. All three of these plates are turned down at their lateral margins and acutely produced at their posterior corners. The third of these plates is longer than either of the others and extends backward to cover and conceal the fifth segment in dorsal view. The fifth segment is only two-fifths as wide as the fourth and has a dorsal plate which is transversely elliptical and does not reach the lateral margins of the segment, but it does project backward a little over the genital segment.

The urosome is only a fifth as long as the metasome and is strongly flattened. The genital segment is as wide as the fifth segment and is partially divided by lateral invaginations. The posterior corners of each half are produced conically backward and are armed with short setae. The abdomen is 2-segmented, both segments with conical

projections at their posterior corners. The caudal rami are wider than long with a finger projection at each distal corner and three setae diminishing in length outward, the inner one being nearly twice the length of the urosome. The eggs are carried in a single ovisac, which is considerably larger than the entire urosome.

The first antennae are 9-segmented, the second segment much longer than any of the others, all the segments well armed with setae. The second antennae are 3-segmented, the terminal segment longer than either of the others, the exopod very small and indistinctly segmented. The mandibular palp is biramose, the rami of about equal length and heavily armed with setae. The maxilliped is tipped with a strong chela. The first four pairs of legs are biramose, the rami 3-segmented. In the first legs the endopod is considerably longer than the exopod and the basal segment much longer than the two distal segments combined. The second segment has a stout curved spine on its inner margin and the end segment has two stout claws turned outward. The basal segment of the exopod has a large outer seta, the second segment has a seta at each distal corner, the outer one enlarged at its base. The end segment has three outer, two terminal, and one inner seta, the outer ones with enlarged bases. In the second, third, and fourth legs the arrangement of the setae is shown in figures 215-217. The exopods of the fourth legs reach beyond the tips of the caudal rami and the last two segments are visible in dorsal view behind the dorsal epimeral plates and outside the genital segment. The fifth legs are uniramous and 2-segmented, the segments of equal length and setose, the terminal one fringed with hairs on its outer margin. Total length, 1.35 mm. Width of carapace, 0.825 mm.

Male.—Body relatively wider and shorter than in the female; carapace three-tenths wider than long. The dorsal epimeral plates diminishing in width more rapidly backward but increasing in length so that the posterior margin of the third plate reaches behind the center of the genital segment. The posterior corners of the carapace and the epimeral plates are longer and more acute than in the female. The urosome is relatively shorter and wider, the caudal rami are considerably wider than long, with the inner terminal seta more than twice as long as the urosome.

The first antennae are 6-segmented and geniculate, the end section made up of two segments, the basal of four segments, of which the second is the shortest and the third the longest. In the end section the terminal segment is three times as long as the penultimate segment. The second antennae, mouth parts, and first four pairs of legs are like those of the female. The fifth legs are 2-segmented but the basal segment is one-half longer than the distal segment and is armed with a long and stout spine at its distal inner corner. Total length, 1.20 mm. Width of carapace, 0.85 mm.

Remarks.—A commensal harpactid has been taken from the branchial chamber of a land crab in Jamaica and the curious form *Balaenophilus* has been found upon the baleen plates inside the mouth of the great blue whale. This is the first harpactid to be obtained from the outside surface of any host. The hard chitin shell of the lobster, however, offers a serious obstacle to true parasitism. Like *Balaenophilus* it is probably to be regarded as a commensal profiting by the well-known scavenger habits of its host.

Suborder CYLCOPOIDA

Family ERGASILIDAE

OSTRINCOLA, new genus

Head fused with the first segment; segments 2 to 5 of varying lengths but diminishing regularly in width. Genital segment longer than wide with convex lateral margins in the female and parallel margins in the male. Abdomen 3-segmented in the female, 2-segmented in the male; caudal rami much elongated and cylindrical.

First antennae 8-segmented in the female, the six distal segments much shorter than the two basal, 8-segmented also in the male but the segments more nearly equal. Second antennae uniramous and 4-segmented, the end segment a curved claw. First four pairs of legs biramous, rami 3-segmented, fifth pair uniramous, 3-segmented, the end segment enlarged into a circular disk in the female.

Genotype.—*Ostrincola gracilis*, new species.

OSTRINCOLA GRACILIS, new species

PLATE 34, FIGURES 219-227

Four females and three males were taken from the mantle cavity of the common oyster (*Ostrea virginica*) at Beaufort, N. C., by H. J. MacDonald in August 1929. One female and one male are designated as holotype and allotype, respectively, of the new species, U.S.N.M. No. 79697.

Female.—Head fused with the first segment into an acorn-shaped cephalothorax as wide as long. Second segment as wide as the cephalothorax, the following segments diminishing regularly in width, the fourth segment with slightly projecting posterior corners, the third and fifth segments longer than the second and fourth. Genital segment subcordate, a little longer than wide, and narrowed posteriorly. Abdomen 3-segmented, the segments diminishing in length and width posteriorly, the anal segment a third as long as the basal and half as wide. Caudal rami cylindrical, very narrow, and four times as long as the anal segment, each tipped with three minute setae.

First antennae 8-segmented, the two basal segments long and cylindrical, the six distal segments much shorter and about as wide as long. Second antennae 4-segmented, the first and third segments each four times as long as the second, the end segment a stout curved claw. First four pairs of legs biramose, rami 3-segmented and about equal in length with the spines arranged as in figures 223-225. Fifth legs uniramous and 3-segmented, the two basal segments short and cylindrical, the end segment enlarged into a vertical circular disk curved like a reflector with the concave side toward the genital segment and fitting over the convex surface of the latter. Eggs carried in two ovisacs, each cylindrical and containing three or four eggs. Total length, 1.10 mm. Width of cephalothorax, 0.25 mm.

Male.—Body similar to that of the female but a little smaller. Head separated from the first segment, the two combined relatively longer; second, third, fourth, and fifth segments about the same length but diminishing in width like those of the female, the fifth segment about half as wide as the second. Genital segment rectangular, a little longer than wide with nearly straight sides. Abdomen 2-segmented, the anal segment longer than the basal with a posterior median incision that reaches beyond the center of the segment. Caudal rami cylindrical but only one-half longer than the anal segment, each with three terminal setae and two or three on the outer margin.

First antennae 8-segmented as in the female, but here the two basal segments are scarcely any longer than the others. Second antennae, mouth parts, and first four pairs of legs like those of the female. Fifth legs 3-segmented and uniramous but the end segment is not enlarged as in the female. Total length, 0.80 mm. Width of head, 0.20 mm.

Remarks.—This genus is closely related to Ramsay Wright's genus *Myicola* (1885, p. 120) from the common clam. It differs, however, in the actual and relative size of the two sexes, the details of the body regions, the two pairs of antennae, and the first and fifth legs. There is as much difference between these parasites of the clam and the oyster as there is between the hosts on which they live.

Family CLAUDIIDAE

PARMULODES,⁶ new genus

Body suborbicular and strongly flattened; head fused with the first segment and covered with a semicircular carapace, second segment free; segments 3 to 5 fused and covered with another carapace smaller than the first and extending back over the genital segment and abdomen, the latter 2-segmented. First antennae 18-segmented, with many setae; second antennae uniramous and uncinat. Mouth a long and narrow sucking tube; first maxillae linear and tripartite at the

⁶ From *parmula*, a little round shield.

tip; second maxillae and maxillipeds uncinata. First four pairs of legs biramous, rami 3-segmented, fifth pair uniramous and 1-segmented.

Genotype.—*Parmulodes verrucosa*, new species.

PARMULODES VERRUCOSA, new species

PLATE 30, FIGURES 150-160

A single female, the type of the genus and species, U.S.N.M. No. 79000, was obtained from a coral tidal flat at Matecumbe, Fla., in July 1925.

Female.—The anterior carapace and the posterior dorsal plate are evenly rounded, with uniform elliptical outline, broken only by the interval of the second segment. The outer rim is slightly thickened and punctured with a row of skin glands extending around the entire margin and similar to those in the larvae of the genus *Argulus*. They are farther apart and slightly smaller in the posterior plate than in the carapace. When enlarged they exhibit definite structure as seen in figure 151 but their function is very problematical. The second segment is covered with a narrow ribbonlike plate whose ends are turned down ventrally and when lifted up to a level with the carapace do not quite reach the margin of the latter. The posterior corners of the carapace are prolonged slightly backward, the anterior corners of the plate slightly forward, and they almost meet in the center of the space between the two. The fifth segment is widened a little at its posterior margin through the bases of the fifth legs, and the genital segment is widened across its anterior margin through the openings of the oviducts. The abdomen is made up of two short segments of about the same length, each wider than long. The caudal rami are about the same width and length, inclined a little outward, each tipped with three setae.

The first antennae are attached some distance behind the anterior margin. Each is made up of 18 segments, the basal segment very long and stout, the remaining segments short, of varying lengths, and diminishing gradually in width distally. The terminal segment just reaches the margin of the carapace, and every segment carries one or more setae, the proximal ones much longer than the distal. The basal segment of the second antenna is stout and longer than the other two segments combined, with a short spine at its inner distal corner. The second segment is uniform in width and unarmed, the third segment is one-fourth as long as the second, with a tiny spine on its outer margin. The terminal claw is twice as long as the third segment, nearly straight and abruptly narrowed at its tip.

The mouth tube is strongly swollen at its base, then narrowed into a long slender tube extending backward between the bases of the legs.

The first maxilla is a long slender rod divided into three very slender prongs at its tip. The second maxilla has a stout basal segment and a long, stout, somewhat twisted claw. The basal segment of the maxilliped is rather slender and the terminal claw is nearly straight. The first four pairs of legs are biramose and the rami are 3-segmented; the arrangement of the spines and setae on the first and third legs is shown in figures 159 and 160. The fifth legs are uniramous and 1-segmented with two terminal setae and one on the outer margin near the tip, and a fringe of short hairs proximal to this outer seta. Total length, 1.15 mm. Greatest width, 0.65 mm.

Remarks.—This genus resembles *Clausidium* in its general make-up and undoubtedly belongs to the same family, but it differs in so many particulars from the other members of the family that it must be placed in a genus by itself.

PESTIFER,^o new genus

Head and first four thoracic segments more or less fused to form a cylindrical body; fifth segment free, much narrower than the fourth segment but wider than long. Genital segment subspherical, wider than long; abdomen small, 1-segmented; caudal rami jointed.

First antennae slender, 7-segmented, segments very unequal in length; second antennae and maxilliped prehensile. Four pairs of biramous legs, rami 2-segmented, the endopods much shorter than the exopods. Egg strings cylindrical, eggs minute and very numerous.

Genotype.—*Pestifer agilis*, new species.

PESTIFER AGILIS, new species

PLATE 31, FIGURES 165-171

Two females with ovisacs were obtained from the skin of an annelid dredged from a depth of 380 fathoms, July 18, 1932, near the Tortugas Islands in the Gulf of Mexico. One has been selected as the holotype, U.S.N.M. No. 79641.

Female.—Description the same as for the genus. Cylindrical body three times as long as wide, narrowed anteriorly, broadly rounded posteriorly. Fifth segment four times as wide as long and about the same width as the genital segment, which is one-third wider than long. The abdomen is minute and is made up of a single segment twice as wide as long with a deep posterior sinus. Caudal rami cylindrical and longer than the abdomen, each tipped with a single-jointed seta. The egg strings are cylindrical and two-thirds as long as the entire body; the eggs are minute and very numerous, 2,500 to 3,000 in each ovisac. The first antennae are slender and 7-segmented,

^o *Pestifer*, bringing vexation.

the third segment longer than the 3 following segments combined, the only setae terminal on the end segment. The maxilliped is 4-segmented, the end segment transformed into a stout claw sharply bent at the center. The four pairs of legs are biramose, the rami 2-segmented, the exopods longer than the endopods, the basipod segments completely fused.

Remarks.—This is another new genus infesting annelids at considerable depths and it evidently belongs to the family Clausidiidae. Its most striking characteristics are the very large maxillipeds, the rami of the swimming legs, and the jointed caudal rami. Total length, 6.24 mm. Ovisacs, 4.16 mm.

Family ASTEROCHERIDAE

Genus ASTEROCHERES Boeck, 1859

ASTEROCHERES LILLJEBORGII Boeck

PLATE 30, FIGURES 161, 162

Asterocheres lilljeborgii BOECK, 1859, p. 176 [6].

This species has been noted by many European authors but this is the first record from American coasts. A single female, U.S.N.M. No. 78909, was obtained from the outside surface of a north Pacific starfish (*Henricia leviuscula*) on the coast of Anlia, one of the Aleutian Islands.

Suborder LERNAEOPODOIDA

Family LERNAEOPODIDAE

Genus BRACHELLEA Cuvier, 1830

BRACHELLEA SQUALI, new species

PLATE 31, FIGURES 163, 164

One of the two females taken from the spiracles of a shark (*Squalus mitsukurii*) by A. Jacot at Tsinan, China, has been selected as the holotype, U.S.N.M. No. 60565.

Female.—Cephalothorax nearly as large as the body and turned backward in line with the second maxillae, the two forming an angle of about 60° with the body axis. Body pear-shaped, narrowed anteriorly where it joins the cephalothorax, broadly rounded and somewhat depressed posteriorly. On a level with the dorsal surface at the posterior end of the body is a flattened slightly bipartite genital process. On each side of this process there issues from the dorsal surface of the body somewhat in front of the posterior margin a short conical process, largest at the base and tapering almost to a point

distally. Each of these processes is about one-third the length and one-fifth the width of the body.

The first antennae are 3-segmented, the basal segment but little swollen; the second pair are biramose, the exopod 2-segmented. The second maxillae are separate to their very tips, which are slightly enlarged and fused; bulla broken off. The maxillipeds are large and much swollen at their base, with a short, stout, and strongly curved claw, which does not reach the level of the mouth tube. Egg strings one-third the diameter of the body and not quite equaling its length; eggs rather large and not very numerous. Total length of body, 4 mm. Greatest diameter, 2 mm. Combined length of cephalothorax and second maxillae, 6 mm. Length of ovisacs, 3.75 mm.

Remarks.—This species can be recognized by the absence of ventral processes and the presence of short dorsal processes above the egg strings. The only other species with dorsal processes alone is *Brachiella lophii* Milne Edwards (1840, p. 514. pl. 41, fig. 4), in which they are pear-shaped instead of conical in form.

LERNAEOSOLEA,⁷ new genus

Body cylindrical, bent into the shape of a horseshoe, the "heels" smoothly rounded, the "toe" passing into a narrow neck curved upward and backward and ending in the head. Ovisacs emerging from the sinus behind the base of the neck and extending backward parallel with the sides of the horseshoe. No caudal rami. Two pairs of antennae but no trace of mouth parts or swimming legs.

Genotype.—*Lernaeosolea lycodis*, new species.

LERNAEOSOLEA LYCODIS, new species

PLATE 32, Figures 190, 191

A single female, the holotype, U.S.N.M. No. 60501, was obtained from the flesh of a short brown wolf-fish (*Anarhichas lupus*) at *Albatross* Station 2208 off the coast of New Jersey.

Female.—Description the same as that of the genus. The head is enlarged a little at the top and produced into a median dorsal and two lateral horns on either side. The dorsal horn and the lateral horn nearest on either side are globular knobs; the other two horns are somewhat elongated but end in round knobs and all the horns lie in the same plane at right angles to the axis of the head. The neck is twisted to the right through an angle of 60°, so that its dorsal and ventral surfaces are turned laterally. The ovisacs are narrowly cylindrical, parallel with the sides of the body horse-shoe, and reaching a little beyond the tips of the latter.

⁷ Dr. Wilson did not specify the family for this genus and it is placed here tentatively.—
EDITOR.

On the front of the head can be seen a pair of rudimentary first antennae apparently 1-segmented and a pair of second antennae in the form of stout claws evidently used as accessory attachment organs, but there are no traces of mouth parts or swimming legs. Total length from toe to heel of the body horseshoe, 13 mm. Diameter of the sides of the horseshoe, 4 mm. Length of ovisacs, 8.4 mm. Distance of lateral horns from tip to tip, 6.5 mm.

Remarks.—The form and body proportions as given above are sufficient to distinguish this unique copepod from all others.

Family EUDACTYLINIDAE

Genus KRØYERINA Wilson, 1932

KRØYERINA ELONGATA Wilson

PLATE 32, FIGURES 180-185

Krøyerina elongata Wilson, 1932, p. 459, pl. 31, figs. 1-p.

This species was established upon female specimens only from the gills of great blue sharks ("*Galeus glaucus*") at Marthas Vineyard, Mass. The present material consists of 50-odd specimens of both sexes, taken from the gills of a tiger shark (*Galocерdo tigrinus*), caught at Woods Hole. These are the first males obtained. One has been designated the allotype, U.S.N.M. No. 79613.

Male.—Body elongate and narrow, head fused with the first segment and covered with a triangular carapace one-fifth wider than long. Segments 2 to 4 the same length but diminishing in width; the fused fifth and genital segments one-third longer than the three preceding segments combined and the same width as the fourth segment. Abdomen 3-segmented, the segments diminishing in length and width distally, but the anal segment is still three-fifths as long as the basal segment. The latter has an enlarged ring or collar around its proximal end which looks like an extra segment, but it is not separated. Caudal rami narrow and rodlike, as long as the anal segment, parallel with each other, each tipped with three setae.

First antennae 7-segmented, every segment bearing setae; the second antennae stout and chelate. Second maxillae shorter and stouter than in the female; maxillipeds with a curved terminal claw. The four pairs of swimming legs are biramose, the rami 3-segmented as in the female. Total length, 5-6 mm. Fifth and genital segments, 1.30 mm. long.

Remarks.—This male closely resembles that of *K. nasuta* (Wilson, 1932, p. 457), with these differences: It is more than twice as large, the fused fifth and genital segment is relatively longer, the first abdominal

segment has an enlarged base, and the caudal rami are longer and parallel instead of divergent.

Family SPHYRIIDAE

PAEONODES, new genus

Body separable into cephalothorax, neck, trunk, genital segment, and abdomen. Cephalothorax enlarged into a transverse ellipsoid as in *Paeon*; neck made up of the second thoracic segment and nearly straight; trunk cylindrical and made up of the third and fourth thoracic segments; genital segment distinctly separated and without posterior processes; abdomen also distinct and as long as the genital segment, with well-defined caudal rami.

Two pairs of segmented antennae, the usual mouth parts, and four pairs of biramous swimming legs, the rami 1-segmented.

Remarks.—When first viewed this genus seems to resemble *Paeon* closely but even a cursory examination reveals that the two genera are widely separated. The presence in *Paeonodes* of normal antennae, mouth parts, and swimming legs instead of nondescript processes, the distinct separation of genital segment and abdomen, and the absence of posterior processes all combine to furnish a decisive separation of the genera.

Genotype.—*Paeonodes exiguus*, new species.

PAEONODES EXIGUUS, new species

PLATE 32, FIGURES 187-189

A single female with ovisacs and an attached male was taken from near the eye of an unidentified fish in May 1911, locality not given. These two specimens, U.S.N.M. No. 79642, are holotype female and allotype male of the new species, respectively.

Female.—Head fused with the first thoracic segment and enlarged into a transverse ellipsoid twice as wide as long. The second segment constitutes a neck as long as the third and fourth segments combined and about the same diameter throughout. The body is made up of the fused third and fourth segments, the former three times as long as the latter, judged by the position of the swimming legs. The diameter increases backward until it becomes twice as wide at the posterior end. The genital segment is spherical and half as wide as the posterior end of the body, with the ovisacs attached to the center on either side. The abdomen is only half as wide as the genital segment, but it is nearly as long and 1-segmented. The caudal rami are about as wide as long and each is tipped with a single seta. The ovisacs are cylindrical, half as long and a third as wide as the body, and the eggs are minute and numerous.

The first antennae are small and 3-segmented, each segment armed with tiny setae; the second antennae are prehensile and disproportionately large, each tipped with a strong curved claw having an accessory spine on its inner margin near the base. Mouth parts small but of normal shape and not at all like the nondescript processes in *Paeon*. There are four pairs of biramose legs spaced as in figure 187, the first pair just behind the head and the last pair just in front of the posterior end of the body, the spaces between pairs in the proportions 5: 4: 1.50. The rami are 1-segmented, and the exopods and endopods are about the same length. Total length, 3.15 mm. Width of head, 1 mm.

Male.—A pygmy male was fastened so securely to the ventral surface of the third thoracic segment of the female that the two could not be separated without very serious mutilation. Consequently it was deemed wise to leave them intact and to be satisfied for the present with the knowledge that the male is a pygmy attached to the female, as in other genera of the Sphyrriidae.

Suborder ARGULOIDA

Family ARGULIDAE

Genus ARGULUS Müller, 1875

During the preparation of this paper an article on the genus *Argulus* by O. Lloyd Meehan (1940) was published. This article added many valuable data to our knowledge of the Argulidae, especially with reference to the respiratory areas and the supporting rods of the sucking cups. Upon these two features, combined with the accessory sex characters of the legs of the male, Meehan established a key to the species of the genus. Such a key has been greatly needed for a long time, and if this one be supplemented with the structural characters of the various appendages its usefulness will be increased. I have therefore incorporated these characters in Meehan's key, which I have added as a supplement to this paper (p. 576). As it stands in Meehan's paper, however, too much specific value has been placed upon the areas and rods and not enough upon other structural characters, with the result that formerly accepted species of *Argulus* have been reduced to synonyms. A discussion of the validity of these species makes up the remainder of the present paper. Such a discussion is quite appropriate, since this paper is so largely concerned with species belonging to the genus *Argulus*.

The removal by synonymy of as large a number of species of *Argulus* as advocated by Meehan constitutes a serious encroachment upon the genus. Consequently the mere statement that one species is the synonym of another is not sufficient. Actual proof must be

offered by a careful comparison of the structural details of the two species. Such proof is here offered in the comparison of species claimed as synonyms by Meehean, but it results in proving their validity rather than their synonymy.

In all Meehean keyed out 26 species. Of these one needed a new name, *A. diversus* being given to Meehean's *A. maculosus*; other material was wrongly identified as *A. salminei* Krøyer, which consisted in part of *A. nattereri* and *A. paulensis* both of Wilson. Including the latter, the present author reestablishes the validity of eight species that Meehean put into synonymy. This gives us 37⁸ species of *Argulus* for which a diagnostic key is given on p. 576.

ARGULUS INDICUS Weber

PLATE 22, FIGURES 34-39, 48

Argulus indicus WEBER, 1892, p. 544, fig. 1.—KAMPEN, 1909, p. 447, figs. 5, 6.

This species was first established upon female specimens from the coast of Java by Max Weber and afterward by P. N. Kampen. Both descriptions were very meager, with one figure by Weber and two by Kampen. A single female was obtained by Dr. H. M. Smith from the skin of a fighting fish (*Betta*) at Bangkok, Thailand, and sent to the present author, by whom it was more fully described (Wilson, 1927). Dr. Smith later obtained 10 females and 11 males from the skin and fins of *Trichopodus pectoralis* at Bangkok. As these are the first males to be collected they are fully described and figured and a single specimen of each sex is U.S.N.M. No. 78896, the male being the allotype.

Male.—Carapace ovate, considerably narrowed anteriorly, with broad lateral lobes, which fall slightly short of the abdomen, just reaching it or slightly overlapping it, no two specimens agreeing exactly in relative length. Cephalic area broadly triangular, distinctly separated from the rest of the carapace and projecting a little anteriorly. The two median ribs are curved and bifurcate at their anterior ends like those of the female, and the ribs in the lateral lobes also are arranged similarly. The respiratory areas are divided into a very large posterior portion and a comparatively minute anterior portion. Again this is like the arrangement in the female except that here in the male the large posterior portion is considerably curved inward and its anterior end is more or less truncated instead of evenly rounded. The compound eyes are relatively larger than those of the

⁸ Two species overlooked by Meehean, and not included in Wilson's key, are *A. cubensis* Wilson and *A. rhamdiae* Wilson. *A. cubensis* was taken by Dr. L. Howell Rivero from the gills of a fresh-water cichlid in Cuba (Wilson, 1936a). *A. rhamdiae* was taken by Dr. A. S. Pearce (Wilson, 1936b) from the skin of a species of *Rhamdia* caught in one of the cenotes of Yucatán.—EDITOR.

female and are similarly removed some distance from the anterior margin and are widely separated. The abdomen is acorn-shaped, contracted into a short neck where it joins the thorax and then abruptly widens until the width equals the length. The posterior sinus is one-fourth of the length and the caudal rami are subterminal. The paired testes are elongate-elliptical and do not quite reach the base of the posterior sinus. Their anterior ends are tapered into the ducts leading to the vesicle and the posterior ends are bluntly rounded.

The first and second antennae are almost exactly like those of the female; the claw on the second segment of the first antenna is near the posterior margin. On the ventral surface of the proximal segment of the second antenna close to its base are two unequal spines. The supporting ribs in the margin of the sucking disks are shown in figure 36; they are well separated and each is made up of three rather indistinct segments, the terminal one enlarged at its proximal end. The teeth of the marginal fringe are much wider at the base than in the female. The maxilliped (fig. 48) is considerably stouter than that of the female, especially in the three terminal segments, but the terminal claw is no larger. The first two pairs of legs have flagella, the third leg is shown in figure 38; the proximal basipod segment has a short and acute spine at its posterior distal corner and the distal basipod segment has a large sac opening on its posterior margin. The rim of the opening is thickened and produced into two finger processes on the ventral side near the basipod. In the fourth leg (fig. 39) the lobe on the basal segment is larger than the entire basipod and in dorsal view projects beyond the lateral margin of the abdomen and is densely fringed with hairs. The second segment has a pointed process at its anterior distal corner, which curves forward and outward and has an acuminate tip. Total length, 7.50 mm.

Remarks.—The exceptionally large posterior lobe on the proximal segment of the fourth basipod is the most prominent characteristic of this male. Coupled with the brown spots distributed over the entire dorsal surface of the body it will furnish a ready means of identification. The large number of specimens obtained from *Trichopodus pectoralis* suggests that it is the real host of this copepod.

ARGULUS INTECTUS, new species

PLATE 22, FIGURES 40-47

One female and one of the three males of this new species, obtained from the outside surface of a scup (*Stenotomus chrysops*) at Woods Hole, Mass., are the holotype and allotype of the new species, U.S.N.M. No. 78891.

Female.—Carapace elliptical, one-tenth longer than wide and broadly rounded both anteriorly and posteriorly. Posterior lobes

reaching only the middle of the second thoracic segment, leaving all the rest of the thorax uncovered, whence the specific name. The cephalic area is ovate and 70 percent of the carapace length; the compound eyes are proportionally large, well separated and removed from the anterior margin. The respiratory areas are peculiar; the smaller one is circular in outline and lies inside the larger one near the anterior end of the latter. This anterior end is narrowed outside the smaller area and abruptly widened behind it and curved backward and inward, the posterior end enlarged somewhat. The second and third thoracic segments are the same width but the third is slightly the longer. The fourth segment is both shorter and narrower and its lateral margins are strongly convex. The abdomen is elliptical, one-half longer than wide and about one-fifth the total length. The posterior sinus is a third of the abdomen length and the caudal rami are lateral, each upon a shoulder of the lateral margin of the sinus at its center. The seminal receptacles are circular, close together and close to the anterior margin of the abdomen. They are partially obscured in dorsal view but are plainly visible on the ventral surface.

In the first antennae the spine on the anterior margin is stout and curved inward while the lateral spine is long and slender and bent into a half circle. The curve of this spine extends considerably beyond the tip of the flagellum, which is 2-segmented and tipped with three small setae. The second antennae are 4-segmented, the posterior spine on the basal segment slender and acuminate. The supporting rods in the margin of the sucking disks are close together and 6-segmented. The basal segment is cylindrical and as long as the other five combined, which are beadlike, tapered distally, and tipped with a tiny spine. The pad on the basal segment of the maxilliped carries three slender acuminate spines and the end segment is armed with three small claws. The swimming legs reach beyond the lateral margins of the carapace, the first two pairs bearing flagella. The proximal segment of the fourth basipod has a posterior process without a heel, but with an acuminate toe which projects well beyond the lateral margin of the abdomen. Total length, 2.30 to 2.55 mm. Carapace, 1.70 mm. long, 1.50 mm. wide.

Male.—Similar to the female but a little larger, the carapace elliptical and broadly rounded both anteriorly and posteriorly, one-fourth longer than wide, and reaching the posterior margin of the second segment. The cephalic area is as long as in the female, the posterior sinus equally broad and shallow. The second and third thoracic segments are about the same length with nearly straight sides, the fourth segment is narrower and shorter with convex sides. The abdomen is one-half longer than wide, its lateral margins more convex than in the female. The testes are elongate-elliptical and reach nearly to the base of the posterior sinus, which is one-fourth the

abdomen length. The caudal rami are lateral upon shoulders of the sides of the sinus as in the female. Here that portion of the sinus anterior to the caudal rami is closed so that the rami appear to be basal, but even the pressure of a cover glass is sufficient to open the sinus and show that the rami are really lateral.

The antennae and maxillipeds are like those of the female except that the spines on the basal plate of the latter are short and stout and not very pointed. The swimming legs are simple and without accessory sex characters; the boot on the fourth basipod has no heel but the toe is longer and more pointed than in the female and nearly the whole boot is visible in dorsal view. Total length, 2.6 to 2.8 mm.

Remarks.—This is the next to smallest species thus far described and its diminutive size, together with the relative shortness of the carapace, the shoulders on the sides of the posterior sinus of the abdomen, and the peculiar shape of the respiratory areas are its distinguishing characters.

ARGULUS LONGICAUDATUS, new species

PLATE 23, FIGURES 49-56

One female and one of two males taken from the outside surface of a crappie (*Pomoxis annularis*) caught in Lake Dallas, Tex., have been designated holotype and allotype of the new species, U.S.N.M. No. 78892.

Female.—Carapace elliptical, one-fourth longer than wide, narrowed a little anteriorly but still broadly and evenly rounded, with the posterior lobes just reaching the anterior third of the third thoracic segment. The compound eyes are small, far forward, and well separated; the cephalic area is a little more than half the carapace length. The respiratory areas are very indistinct; they consist of a large posterior curved area and a minute, circular anterior area, the two areas well separated. The second, third, and fourth thoracic segments diminish in width and length backward. The abdomen is obovate, nearly as long as the four thoracic segments combined and a little less than twice as long as wide. The posterior sinus is three-quarters of the entire length and the lobes taper rapidly distally and end in sharp tips. The seminal receptacles are small, circular, and close to the anterior margin; the caudal rami are basal. Through its basal portion in front of the posterior sinus the abdomen is one-third wider than the thorax and its anterior corners are broadly rounded.

The first and second antennae are slender and of about equal length; in the first pair the basal segment has a blunt spine at its inner corner, the second segment has a small straight spine on its anterior margin, and the curve of the lateral claw reaches the center of the

last segment of the flagellum. There is also a large spine on the posterior margin of this second segment and the flagellum is 3-segmented. The second antenna is 4-segmented, with a stout spine on the basal segment and two slender spines at the tip of the third segment. The sucking disks are of medium size and far forward; the supporting rods in their margins are 7- or 8-segmented (fig. 51). The basal segment is narrower and longer than any of the others, which gradually diminish in length and width distally, the terminal ones being flattened disks. The maxilliped is slender and its basal plate is armed with three slender, curved spines. The first three pairs of legs are of the usual pattern and there are no flagella on any of them. On the fourth legs instead of the usual boot-shaped appendage a flattened lamina extends backward from the basal segment. Its posterior margin is divided by a shallow sinus into two rounded lobes covered with stiff hairs. The second basipod segment has a row of four slender acuminate spines on its ventral surface along the posterior margin. Total length, 7 mm. Carapace, 4 mm. long, 3.25 mm. wide. Abdomen, 2.25 mm. long.

Male.—Carapace elliptical, one-third longer than wide, the posterior lobes not reaching the center of the second thoracic segment. Cephalic area 65 percent of the carapace length, the compound eyes larger and not so far forward as those of the female. The respiratory areas are like those described for the female and are a little more distinctly visible. The four thoracic segments are about the same length and width but the fourth segment is narrowed posteriorly to join the abdomen. The latter is longer than the four thoracic segments combined and one-half wider. The posterior sinus does not quite reach the center and is broadly triangular; the caudal rami are basal and only just visible dorsally. The testes are exceptionally large and fill nearly the entire space in the abdomen. Each is elongate-ovate, considerably narrowed posteriorly, and extends back into the posterior lobe to the center of the sinus.

The antennae and maxillipeds are like those of the female except that the latter are stouter and the ventral surface of the last three segments is covered with short spines. The swimming legs are long and slender and none of them exhibit any accessory sex details except the fourth pair (fig. 56). Here the second basipod segment is abruptly reduced in diameter on its anterior margin near the center of the segment. Attached to the reduced portion close to the notch is a spherical knob, which stands out prominently and serves as an excellent character for identification of the species. Total length, 3.96 mm. Carapace, 1.98 mm. long, 1.50 mm. wide.

Remarks.—This species is readily recognizable by the shape and length of the abdomen in both sexes and by the knob on the anterior

margin of the fourth basipod in the male. When this copepod is alive it must be highly colored, as even in the preservative the thorax retains a deep orange hue and the carapace and abdomen have a bluish tinge, probably a bright blue in the living copepod.

ARGULUS LUNATUS, new species

PLATE 23, FIGURES 57-63; PLATE 24, FIGURES 64-66

Eight females and four males were obtained from the outside surface of goldfish (*Carassius auratus*) at Norfolk, Va. One female and a male have been designated the holotype and allotype, U.S.N.M. No. 78893.

Female.—Carapace broadly elliptical, somewhat narrowed anteriorly, with wide posterior lobes that reach the anterior margin of the abdomen. Posterior sinus broad and flaring, one-third the carapace length and squarely truncated at its base. Cephalic area 58 percent of the carapace length; eyes large and far forward but well separated. Respiratory areas elongate-elliptical, the anterior one much smaller than the posterior and the two in contact along a transverse line. The four thoracic segments are all the same width and the first three are the same length, while the fourth is shorter but is not narrowed posteriorly. The abdomen is obovate, longer than wide with broadly rounded anterior corners and narrow posterior lobes bluntly rounded at their tips. The sinus does not reach the center of the abdomen, and the caudal rami are lateral, each mounted on a shoulder near the base of the sinus. The seminal receptacles are circular, of medium size, and widely separated close to the anterior corners.

The first antennae are narrow and elongate, the two proximal segments fused, with no spine at their base or on the posterior margin, but with a short and stout spine on the anterior margin. The lateral claw is curved into a half circle and reaches the tip of the flagellum. The second antennae are 5-segmented, the two basal segments enlarged, the end segment lanceolate. The supporting rods of the sucking disks are made up of seven or eight elliptical segments gradually diminishing in size distally and tipped with a twisted rod. The basal segment of the maxilliped is stout and longer than the three distal segments combined, the basal plate is wide and the three spines are short, stout, and blunt. The raised area is covered with coarse spines and smaller spines are scattered over the entire ventral surface of the appendage. The first two pairs of legs have flagella and the two basipod segments of all four pairs are more or less completely fused. In the fourth legs the part corresponding to the proximal basipod segment is prolonged backward into a flap, which is broadly rounded at its tip and fringed with hairs but bears no resemblance to a boot,

having neither heel nor toe. Total length, 5 mm. Carapace, 3 mm. long, 2.95 mm. wide.

Male.—Carapace orbicular, not narrowed anteriorly, a little wider than long and reaching only the fourth segment. Cephalic area 58 percent of the carapace length, the eyes larger than in the female and farther forward. The respiratory areas are similar but the dividing space between them is diagonal rather than horizontal. The four thoracic segments are the same width and the first three are the same length, but the fourth is only half as long as the others and its posterior margin is a half circle. The abdomen is elliptical, one fifth longer than wide, with no anterior corners. The testes are 80 percent of the abdomen's length and distinctly lunate, whence the specific name. The posterior sinus is one-third of the length of the abdomen, the tips of the posterior lobes rounded. The caudal rami are lateral, attached to shoulders on the sides of the sinus near its base.

The antennae are similar to those of the female while the spines on the basal plate of the maxilliped are longer, curved and acuminate (fig. 65). The proximal segment of the basipod of the second leg has two long finger processes on its posterior margin (fig. 63). The same segment in the third leg is swollen posteriorly but otherwise unmodified. In the fourth leg the proximal basipod segment has a posterior lamina very much shorter than in the female, and the distal segment has an acute process at its anterior outer corner. Total length, 4 mm. Carapace, 3 mm. long, 3.02 mm. wide.

Remarks.—After this species had been described and the figures drawn the specimens suffered a severe drying, but the specific characters still remain visible. From *A. japonicus*, which it most resembles, this species may be distinguished in the female by the shape of the fourth segment and the abdomen and by the structural details of the antennae, the maxillipeds, the respiratory areas, and the ribs of the sucking disks. In the male the most striking difference is to be found in the distinctly lunate form of the testes, curved toward each other with acute ends.

ARGULUS JAPONICUS Thiele

PLATE 24, FIGURES 67-73

Argulus japonicus THIELE, 1900, p. 48; 1904, p. 39, pl. 8, figs. 94-98.

This is properly an Asiatic species that has been imported into the United States along with the influx of goldfish, which have risen rapidly to popularity in recent years. As goldfish have been distributed to aquaria and artificial ponds these parasites have spread with them and have become very common.

Thiele (1900) founded his new species upon female specimens taken from goldfish at Tokyo, Japan. Later (1904) he obtained supple-

mentary specimens, including both sexes, from goldfish at Yokohama and gave a more detailed description. More recently specimens, also including both sexes, were taken from goldfish at Tokyo and sent to the National Museum. They differ from Thiele's in a few details. For this reason, and more especially to afford a ready means of comparison between this species and *A. lunatus*, the Tokyo specimens are here described and figured.

Female.—Carapace circular, as wide as long and reaching just beyond the anterior margin of the fourth thoracic segment, the rami of the first three pairs of legs and nearly all of the fourth pair being visible dorsally. Compound eyes of medium size, far forward and well separated; median eye farther back and very small. Anterior ends of the median ribs distinctly forked, the cephalic area much longer than wide. Second and third thoracic segments much wider than long, fourth segment narrower, with a constriction at the center of each lateral margin. Abdomen elliptical, one-half longer than wide and contracted into a short neck where it joins the thorax. Posterior sinus narrow and V-shaped, less than a quarter of the abdomen length, the caudal rami basal, the posterior lobes short and broadly rounded.

Basal portion of the first antenna short with a curved and bluntly rounded spine on its inner margin. Second segment with a stout, acute spine on the anterior margin, a curved acute spine on the ventral surface near the posterior margin and a slender lateral claw curved into a half circle. Second antenna 6-jointed, the basal joint enlarged and armed with a long blunt spine at its inner end. The five terminal segments are each about the same length and extend well beyond the tip of the first antennae. The maxilliped is fairly stout, its basal plate with a raised knob covered with spines on its ventral surface and three long acuminate posterior spines. There are no flagella on the swimming legs and the basal segment of the fourth leg has a small semi-circular flap on its posterior margin. Each supporting rib in the margins of the sucking disks is made up of nine small segments like a row of beads, all about the same size, and the fringe on the margin is a row of flattened spatulate laminae with bluntly rounded tips. Total length, 6 mm. Carapace, 4 mm. long.

Male.—Considerably smaller than the female, the carapace just reaching the abdomen and leaving less of the legs visible in dorsal view. Abdomen more regularly elliptical in outline and the posterior sinus a little deeper. The testes are elongate-ovate and tapered backward and extend into the posterior lobes.

The antennae and mouth parts are similar to those of the female; in the second legs the proximal segment has two large knobs covered with small spines projecting from the posterior margin. In the third

legs the second segment has a large seminal receptacle on the dorsal surface. Both segments of the basipod of the fourth legs have curved projections on the posterior margin and in addition there is an acute peg at the distal anterior corner of the second segment. As here presented (fig. 73) it reaches considerably beyond the distal end of the segment but can evidently be drawn back by muscles connected with it into the position represented in Thiele's figure (1904, pl. 8, fig. 97). Total length, 3.5 mm.

Remarks.—A careful comparison of the details in the figures of *A. japonicus* and of *A. lunatus* will give evidence that they belong to separate species. There is considerable superficial resemblance but not a single characteristic can be found showing exact correspondence.

ARGULUS LATUS S. I. Smith

PLATE 27, FIGURES 108-115

Argulus latus S. I. SMITH, in Verrill and Smith, 1873, p. 574.

Argulus funduli MEEHEAN, 1940, p. 498 (part).

Smith's type specimens were all females and that is the only sex thus far described. Two males, accompanied by two females, caught swimming freely in the plankton of one of the brackish-water ponds on Chappaquiddick Island off the northern end of Marthas Vineyard, are the first to be discovered and since the previous descriptions of the female have been rather limited a full description of both sexes is here presented. They are U.S.N.M. No. 60452.

Female.—Carapace orbicular, 14 percent wider than long, the anterolateral sinus very shallow, the posterior sinus fully as wide as deep, the posterior lobes broadly rounded and not reaching the center of the third thoracic segment. Fourth segment only two-thirds as wide as the third segment and reduced another third where it joins the abdomen. The latter is obcordate, one-half longer than wide and considerably narrowed posteriorly. The posterior sinus is a little more than one-third the entire length with nearly parallel sides. The caudal rami are subbasal, close to the bottom of the sinus and usually appearing basal owing to the closure of the sinus behind them. The seminal receptacles are proportionally large and elliptical.

The first antennae have neither a claw nor a knob on the anterior margin of the second segment. The lateral claw is small and weak and its curve reaches only the center of the basal segment of the flagellum. The latter is stout, 3-segmented and the terminal segment is not forked. The second antennae are 4-segmented, the first segment longer than the second and third combined, with a blunt spine on the posterior margin at the base. The compound eyes are far forward and just behind the second antennae; they are of medium

size and well separated. The sucking disks are very large for so small a copepod, between a third and a fourth of the carapace width and so widely separated that their outer edges often appear outside the edge of the carapace. The supporting rods in the margins of the disks are made up of 18 segments regularly imbricated and slightly tapered distally. The maxillipeds are slender, the end segment tipped with a finger process and a straight spine. The basal plate is small and its posterior border is slightly bilobed, but without teeth or any sort of projection. The first two pairs of legs have no flagella and the basipod of the fourth leg has only a semicircular lamella with no indications of a heel. In spite of the width of the carapace all the legs project well beyond its lateral margins. Total length, 2.3 to 3 mm. Carapace, 2 mm. long, 2.25 mm. wide.

Male.—Carapace ovate, slightly wider than long and considerably narrowed anteriorly, the cephalic area about as wide as long, the compound eyes fully as far forward as in the female, the median eye quite close behind them and fairly visible. The posterior lobes are very broadly rounded and reach beyond the anterior margin of the fourth segment and the posterior sinus is narrower than in the female, only half as wide as deep. The fourth thoracic segment is half as long and two-thirds as wide as the third segment with convex sides. The abdomen is elliptical, one-third longer than wide and more than half as long as the carapace. The posterior sinus is about a fourth of the entire length and the caudal rami are subbasal on lateral shoulders near the base of the sinus. The testes are elongate elliptical, narrowed posteriorly, and just reaching the base of the sinus.

The first and second antennae are like those of the female, the lateral claw on the second segment of the first antenna even weaker than in the female. The supporting rods of the sucking disks have one or two fewer segments and are just as fully imbricated, and the disks themselves are fully as large. The maxillipeds are much stouter and the segments are shorter, the end segment armed with three curved claws and a lamella, which in turn is tipped with a small curved claw. The basal plate has a smooth posterior margin without spines or processes and without a boss on its ventral surface. The only accessory sexual characters on the second, third, and fourth legs are a swelling on the posterior margin of the third basipod and a minute triangular process on the posterior margin of the fourth basipod. Total length, 2.25 mm. Carapace, 1.43 mm. long, 1.50 mm. wide.

Remarks.—Meehan (1940, p. 468) said of this species: "The male of *A. latus* Smith * * * has never been reported because it is indetical with *funduli* Krøyer * * * so far as the available

specimens are concerned." The two males here described furnish a manifest contradiction to this statement. They were properly labeled and available in the collection of the National Museum. Meehan (1940, p. 499) examined and rejected them because "the males were immature so that the accessory copulatory apparatus was not developed far enough to tell whether there were any specific differences." Specific differences are not confined to the accessory copulatory apparatus. The very use of the word accessory refutes such an idea and we turn to a consideration of the other characteristics to which these are accessory.

These two males were found in company with two females that were certainly *A. latus*, and the natural assumption would be that the four were the two sexes of the same species. The males are just the right size for adult males of the species *latus*; the respiratory areas, the supporting rods of the sucking disks, and the first and second antennae are like those of the female *latus*. The maxillipeds are prehensile as would be expected in males, but the basal plate has neither spines on its posterior margin nor a boss on its ventral surface and so far corresponds to those of the female. Finally, the abdomen shown in figure 109 is as different from the abdomen of the *funduli* male, shown in figure 123, in size, shape, posterior sinus, and the position of the caudal rami, and in the shape and size of the testes as is necessary for specific differentiation. With an abdomen of the relative size here shown and a pair of enlarged testes crammed with sperm it would seem as if these males might be considered sufficiently developed to be assigned to the species *latus*. The abdomen alone shows that they cannot now be placed in the species *funduli* and it is doubtful if sufficient changes will ever occur in further development to allow them to be placed there.

In spite of such manifest specific differences these specimens identified as and labeled *A. latus* by the present author were recorded by Meehan as synonyms of *A. funduli*. He remarked (1940, p. 499) that "Smith's description of *A. latus* is not full enough to enable one to determine whether he has established a true species." Meagerness of description is no more proof of synonymy than of validity.

Taking into account, therefore, all the specific characteristics described above it seems reasonable to conclude that *A. latus* is a valid species, now that both sexes are known.

Incidentally it is worthy of note that figure 108 bears the signature of J. H. Emerton, the locality Quohog Bay, and date September 3, 1873, and "drawn from life." In all probability this figure was drawn for the 1873 description from one of the original type specimens. Quohog Bay lies between Marthas Vineyard and Chappaquiddick Island and the brackish-water pond from which the present specimens

were taken open into it. Hence these two males and two females came from exactly the same locality as the original type females. It is also worthy of note that all the specimens of both sexes were caught swimming freely in the tow.

ARGULUS MEGALOPS SPINOSUS, new variety

PLATE 26, FIGURES 95-104

Dr. Frits Johansen obtained 32 specimens, including both sexes, from the outside surface of an eel-backed flounder (*Liopsetta putnami*) at Cape Tormentine, New Brunswick, in the Gulf of St. Lawrence. The male allotype and female holotype are U.S.N.M. No. 60460. Forty specimens, also including both sexes, were taken from the skin of the long-spined sculpin (*Acanthocottus octodecimspinosus*) in the Gulf of St. Lawrence.

Female.—Carapace elliptical, the length to the breadth as 5 to 4 and to the length of the entire body as 5 to 8. Posterior sinus broadly triangular and shallow, posterior lobes reaching the center of the third segment. Abdomen broadly elliptical, the width to the length as 11 to 13; anal sinus narrow and short, caudal rami basal. Fourth thoracic segment as wide as the third, with broadly rounded lobes at its posterior corners.

Second segment of the first antenna with a stout curved spine on its anterior margin, a straight spine on the ventral surface near the posterior margin and a large and strongly curved lateral claw. The middle segment of the terminal portion of the antenna has two large spines at its distal end and the terminal segment is tipped with three spines. The basal segment of the second antenna has a very stout and blunt spine on its ventral surface close to the proximal end. The second, third, and fourth segments diminish rapidly in length, the fourth a third as long as the second. All four segments are girdled with long and slender spines, numbering respectively eleven, six, four, and three. The supporting rods in the margins of the sucking disks are each made up of six segments nested one within another, the basal one twice as long as the others. The maxilliped is stout and fairly spiny on its ventral surface. The swimming legs are practically identical with those of the regular female of the species and are without flagella.

Male.—Carapace ovate, longer than wide, with a deep sinus on each lateral margin opposite the compound eyes forming a prominent shoulder.⁹ Posterior sinus enlarged at its base, posterior lobes reach-

⁹ The male of *Argulus dactylopteri* Thorell (1865, p. 609, pl. 16) shows an even more prominent shoulder.

ing the fourth thoracic segment. Abdomen elliptical, three-fifths longer than wide with a very shallow posterior sinus, the caudal rami basal. The testes are elongate elliptical and reach the entire length of the abdomen.

The antennae, mouth parts, and first two pairs of legs are like those of the female. On the basal segment of the third legs in place of the thumblike process of the regular male is a slender, 3-segmented process which extends along the side of the second joint parallel with the axis of the leg instead of standing out at right angles to it. On the basal segment of the fourth leg at the anterior distal corner is a peg that is pointed instead of spherical and apparently 2-jointed. Total length of female, 5.8 mm.; of male, 4 mm.

Remarks.—This new variety is distinguished chiefly by the heavy spinous armature of the antennae and mouth parts of the female and by the prominent carapace shoulders and the sex armature of the basipods of the third and fourth legs in the male.

ARGULUS ROTUNDUS, new species

PLATE 27, FIGURES 116-122

The type, a single female, U.S.N.M. No. 78901, was obtained from an unknown fish in the Gulf of Mexico in May 1915.

Female.—Carapace circular, about as wide as long; posterior lobes elongate and coiled around behind the thorax overlapping the abdomen. Posterior sinus wide and deep reaching the center of the carapace. Respiratory area consisting of a long outer tract curved to follow the outline of the carapace and a very much smaller ovate inner area set into the inner margin of the larger area near its anterior end. The smaller area is at right angles to the larger one, its pointed end inward. Abdomen wider than long, its posterior sinus not reaching the center, the sides of the sinus overlapping so that the only opening is at the base where the caudal rami are attached and they are more or less invisible in dorsal view.

In the first antennae the basal segment has a small blunt spine at the proximal posterior corner and a still smaller pointed process at the anterior distal corner. The second segment has a smooth anterior margin without any indication of a spine or knob and its ventral surface is likewise unbroken. The lateral claw is stout and strongly curved and the terminal portion of the antenna is 2-segmented and reaches just beyond the curve of the claw. The second antennae are slender and 4-segmented, with a spine on the basal segment and an elongate second segment. The sucking cups are large and so close together that they almost touch on the midline. The supporting rods in the margins are slender, each made up of 11 segments, of which the 2 basal ones are a trifle larger than the

others. The 2 distal segments are reduced to mere rods curved into a half circle and the margin of the cup, fringed with hairs, is indented opposite each rod. The maxillipeds are stout with a wide basal plate having a large raised area covered with hairs. The three projections on the posterior margin of the plate are flat laminae squarely truncated at their tips, the distal one nearly as wide as the other two combined, the middle one narrow. The first and second legs carry normal flagella; in the fourth legs each basipod segment has a laminate pad on its posterior margin. The one on the proximal segment is almost squarely truncated, the one on the distal segment is inclined outward and broadly rounded. All the legs are invisible in dorsal view. Total length, 10 mm. Carapace width, 9.25 mm.

Remarks.—This large *Argulus* has an almost perfectly circular outline, the carapace covering everything except a part of the thorax in the posterior sinus. The respiratory areas, the supporting ribs of the sucking cups, and the posterior pads on the basipods of the fourth legs furnish the best characteristics for identification.

ARGULUS MELANOSTICTUS Wilson

PLATE 25, FIGURES 89-94

Argulus melanostictus WILSON, 1935, p. 776, pl. 25, figs. 1-4.

A single female, U.S.N.M. No. 60504, was obtained by Dr. H. M. Smith in plankton from the Gulf of Thailand. The host is unknown. As this locality is separated by the entire width of the Pacific Ocean from Monterey Bay on the coast of California, where the type specimens were found, and as this female differs from the types in some particulars it is here described and figured.

Female.—Carapace cordate, considerably narrowed anteriorly, slightly longer than wide, the posterior lobes narrowly rounded, strongly divergent and not quite reaching the fourth thoracic segment. Cephalic area a little wider than long and projecting anteriorly; compound eyes of medium size, far forward and well separated. The entire dorsal surface of the carapace, the thorax, and the abdomen are covered with small spots jet black in color. These spots are circular or slightly elliptical, vary considerably in size, and are not arranged in any definite pattern (fig. 94). The first and second segments of the thorax are equal in length, the third is longer and the fourth shorter. The abdomen is two and a half times as long as wide, the anal sinus extends beyond the center and the posterior lobes are very narrow and acute. The caudal rami are very minute and basal and partly concealed in dorsal view. The entire integument of the abdomen, dorsal, lateral, and ventral, is raised into minute irregular knobs like pebbled leather, which gives the wavy outline noticeable in the figure.

In the first antennae there is a well-developed claw on the anterior margin of the second segment, the lateral claw is long and slender and its curve nearly reaches the tip of the flagellum, which is 3-segmented. The second antenna is 4-segmented, the basal segment a little longer than the other three segments combined and armed on its ventral surface with a large acute spine. The sucking disks are small, well separated, and removed a considerable distance behind the compound eyes. The supporting rods are very irregular, each made up of about 35 segments more or less imbricated, of different lengths and different curvatures, no two alike but showing a general tendency toward a uniform taper distally (fig. 91). The maxilliped corresponds well with the California specimens and is distinguished chiefly by the finger processes with which it is tipped (fig. 93). The first two pairs of legs have flagella and the fourth basipod has a boot-shaped posterior lamella. Length, 8 mm.

Remarks.—The description of this Thailand specimen is of interest chiefly to show the differences that may occur within the same species in specimens living in widely separated localities. The supporting rods of the sucking disks are worthy of special comment for the variations they exhibit. In the original type specimens from California each was made up of 19 to 21 crescentic disks regular in outline, uniformly imbricated, and tapered distally. In this specimen from the other side of the Pacific the number of segments jumps to 30 or more and the only regularity left is in the distal tapering, the form and the imbrication becomingly extremely irregular.

ARGULUS TRILINEATUS Wilson

PLATE 25, FIGURES 79-88

Argulus trilineatus WILSON, 1904, p. 651, figs. 34-38.

Argulus japonicus MEEHEAN, 1940, p. 494, fig. 32.

This species was founded upon a single female from a goldfish from Macon, Ga., and another single female was obtained from a goldfish at Henderson, Ky., in 1914. These are the only specimens reported up to June 1937, when 6 females and 6 males were taken by Dr. Josiah Bridge from goldfish at Takoma Park, Md. The males, the allotypes, U.S.N.M. No. 78900, are the first males to be collected.

Male.—Carapace elliptical, a little shorter than wide and reaching just beyond the anterior margin of the fourth thoracic segment. The cephalic area projects considerably from the anterior margin; the compound eyes are large, far forward, and well separated. The posterior sinus is quite narrow and only about a fourth of the carapace length. The central longitudinal ribs extend to the frontal margin of the head and are not branched. The respiratory areas are like

those of the female, a small elliptical anterior area and a large posterior area slightly curved. The abdomen is spindle-shaped, one-half longer than wide; the posterior sinus does not reach the center and the posterior lobes are bluntly rounded. The base of the sinus is angular and the caudal rami are subbasal, attached to the sides of the angle a short distance from the extreme base. (See fig. 80.)

The first and second antennae are like those of the female; the supporting rods in the margins of the sucking disks are stout and 4-jointed. The basal segment is twice as long as any of the others and is tapered proximally; the other segments diminish in size distally. The segments of the maxillipeds are much shorter than in the female and the end segment is divided lengthwise, the anterior portion ending in a finger process, the posterior portion in a curved claw. The first and second legs have no flagella; in the second legs the proximal basipod segment has a rounded knob at either end extending backward from the posterior margin and the two knobs are connected by a concave membrane. In the third legs the distal basipod segment has a large inner receptacle that opens on the posterior surface and can be closed by an external flap. The proximal basipod segment of the fourth leg has a rounded lobe on its posterior margin; the distal basipod segment has an acutely pointed peg at its distal anterior corner, and its posterior margin is fringed with long hairs. Total length, 3.25 mm. Carapace, 2.15 mm. long, 1.95 mm. wide.

Remarks.—With reference to this species Meehan said (1940, p. 468): "Specimens of *A. japonicus* collected by Dr. Pearse in Japan and those sent me from that country proved to be identical with *A. trilineatus*, thus invalidating another species." The fortunate discovery of the male suffices to distinguish *trilineatus* from *japonicus*. A fine lot of specimens of *japonicus*, including both sexes, was taken from goldfish at Tokyo, Japan, and sent to the National Museum. For the sake of comparison with the present species these are fully described on p. 559 and figured. If the two sets of figures here presented are compared in detail it will be found that they are not identical, as Meehan claimed, but enough differences can easily be found to make both species valid. Attention is called particularly to the pattern of the dorsal grooves of the carapace, to the length of the posterior lobes, to the details of the first and second antennae, especially the latter, to the supporting rods of the sucking disks, to the maxillipeds, and to the caudal rami. The sum total of these differences is more than sufficient to overcome any similarity that may be found in the pattern of the respiratory areas.

ARGULUS BIRAMOSUS Bere

PLATE 20, FIGURES 2, 4, 6

Argulus biramosus BERE, 1931, p. 428, pl. 9, figs. 1-7.*Argulus appendiculosus* MEEHEAN, 1940, p. 512 (part).

There is considerable similarity between *biramosus* and *appendiculosus* in the respiratory areas and supporting rods (figs. 3 and 4), but there is no real identity, as Meehean claims. There are many differences in the structural characters of the various appendages. The second segment of the first antenna in *appendiculosus* is armed with a spine on the ventral surface near the proximal end and two transverse ridges at the distal end across the base of the lateral claw (fig. 1). Both spine and ridges are absent in *biramosus* (fig. 2). The flagellum is biramose in both species but it differs in shape and armature. The second antennae are 4-segmented in *appendiculosus*, the basal segment without setae. In *biramosus* they are 5-segmented, every segment armed with setae.

Meehean's description of the abdomen as spindle-shaped applies better to *biramosus* than to *appendiculosus*, where it is scarcely narrowed at all anteriorly; cordate would be a more accurate term. In the latter species the caudal rami are lateral, close to the base of the posterior sinus, and practically invisible dorsally. In *biramosus* they are farther from the base, stand out prominently in dorsal view, are divergent, very much larger, and truncate at their tips. Meehean's description fits them admirably but does not apply at all to the caudal rami of *appendiculosus* (figs. 5, 6).

These differences may not be enough fully to establish *biramosus* as a valid species, but they are more than enough to question the validity of this species as a synonym of *appendiculosus*. Unfortunately, Dr. Bere did not have a male in material that was collected at Trout Lake, Wis., and one must be examined before synonymy can be finally settled. In the meantime *Argulus biramosus* should stand.

ARGULUS CANADENSIS Wilson

PLATE 20, FIGURES 8, 10, 12, 14

Argulus canadensis WILSON, 1916, p. 348, pl. 60, figs. 1-6; 1936c, p. 355, figs. 1-9.*Argulus stizostethii* MEEHEAN, 1940, p. 479 (part).

Despite the statement that this species is the same as *stizostethii* Kellicott, Meehean (1940, p. 480) admits "a slight variation in size and shape of body and some structures." The difference in size applies to nearly all the specimens and the variation in shape is seen especially in the cephalic area of the carapace, the position of the compound eyes, the formation by the dorsal ribs of the carapace of a definite shoulder on either side of the cephalic area in *canadensis* and its complete absence in *stizostethii*, and in the position of the cau-

dal rami. The testimony of the structural characters of the appendages is even more decisive. Figures 7 and 8 show the two pairs of antennae, the spines on the basal segments in *stizostethii* large, long, and pointed (fig. 7), those in *canadensis* smaller, short, and blunt (fig. 8). Figures 9 and 10 show the supporting rods of the two species, the segments in *canadensis* (fig. 10) doubly imbricated and strongly tapered, those in *stizostethii* (fig. 9) simply imbricated and much less tapered. Figures 11 to 14 show the accessory sexual characters of the third and fourth legs of the respective males. The prominent curved spine on the posterior margin of the third basipod in *canadensis* (fig. 12) and the two knobs at the anterior distal corner of the fourth basipod (fig. 14) contrast strongly with what is found in the same localities in *stizostethii*. Such a comparison can prove only that *canadensis* is a perfectly valid species and not a synonym of *stizostethii*. In support of this statement it may be noted that the hosts of *canadensis* belong almost exclusively to fish of the salmon and trout families while the hosts of *stizostethii* are found in the sauger and pike families.

ARGULUS NIGER Wilson

PLATE 20, FIGURES 15, 17

Argulus niger WILSON, 1902, p. 714, pl. 18, figs. 42-45.

Argulus pugettensis MEEHEAN, 1940, p. 487 (part).

Meehean expresses the opinion (1940, p. 467) that "The male of *A. niger* has never been described, since it is the same as *pugettensis* except that the former is very dark, as its name indicates." If the lack of a male is to be taken as evidence that the female must become the synonym of some other species whose male is known, the number of copepod species would be greatly diminished. The same statement is made by Meehean (1940, p. 468) in reference to *A. latus* Smith, but the male of that species was found among the specimens here identified and is fully described on p. 560. There is a similar chance that the male of *niger* will be found some day among parasitic copepods from the Pacific coast.

Following his redescription of *pugettensis* Meehean remarks (1940, p. 489): "As far as can be determined *niger* is identical in every respect." Meehean himself notes the difference in color, which in the present instance is an exceptional one. Ordinarily the color of preserved specimens is not worth recording although in the living animal it presents one of the most important specific distinctions; but black is an exceedingly rare color in parasitic copepods and may well serve as the first character to separate *niger* from *pugettensis*. Figures 15 and 16 show the antennae of the two species and figures 17 and 18 the maxillipeds. A cursory examination of these figures will be sufficient

to prove that the species cannot be synonyms and that there is no need of waiting for the discovery of the *niger* male. The relative length of the flagellum in the antenna and of the second segment in the second antenna and the comparative size and armature of the end segment in the maxilliped are especially noticeable.

ARGULUS VARIANS Bere

PLATE 21, FIGURES 19, 21; PLATE 26, FIGURES 105-107

Argulus varians BERE, 1936, p. 579, pl. 1, figs. 11-16.

Argulus megalops MEEHEAN, 1940, p. 492 (part).

Although Meehean claims only that *varians* is "similar to *megalops* except for the great variation in the size of the carapace" (1940, p. 468), he records it as a synonym. Dr. Bere's species was established in the laboratory of the present author and her specimens were carefully examined before being accredited as new. The following considerations led to the separation of *varians* from *megalops* and these still seem sufficient.

The size and shape of the respiratory areas are shown in figures 19 and 20, and while they are similar they are by no means identical. Figures 21 and 22 show the supporting rods in the sucking cups. In *varians* each is made up of four segments longer than wide, sub-rectangular, the basal one as long as the other three. In *megalops* each rod is made up of ten segments wider than long and strongly imbricated. The second antennae are 5-segmented and as long as the first pair in *varians*; they are only 4-segmented in *megalops* but are nearly twice as long as the first pair. The ventral surface of the maxillipeds and the basal plate in *varians* are covered with scales whose distal margins are divided into four to seven sharp points. In *megalops* there are no scales, only minute spines. In *varians* the seminal receptacles are close to the anterior margin of the abdomen and almost touch each other on the midline. In *megalops* they are larger, farther from the anterior margin, and well separated. All these characteristics are opposed to synonymy with the similarity in the respiratory areas the only point in its favor. The balance of evidence therefore is decidedly against synonymy and *varians* must be restored to validity.

ARGULUS MACULOSUS Wilson

PLATE 21, FIGURES 24, 26, 28, 30

Argulus maculosus WILSON, 1902, p. 715, pl. 19, figs. 46-50, pl. 26, fig. 82; 1907b, p. 416, pl. 31, figs. 15-22. (Not *Argulus maculosus* Meehean, 1940, p. 507.)

Meehean (1940, p. 468) stated that he was compelled to redescribe this species because no specimens could be found "to match the

original description." However, he did not redescribe the original material, but substituted new types, a new description, and new figures, and should have given it a new name; *Argulus diversus* is here proposed, p. 572. His species, therefore, cannot be entered above under the original name; neither should the above references appear over his description of *maculosus* as that is an entirely different species.

Meehan found a vial containing two males and three females in the National Museum collection correctly labeled *A. maculosus*. On examination he found the respiratory areas of these five specimens similar to those of *A. americanus* and he identified them with that species. However, these specimens are not *americanus* as is plainly shown below. Even if they had been *americanus* the name *maculosus* had the right of priority and the former should have become the synonym. The two species were established in the same publication (Wilson, 1902), *maculosus* on p. 715 and *americanus* on p. 718.

Meehan (1940, p. 468) apparently believed that this species was established on the basis of color, but in the original description the color was expressly stated to be that of alcoholic specimens, which would nullify any specific value. As might have been easily inferred the color was introduced solely to explain the origin of the specific name.

The first proof of the validity of both species is found in the shape and proportions of the body regions. In *maculosus* the carapace falls considerably short of the anterior margin of the abdomen and the inner margins of the posterior lobes are parallel and separated enough to disclose the entire thorax. In *americanus* the carapace reaches the center of the abdomen and its posterior lobes are turned inward and overlap on the midline, entirely concealing the thorax. In *maculosus* the abdomen is a fourth as wide as the carapace and as long as it is wide. In *americanus* the abdomen is half as wide as the carapace and its width is 60 percent greater than its length. In *maculosus* the caudal rami are definitely subterminal; in *americanus* they are more nearly terminal.

The anterior margin of the first antenna is armed with a stout claw in *americanus* (fig. 25) and the flagellum projects far beyond the curve of the lateral claw. In *maculosus* (fig. 26) the anterior margin is smooth and the flagellum does not reach the curve of the lateral claw. The second antenna is 4-segmented in *americanus* and reaches far beyond the tip of the first antenna. In *maculosus* it is 5-segmented and does not quite reach the tip of the first antenna. Figures 27 and 28 show the supporting ribs of the sucking cups in the two species. In each they are 2-segmented but the segments themselves differ radically in length and shape. The ventral surface of the maxillipeds in

americanus and the boss on the basal plate are armed with stout scale-like spines but in *maculosus* the spines are small and simple and there is no boss on the basal plate.

The respiratory areas in these two species are so nearly alike yet differ so much among themselves that sufficient search might yield a specimen of each species in which these areas could be regarded as identical. During the search it would become evident that the areas show definite tendencies toward the two forms in figures 23 and 24. Figures 29 and 30 show the accessory sex characters in the last three pairs of legs in the two males. Without giving a detailed comparison it can be seen readily that nowhere do they correspond; that everywhere there are marked differences. Finally it is worthy of note that newly hatched larvae of these two species have been obtained from eggs laid in aquaria in the laboratory. These larvae have been fully described and figured (Wilson, 1907b, p. 416, pl. 31, figs. 15-32, *maculosus*, and 1904, p. 639, figs. 16-21, *americanus*). The contrast between the respiratory areas in these two larvae is especially interesting, as it strongly offsets whatever similarity may be found in the adults.

There is thus a single characteristic in which more or less similarity might be claimed but everywhere else there is such overwhelming dissimilarity as definitely to separate the species and make them both valid.

ARGULUS DIVERSUS,¹⁰ new name

Argulus maculosus MEEHEAN, 1940, p. 507, fig. 40, preoccupied.

The characters given in the key on p. 579 distinguish this species from its nearest relatives.

ARGULUS PAULENSIS Wilson

PLATE 21, FIGURES 31-33

Argulus paulensis WILSON, 1924, p. 4, pl. 1, figs. 1-5.

Argulus salminci MEEHEAN, 1940, p. 502 (part).

Although admitting that the National Museum collection contained no specimen of *salminci* with which to compare this species, Meehan (1940, p. 468) nevertheless decided that the two species were "apparently the same" and recorded *paulensis* as an actual synonym of *salminci*. The types of both sexes of these species were reexamined and the following details are now added to the original description:

Female.—Abdomen longer than wide with broadly rounded posterior lobes, which are fringed with short hairs. The posterior sinus is a quarter of the abdomen length and the caudal rami are curved

¹⁰ *diversus*, different.

and attached to the sides of the sinus close to its base (fig. 33). The seminal receptacles are unique in that they are not circular as in most species but irregularly ovate. Each is so large that it nearly fills the entire anterior corner of the abdomen and is surrounded with a fleecy packing that looks like cotton. This packing is snow white and stretches back along the midline to the base of the posterior sinus. These abdominal details are sufficient to separate this from all other known species.

Male.—The respiratory areas are shown in figure 31. The smaller one has an elongate ovate form, the smaller end turned forward, and fits into an invagination on the inner side of the larger one. The latter is enlarged behind the invagination and narrowed in front of it, with rounded ends. The abdomen is relatively much larger than in the female and the testes, like the seminal receptacles in the female, are exceptionally large and fill nearly all the abdomen in front of the posterior sinus. The caudal rami are curved and lateral. In the original description of this species in the reference given above it was clearly distinguished from *salminei*. This distinction still holds and with the addition of the details here given makes this species undeniably valid. As stated there the two males found by Thiele in the Copenhagen Museum and referred to *salminei* do not agree with Krøyer's type male but do agree fully with this male *paulensis* and evidently belong here.

ARGULUS NATTERERI Heller

PLATE 24, FIGURES 74-78

Argulus mattereri HELLER, 1857, p. 103, pl. 2, figs. 4-12.—KRØYER, 1863, pp. 97, 103, pl. 1, fig. 2a-d.—THIELE, 1904, p. 23, pl. 7, figs. 43-52.

Argulus salminei MEEHEAN, 1940, p. 502 (part).

Two females originally identified as belonging to this species were declared by Meehan (1940, p. 503) to be "identical with *A. paulensis*," but he placed in the vial containing them an autographed label that read "identified as *A. salminei*." In furtherance of this last statement the figure of the respiratory areas in Meehan's species *salminei* was taken from one of these females. (See figure 74.) The color of these preserved females is dark brown, the respiratory areas considerably darker than the carapace. The color of the preserved *paulensis* specimens is snow white and they are only half as large as the *nattereri* females. The first and second antennae correspond in every detail with the figures given by Thiele for *nattereri* with not enough difference in the anterior protuberance of the first pair to be worthy of mention (Meehan, 1940, p. 503). In one female all the teeth on the basal plate of the maxilliped were short and broad but in the other female (fig. 77) only the central tooth was short while the

other two were long and narrow. The supporting ribs of the sucking cups have 16 segments, 125 percent more than the 7 reported for *salminei* and 60 percent more than in *paulensis*. The respiratory areas of *paulensis* (fig. 31) and *nattereri* (fig. 74) are so radically different that the two species could not possibly be synonyms. The caudal rami of *paulensis* (fig. 33) are curved and lateral, those of *nattereri* (fig. 78) are straight and basal. For the present, therefore, the three species, *paulensis*, *nattereri*, and *salminei* must be regarded as equally valid, awaiting the discovery of the male of *nattereri* and the reexamination of both sexes of *salminei* with especial reference to the respiratory areas and supporting rods.

ARGULUS SALMINEI Krøyer

Argulus salminei KRØYER, 1863, pp. 89, 102, pl. 1, fig. 1a-f.—WILSON, 1902, p. 720, pl. 22, fig. 64. (Not *Argulus salminei* Meehan, 1940, p. 502, fig. 57; see under *A. nattereri* and *A. paulensis*.)

The National Museum collection contains a single example of this species, identified and forwarded by F. Silvestri, of Buenos Aires, Argentina. This sample has lost all its appendages and the body is mutilated and distorted, hence no specific characters are revealed. Therefore, the statement made by Meehan (1940, p. 468) that no specimen of the species was available may be regarded as virtually correct.

In spite of this statement, however, Meehan has published a detailed description of both sexes accompanied by original figures. The description could be compiled easily from existing literature without a specimen but not so the figures. Since no suitable specimen of *salminei* was available the figures must have been taken from specimens declared to be synonyms of *salminei*. The accessory sex characters that Meehan gives correspond exactly with those of a *paulensis* male; the respiratory areas are identical with those of a *nattereri* female and the supporting ribs are those of the *paulensis* female. Meehan's description of necessity corresponds with his figures, and since both *paulensis* and *nattereri* are shown in the present paper to be valid species the result is that his species becomes a synthesis of the characters of two species, neither of which is the real *salminei*, and must be canceled.

It would seem as if Thiele was largely responsible for this confusion of species. He found two male specimens of the genus *Argulus* in the Copenhagen Museum unaccompanied by a female. For some reason he placed them in the species *salminei* although they did not agree at all with Krøyer's type male of that species. However, they do agree fully with the male of *paulensis*, a species established 20 years later. This male was associated with two females on the same fish and they

may safely be regarded as the two sexes of *paulensis*. Thus we have three males just alike and one of them is proved to be the male of *paulensis* through association with two females. The only sensible disposal of the other two, considering the fact that they do not agree with the type male of *salminei*, is to transfer them to the species *paulensis*, with the male of which they do agree, and to conclude that Thiele was mistaken in his identification.

NOTE ON THE KEY TO THE SPECIES OF ARGULUS

The key to the species of *Argulus* published in Meehean's paper (1940, pp. 475-479) is here used as a basis for a new key. The key is based on only the species of which material for examination was available in the collections of the United States National Museum (*cf.* p. 552, footnote 8, and p. 576, footnote 11). In it are included eight species that Meehean regarded as synonyms, four new species, and one new name. Using the characters for identification that appear in the key, the eight species that Meehean took to be synonyms are found to have validity as creditable as any of the species included.

Meehean's key has real worth and is of great value in determining the species of *Argulus*. However, it placed excessive value upon the respiratory areas and the supporting ribs of the suction cups. The insertion of the eight species shows how easily the real validity can be established by carrying the analysis to further details without impairing the testimony of the areas and ribs. A key that will allow this may be depended upon for the reception of new species that may appear in the future.

In distinguishing *A. bicolor* from *A. fuscus* in the original key *bicolor* shows as much widening in the posterior portion of the larger respiratory areas as is seen in *fuscus*. Dr. Bere shows no widening in the latter species.

The species *A. salminei* Meehean has been shown to combine both *A. nattereri* and *A. paulensis*, which are valid species, and as sufficient structural details of Krøyer's *salminei* are not available for want of actual specimens this species has not been included in this key.

A new name, *diversus*, is given to Meehean's *maculosus*, which was preoccupied.

A. biramosus Bere (p. 568) is not included in the key. No male has been discovered and without males the species cannot be fully characterized. It may be questioned that this species is identical with *appendiculosus*, as Meehean believes. In the type specimen of *appendiculosus* the dorsal ribs of the carapace were not branched anteriorly.

An asterisk following a specific name indicates that this actual species did not appear in the original key published by Meehean.

KEY TO THE SPECIES OF ARGULUS IN THE UNITED STATES NATIONAL MUSEUM ¹¹

- a¹. Anterior respiratory area prolonged laterally around posterior one (club-shaped).
- b¹. Teeth of basal plate of second maxillae sharp and well separated; supporting ribs of suction cups made up of 12 to 15 singly imbricated segments; flagellum of first antenna with 2 equal segments; no flagella on legs; distal segment of third basipod in male with many small knobs on ventral surface but without posterior spine; fourth basipod with a single spherical peg----- *stizostethii*
- b². Teeth of basal plate sharp and well separated; supporting ribs of suction cups made up of 10 to 12 doubly imbricated segments; no flagella on legs; basal segment of flagellum on first antenna five times as long as distal segment; third basipod in male without knobs but with posterior curved spine; fourth basipod with 2 pegs, the outer one bent at right angles----- *canadensis** (p. 568)
- b³. Teeth of basal plate blunt, close together; supporting ribs of suction cups made up of 4 to 6 segments; flagella present on legs; third basipod with ventral suckers; fourth basipod without a peg in male; respiratory areas very narrow----- *siamensis*
- a². Smaller respiratory area anterior, mesial, or in an anteromesial notch of larger area.
- b¹. Entire smaller respiratory area anterior to larger one.
- c¹. Teeth on maxillary plate sharp, distal one more widely separated than other two; ribs of suction cups composed of 10 to 12 shorter segments and 1 longer one; carapace just reaching fourth segment, which has rounded corners overlapping abdomen; third basipod in male with posterior swelling; fourth basipod with 2 blunt anterior processes and a spherical peg----- *aloesae*
- c². Teeth on maxillary plate blunt and close together; ribs of suction cups with 7 to 8 beadlike segments not imbricated; fourth segment without overlapping corners; carapace reaching abdomen; basipod of second leg in male with 2 posterior processes, of third leg with posterior swelling, of fourth leg with an acute peg----- *lunatus** (p. 557)
- c³. Teeth on maxillary plate sharp and curved dorsally; ribs of suction cups made up of 1 long basal and 6 to 7 short terminal segments flattened but not imbricated; second and third male basipods not modified, fourth with a spherical peg at anterior center of distal segment.
*longicaudatus** (p. 555)
- c⁴. Basal plate of maxillae lobed or with slender blunt teeth.
- d¹. Maxillary teeth blunt but plate not lobed.
- e¹. Ribs of suction cups made up of rods.
- f¹. Ribs composed of 3 rods; knob or hook lacking on anterior margin of first antennae; lobe of fourth leg boot-shaped, toe extending to or beyond edge of abdomen; whole body circular; anterior respiratory area minute, posterior very large-- *indicus* (p. 552)
- f². Ribs composed of 4 to 6 rods; anterior hook present on first antennae; lobe of fourth leg large, semicircular, without a heel;

¹¹ Two species overlooked in making up this key are *A. cubensis* Wilson and *A. rhamdiae* Wilson (cf. footnote p. 552.)

- body one-fourth longer than wide; anterior respiratory area as wide as posterior but very much shorter..... *flavescens*
- e*². Ribs of suction cups made up of imbricated plates with or without a long basal segment.
- f*¹. Ribs of suction cups made up of imbricated plates; postantennal spine broad and blunt.
- g*¹. Imbricated plates 30 or more; knob present on anterior margin of first antennae; maxillae slender... *melanostictus* (p. 565)
- g*². Imbricated plates 15 to 20; carapace reaching abdomen; anterior hook present on anterior margin of first antennae.
- h*¹. Flagella present; basal maxillary plate with a boss covered with spines; end segment of maxilliped half as large as penultimate segment; tipped with 3 sharp claws; second antenna 5-segmented, second segment as long as third..... *pugettensis*
- h*². Flagella present; maxillipeds exceptionally stout, basal plate without a boss, end segment 3 times as large as penultimate segment; second antennae 4-segmented, third segment 9 times as long as second..... *niger** (p. 569)
- h*³. No flagella; maxillipeds normal size; proximal tooth on basal plate widened; respiratory areas nearly equal in size; supporting ribs made up of 19 tiny segments; segments of second antennae equal..... *floridensis*
- f*². Ribs of suction cups made up of long basal segment and imbricated plates.
- g*¹. Swimming legs without flagella.
- h*¹. Respiratory areas small and widely separated; basal segment of supporting ribs narrow and elongate; posterior lobe of fourth leg somewhat bilobed; knob on anterior margin of first antenna..... *borealis*
- h*². Respiratory areas normal, one large, one small.
- i*¹. Spines on basal maxillary plate alike; posterior respiratory area regular; supporting ribs made up of 1 long and 9 imbricated segments; posterior lobe on fourth leg boot-shaped; basipod of third leg in male with curved spine at anterior corner; basipod of fourth leg with spherical peg..... *megalops* (p. 563)
- i*². Spines on basal maxillary plate alike; posterior respiratory area symmetrical; supporting ribs made up of 1 long basal and 3 distal segments not imbricated; lobe on fourth leg without a toe; second male basipod with 2 posterior processes; fourth basipod with conical peg.
*trilineatus** (p. 566)
- i*³. Spines on basal maxillary plate alike; posterior respiratory area symmetrical; ribs of suction cups made up of 4 quadrangular segments; ventral surface of maxilliped covered with scales..... *varians** (p. 570)
- i*⁴. Spines on basal maxillary plate unlike, lateral one blunt, the others more pointed; anal sinus deep.
- j*¹. Suction cups occupying almost full width of carapace; supporting ribs made up of 6 to 10 imbricated plates and a rectangular basal segment; larger respiratory area widened posteriorly..... *bicolor*

- j*². Suction cups normal size; supporting ribs made up in female of 12 to 14 imbricated plates with a rectangular basal segment; larger respiratory area same width throughout----- *fuscus*
- g*². Swimming legs with flagella.
- h*¹. Anterior hook on first antenna, broad spine at base and broad postantennal spine; ventral surface of maxilliped with spinous pads and boss on basal plate---- *pugettensis*.
- h*². Anterior knob on first antenna; no postantennal spine; no spinous pads on maxilliped but boss on basal plate; dorsal ribs of carapace branched anteriorly---- *japonicus* (p. 558)
- d*². Basal maxillary plate lobed.
- e*¹. Lobes of maxillary plate truncate; anterior hook on first antennae; ribs of suction cups made up of rods.
- f*¹. Lobes of maxillary plate parallel, squarely truncate; ribs of suction cups made up of 3 rods; posterior respiratory area deeply notched on inner margin, posterior end much wider than anterior. *laticauda*
- f*². Lobes of maxillary plate very divergent, truncate in female, rounded in male; ribs of suction cups with 4 or 5 rods; posterior respiratory area not notched and same width throughout. *reticulatus*
- e*². Lobes of maxillary plate not truncate.
- f*¹. Postmaxillary spines missing; proximal lobe of maxillary plate more widely separated than the other two; ribs of suction cups made up of 16 to 18 segments singly imbricated; abdomen of male 3 times as long as wide, testes 10 times as long as wide; third and fourth basipods in the male modified----- *funduli*
- f*². Postmaxillary spines missing; neither lobes nor teeth on the basal maxillary plate; ribs of suction cups made up of 18 to 19 segments doubly imbricated; abdomen of male one-eighth longer than wide; testes 3 times as long as wide; male legs not modified----- *latus** (p. 560)
- f*³. Postmaxillary spines missing; teeth on basal maxillary plate long and evenly spaced; ribs of suction cups made up of 14 to 15 segments not imbricated; lobes of abdomen fringed with short hairs----- *nattereri** (p. 573)
- f*⁴. Two pairs of postmaxillary spines present; lobes of basal maxillary plate broad, truncate; ribs of suction cups made up of 2 rods shaped like a cane with a curved handle, handle of both rods proximal; anterior respiratory area small, triangular. *violaceus*
- b*². Smaller respiratory area mesial to larger or in an anteromesial notch of latter.
- c*¹. Spine present at base of first antenna.
- d*¹. Three postantennal spines in a row on each side of midline.
- e*¹. Smaller respiratory area anteromesial; ribs of suction cups 2-segmented, distal segment a third as long as basal, blunt; anterior peg on fourth male basipod conical, posterior process broadly rounded----- *americanus*

- e*². Smaller respiratory area more mesial; ribs of suction cups 2-segmented, distal segment longer than basal, acuminate; anterior peg on fourth male basipod spherical, posterior process acute.
*maculosus** (p. 570)
- e*³. Smaller respiratory area entirely mesial; ribs of suction cups 6-segmented, basal segment longest; anterior peg on fourth male basipod conical, posterior process narrowly rounded.
*diversus*¹² (p. 572)
- e*⁴. Smaller respiratory area entirely mesial; ribs of suction cups 3- or 4-segmented, basal segment narrowest; anterior peg on fourth male basipod fingerlike, posterior process with heel and acute toe..... *versicolor*
- d*². Only 2 postantennal spines on each side; ribs of suction cups made up of 5 to 8 rods diminishing in length distally; anterior peg of fourth male basipod conical; posterior processes on both basipod segments, without heels..... *mississippiensis*
- d*³. No postantennal spines; lobes of basal maxillary plate close together, laminate and truncate, the distal one widest, the central one narrowest; ribs of suction cups made up of 11 beadlike segments, the 2 distal ones imperfect..... *rotundus** (p. 564)
- c*². No spine at base of first antenna.
- d*¹. Basal maxillary plate lobed or with slender blunt teeth; no spine on ventral surface of first antenna, or at base of first or second antennae.
- e*¹. Basal maxillary plate with 2 to 4 lobes, usually 3; postmaxillary spines absent; anterior knob present on first antennae; ribs of suction cups made up of 7 to 9 short rods..... *catostomi*
- e*². Basal maxillary plate with 3 blunt teeth; anterior knob on first antennae rudimentary; tip of flagellum biramose; ribs of suction cups made up of 2 long rods; posterior lobe of fourth male basipod very large..... *appendiculosus*
- d*². Basal maxillary plate with very sharp teeth; no spine at base of first antenna; ribs of suction cups made up of rods.
- e*¹. Ribs of suction cups with 8 or 9 rods; lateral hook of first antenna short, not reaching tip of flagellum; abdomen nearly half as wide as carapace..... *lepidostei*
- e*². Ribs of suction cups with 12 to 18 short rods; abdomen two-fifths of carapace width with lateral projections at anterior corners in male; protuberances at distal end of first endopod segment of third and fourth legs in male..... *nobilis*
- e*³. Ribs of suction cups made up of a long basal and 5 or 6 short distal rods; first 3 thoracic segments with narrow dorsal pads on their posterior margins; abdomen one-fifth as wide as carapace; no protuberances on legs of male..... *intectus** (p. 553)
- d*³. Basal maxillary plate with short truncate lobes; a knob on anterior margin and a spine on ventral surface of first antennae; ribs of suction cups with 12 to 13 segments, tapered but not imbricated.
*paulensis** (p. 572)

¹² New name for *maculosus* Meehan, preoccupied.

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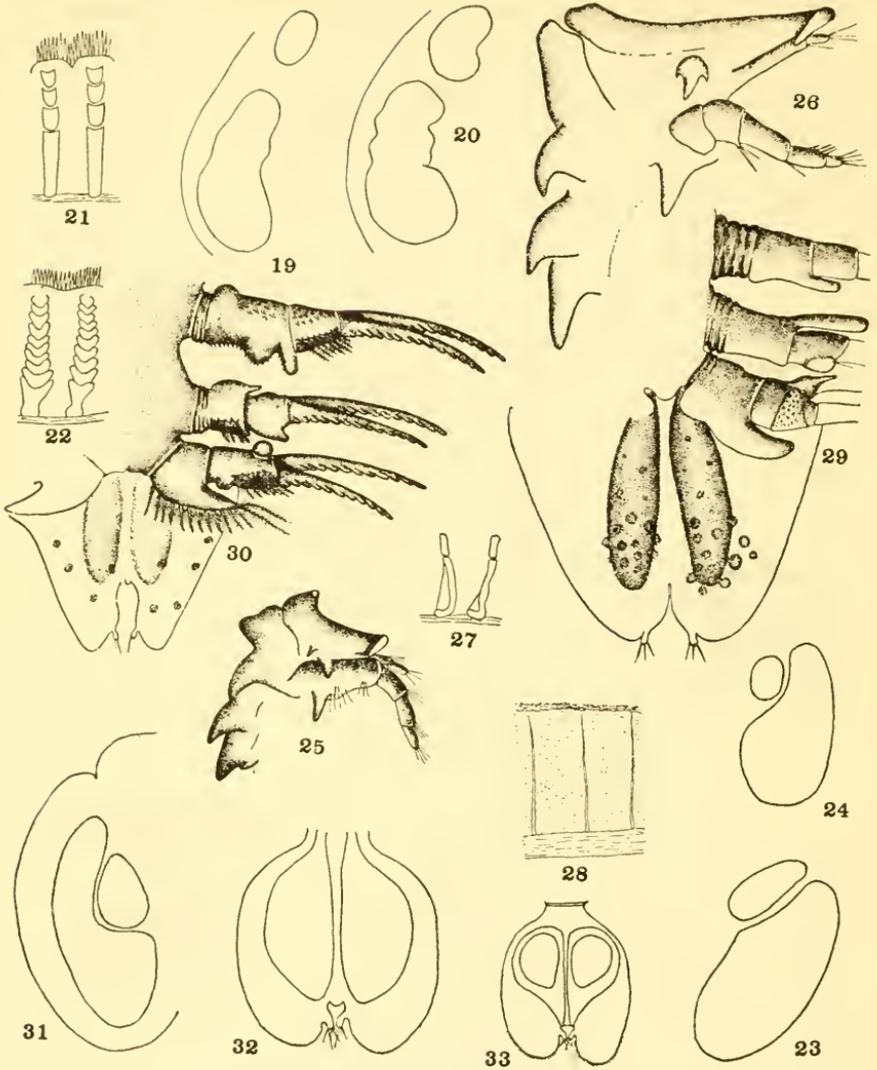
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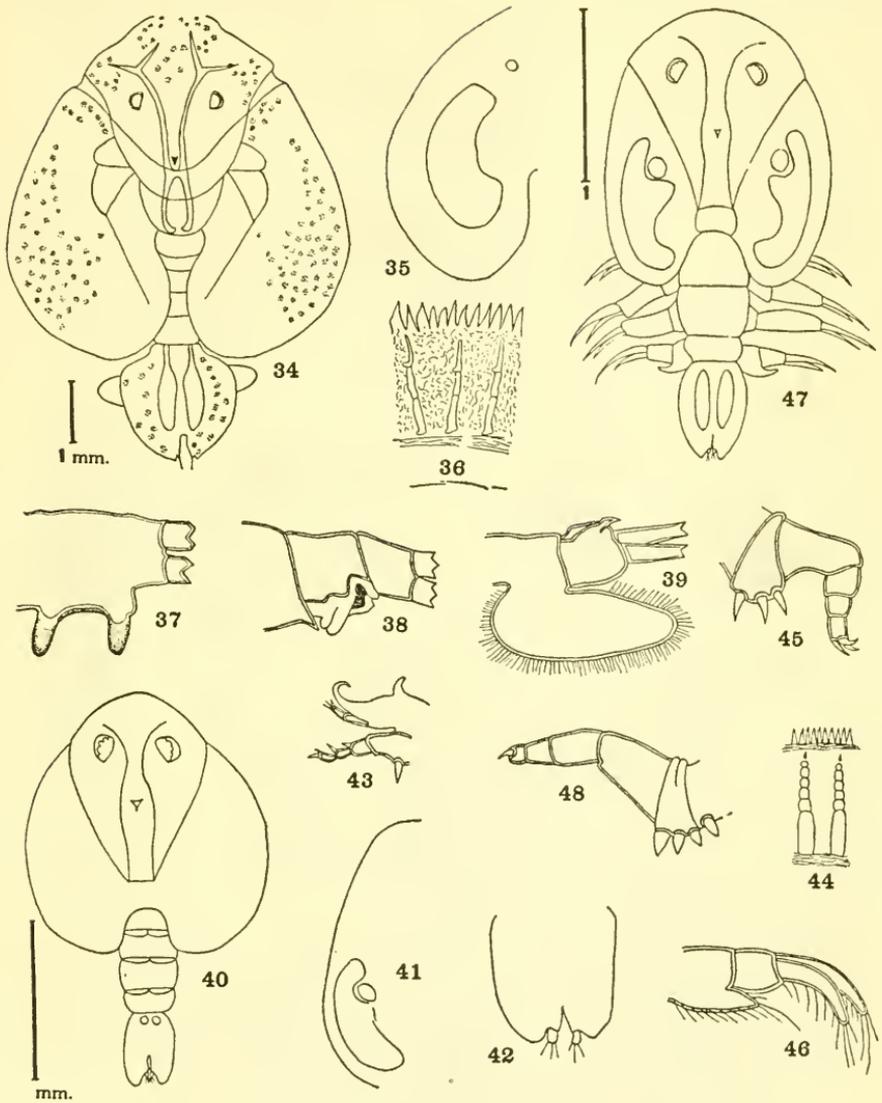
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SPECIES OF ARGULUS

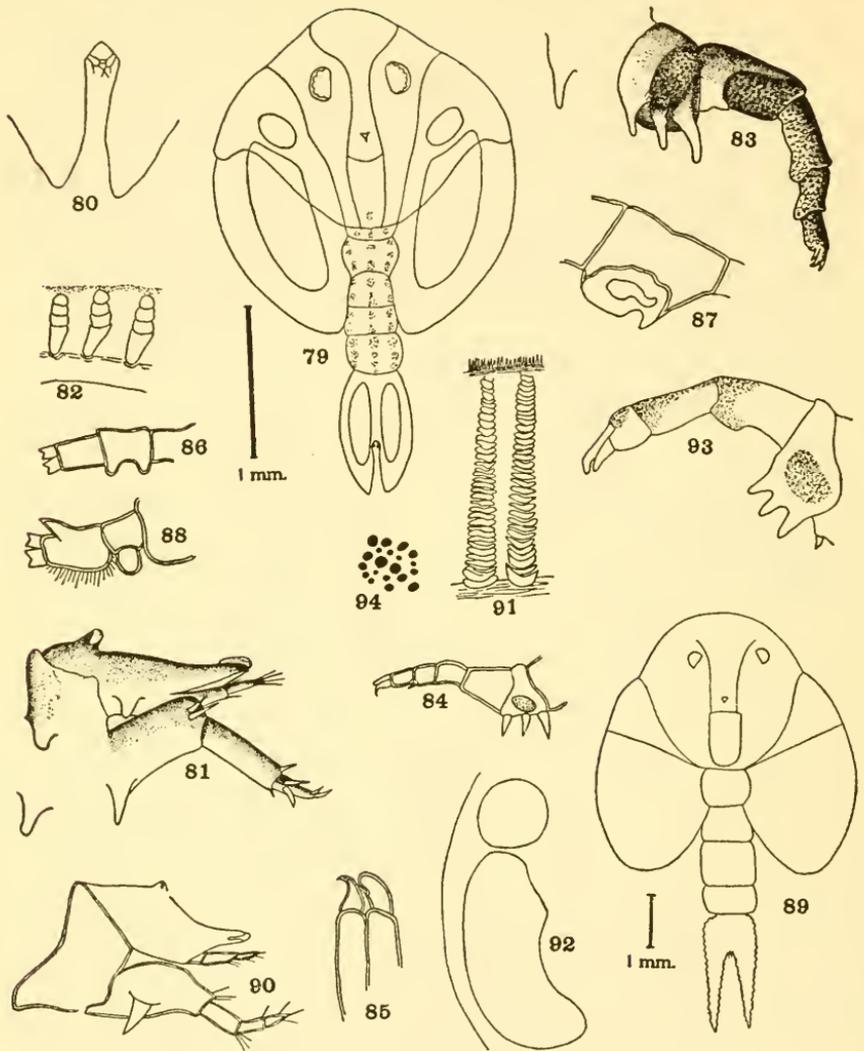
- 19, 21, *Argulus varians* Bere: 19, Respiratory areas; 21, ribs of sucking cups.
 20, 22, *Argulus megalops* Smith: 20, Respiratory areas; 22, ribs of sucking cups.
 23, 25, 27, 29, *Argulus americanus* Wilson: 23, Respiratory areas; 25, first and second antennae; 27, ribs of sucking cups; 29, accessory sex modifications on legs of male.
 24, 26, 28, 30, *Argulus maculosus* Wilson: 24, Respiratory areas; 26, first and second antennae; 28, ribs of sucking cups; 30, accessory sex modifications on legs of male.
 31-33, *Argulus paulensis* Wilson: 31, Respiratory areas of male; 32, abdomen of male; 33, abdomen of female.



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34-39, 48, *Argulus indicus* Weber: 34, Dorsal view of male; 35, respiratory areas; 36, ribs of sucking cups; 37-39, sex modifications on second, third, and fourth legs; 48, maxilliped of male.

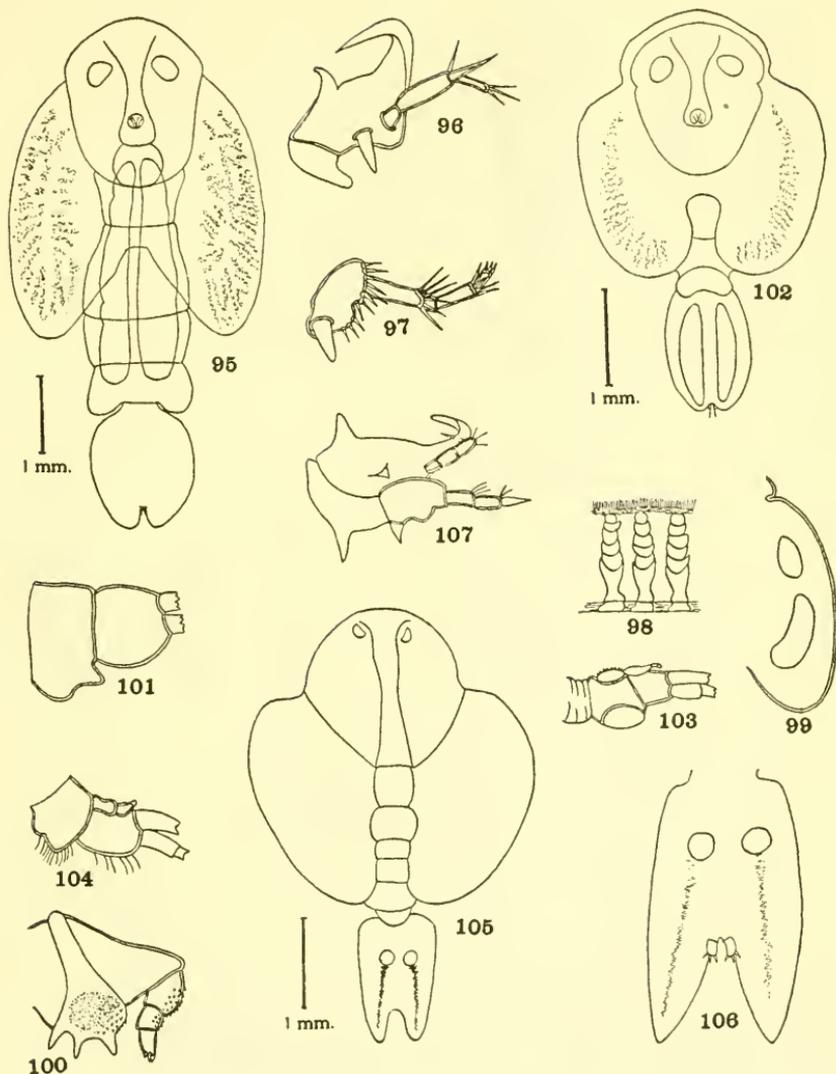
40-47, *Argulus intectus*, new species: 40, Dorsal view of female; 41, respiratory areas; 42, abdomen; 43, first and second antennae; 44, ribs of sucking cups; 45, maxilliped; 46, fourth leg; 47, dorsal view of male.



SPECIES OF ARGULUS

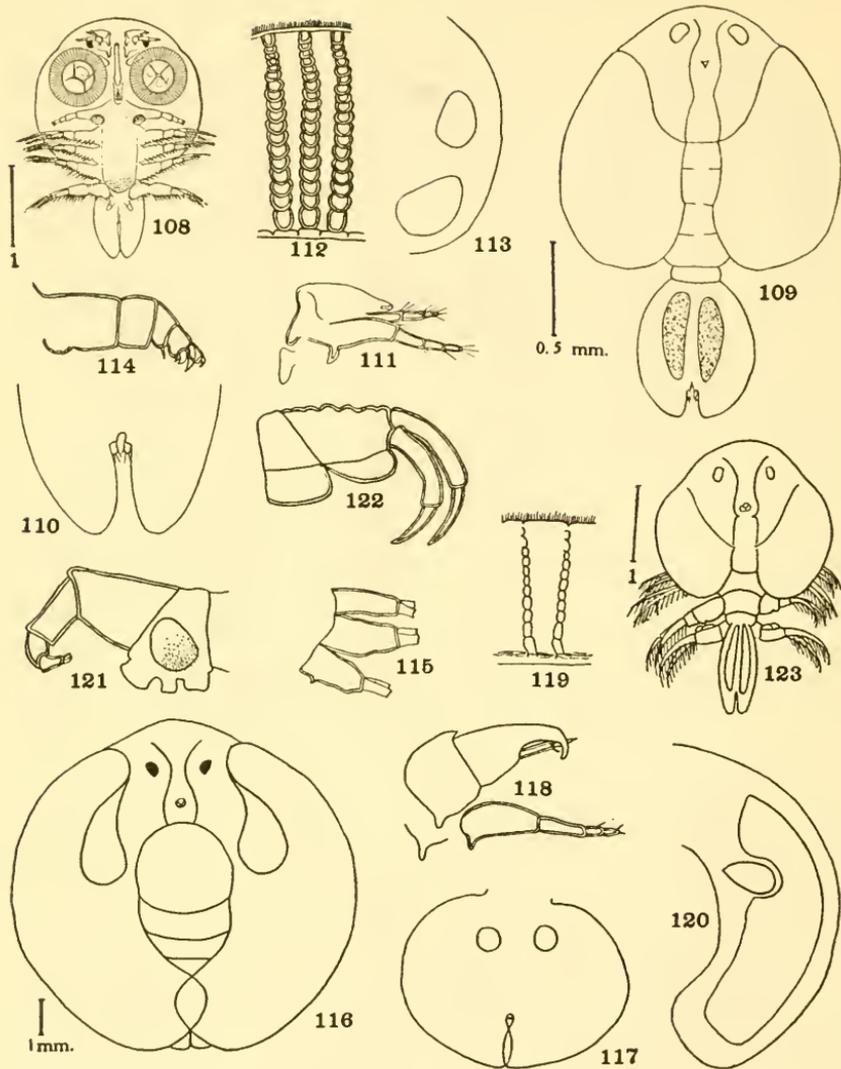
79-88, *Argulus trilineatus* Wilson: 79, Dorsal view of male; 80, abdomen showing caudal rami; 81, first and second antennae; 82, ribs of sucking cups; 83, maxilliped of male; 84, maxilliped of male; 85, tip of the same; 86-88, accessory sex modifications of second, third, and fourth legs.

89-94, *Argulus melanostictus* Wilson: 89, Dorsal view of female; 90, first and second antennae; 91, ribs of sucking cups; 92, respiratory areas; 93, maxilliped; 94, spots on dorsal surface, showing relative size, the magnification one-half greater than in fig. 89.



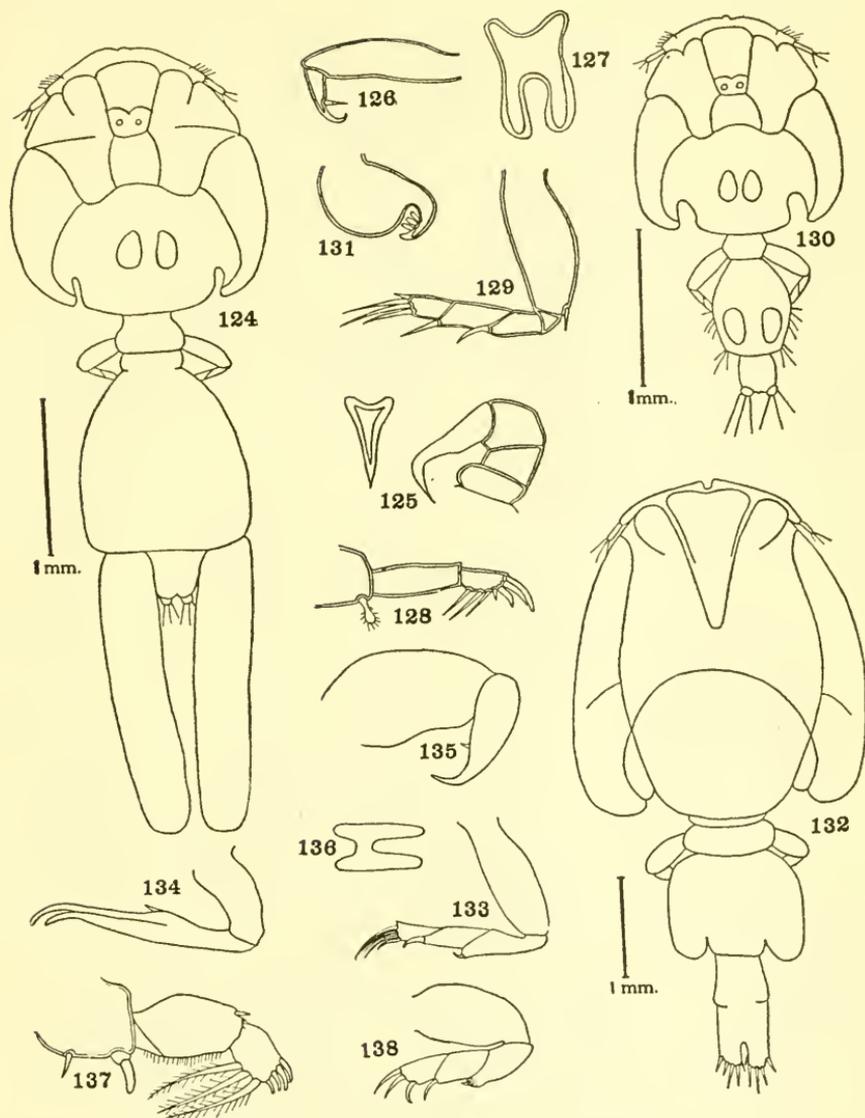
SPECIES OF ARGULUS

- 95-104, *Argulus megalops spinosus*, new variety: 95, Dorsal view of female; 96, first antenna; 97, second antenna; 98, ribs of sucking cups; 99, respiratory areas; 100, maxilliped; 101, basipod of fourth leg; 102, dorsal view of male; 103, third leg of male; 104, fourth leg.
- 105-107, *Argulus varians* Bere: 105, Dorsal view of female; 106, abdomen; 107, first and second antennae.



SPECIES OF ARGULUS

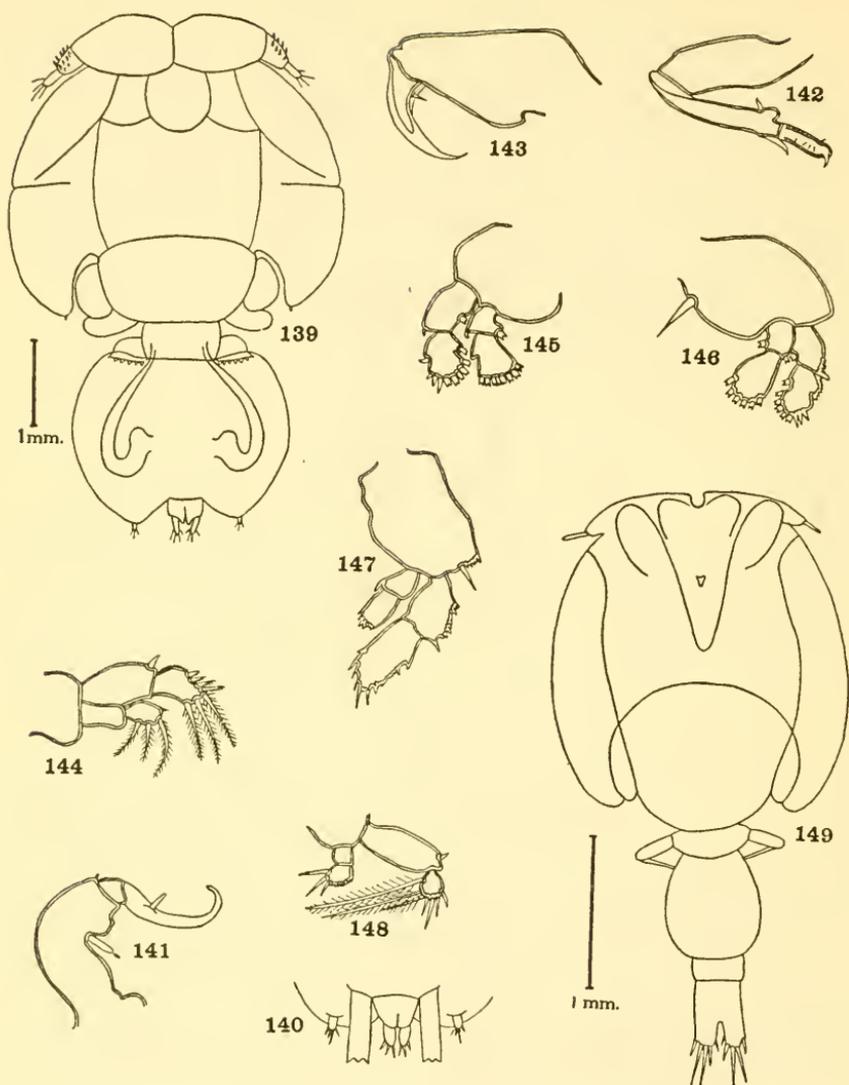
- 108-115, *Argulus latus* Smith: 108, Ventral view of female (drawn by J. H. Emerton); 109, dorsal view of male; 110, abdomen with caudal rami; 111, first and second antennae; 112, ribs of sucking cups; 113, respiratory areas; 114, maxilliped; 115, second, third, and fourth legs, with almost no modifications.
- 116-122, *Argulus rotundus*, new species: 116, Dorsal view of female; 117, abdomen; 118, first and second antennae; 119, ribs of sucking cups; 120, respiratory areas; 121, maxilliped; 122, fourth leg.
- 123, *Argulus funduli* Krøyer: Dorsal view of male, for comparison with fig. 109.



SPECIES OF LEPEOPHTHEIRUS

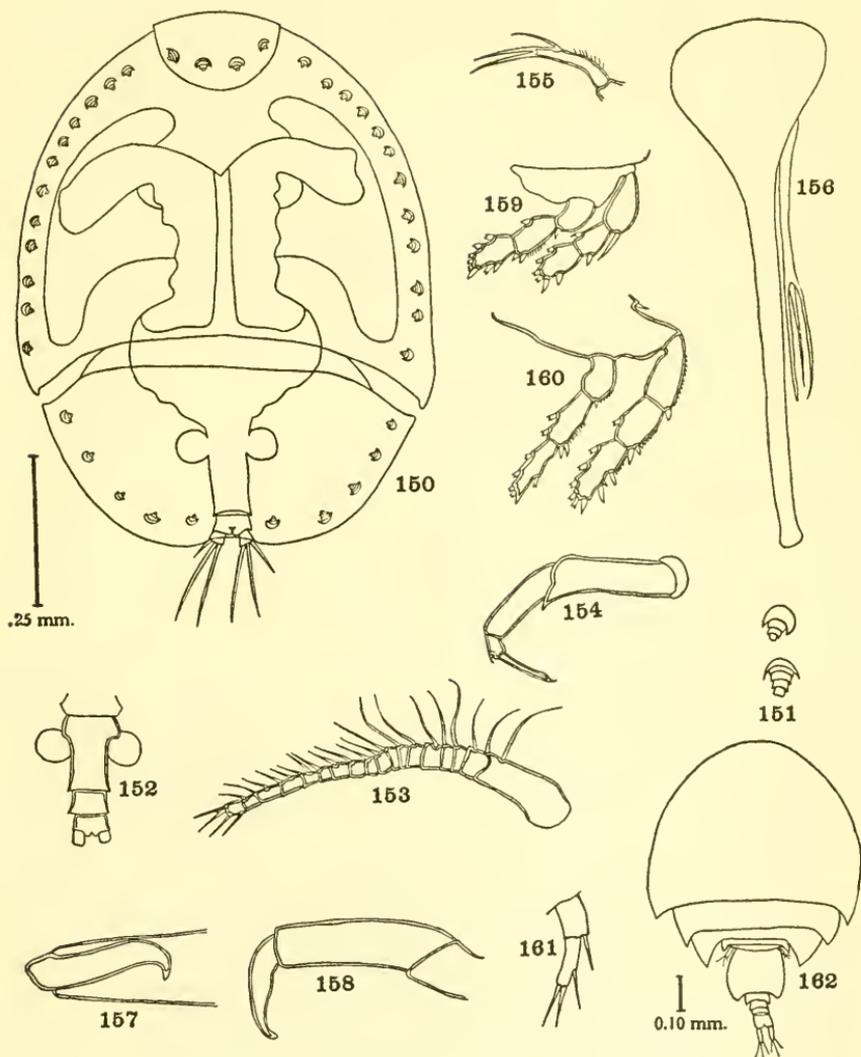
124-131, *Lepeophtheirus christianensis*, new species: 124, Dorsal view of female; 125, second antenna and first maxilla; 126, maxilliped; 127, furca; 128, first leg; 129, fourth leg; 130, dorsal view of male; 131, second antenna of male.

132-138, *Lepeophtheirus eminens*, new species: 132, Dorsal view of female; 133, fourth leg of female; 134, second maxilla; 135, maxilliped; 136, furca; 137, first leg; 138, fourth leg of male.

SPECIES OF *DYSGAMUS* AND *LEPEOPHTHEIRUS*

139-148, *Dysgamus atlanticus* Steenstrup and Lütken: 139, Dorsal view of female; 140, ventral view of abdomen; 141, second antenna; 142, second maxilla; 143, maxilliped; 144, first leg; 145, second leg; 146, third leg; 147, fourth leg; 148, first leg of male.

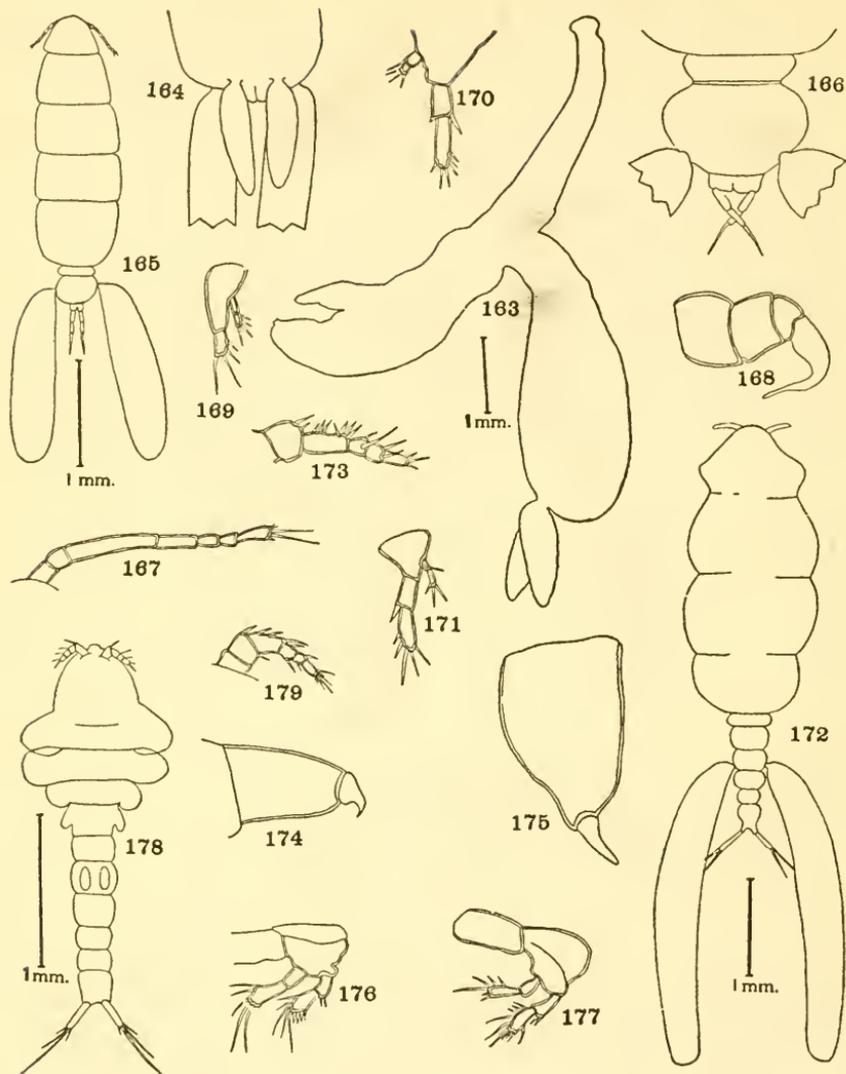
149, *Lepeophtheirus eminens*, new species: Dorsal view of male.



SPECIES OF PARMULODES AND ASTEROCHERES

150-160, *Parmulodes verrucosa*, new genus and species: 150, Dorsal view of female; 151, skin glands; 152, genital segment and abdomen; 153, first antenna; 154, second antenna; 155, fifth leg; 156, mouth tube with first maxilla; 157, second maxilla; 158, maxilliped; 159, first legs; 160, third legs.

161, 162, *Asterocheres lilljeborgii* Boeck: 161, Fifth leg; 162, dorsal view.

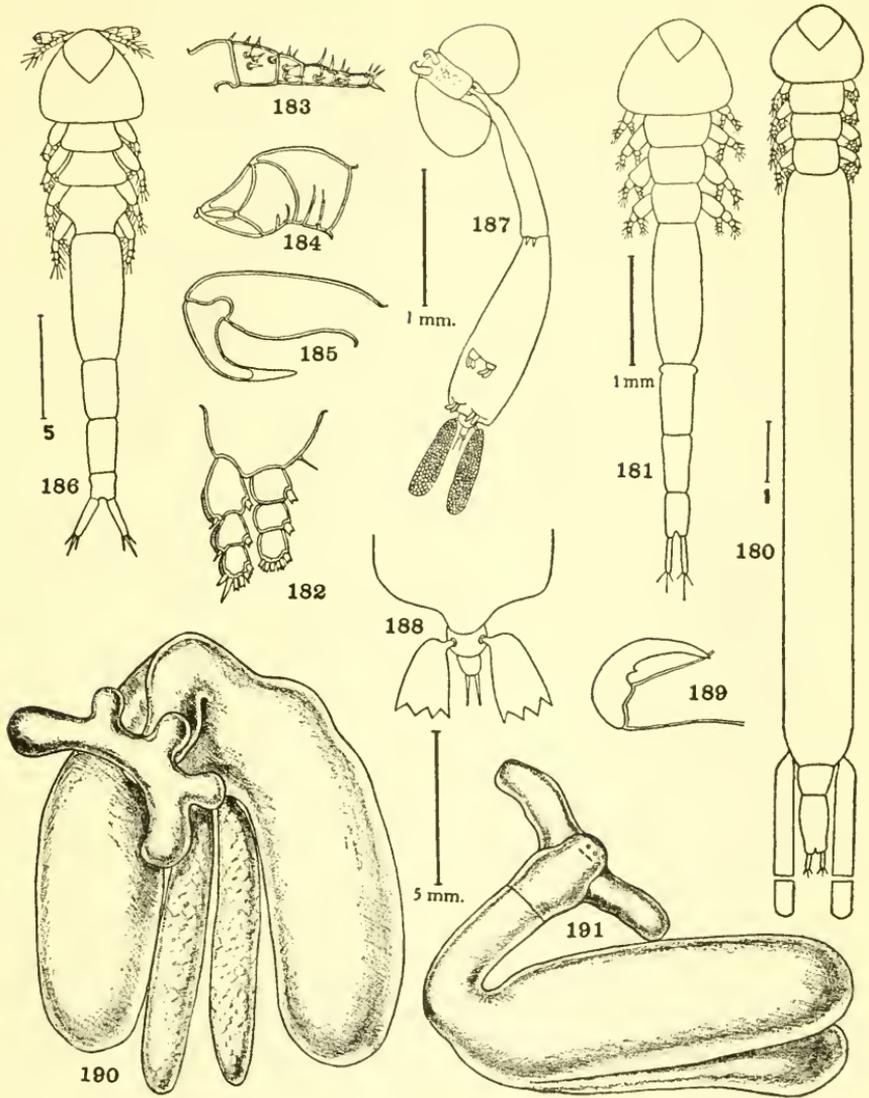


SPECIES OF BRACHELLEA, PESTIFER, AND TEREDICOLA

163, 164, *Brachiella squali*, new species: 163, Lateral view of female; 164, dorsal view of posterior processes and egg strings.

165-171, *Pestifer agilis*, new genus and species: 165, Dorsal view of female; 166, dorsal view of genital segment and abdomen; 167, first antenna; 168, second antenna; 169-171, first, third, and fourth legs.

172-179, *Teredicola typica* Wilson: 172, Dorsal view of female with egg strings; 173, first antenna; 174, second antenna; 175, maxilliped; 176, first legs; 177, second legs; 178, dorsal view of male; 179, first antenna of male.



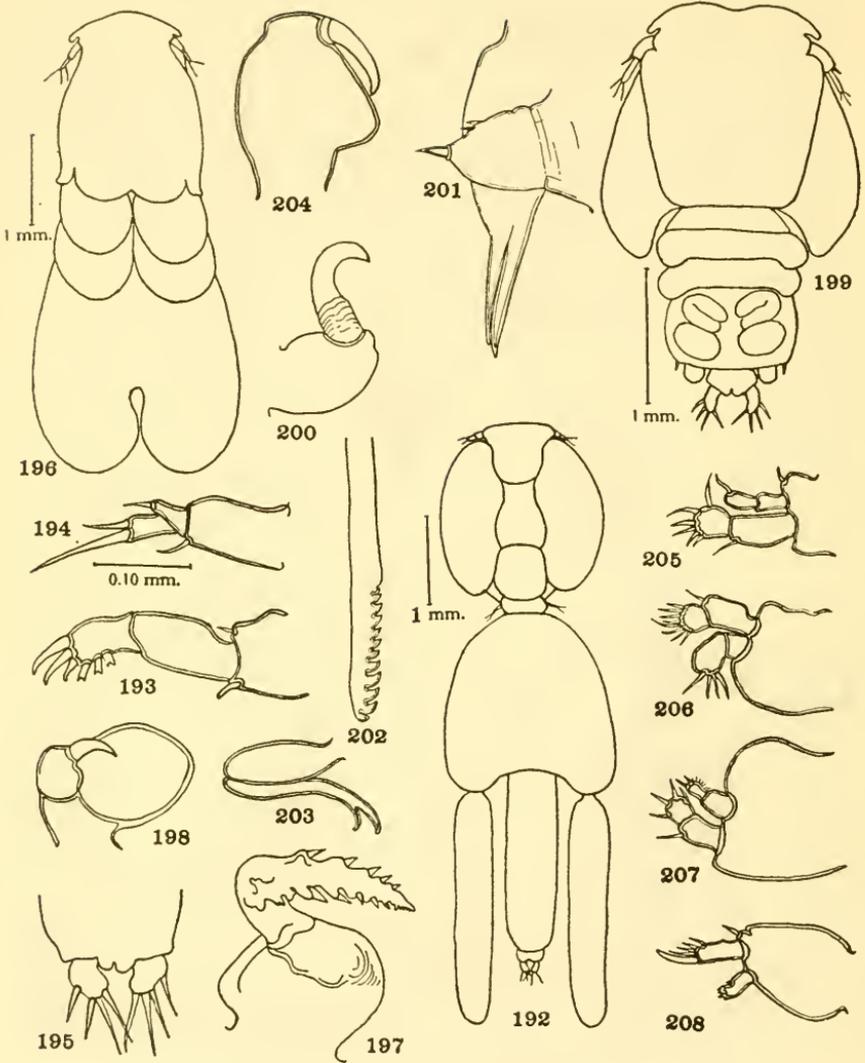
SPECIES OF KRØYERINA, PAENONODES, AND LERNAEOSOLEA

180-185, *Krøyerina elongata* Wilson: 180, Dorsal view of female; 181, dorsal view of male; 182, first leg; 183, first antenna; 184, second antenna; 185, maxilliped.

186, *Krøyerina nasuta* Wilson: Dorsal view of male to contrast with fig. 181.

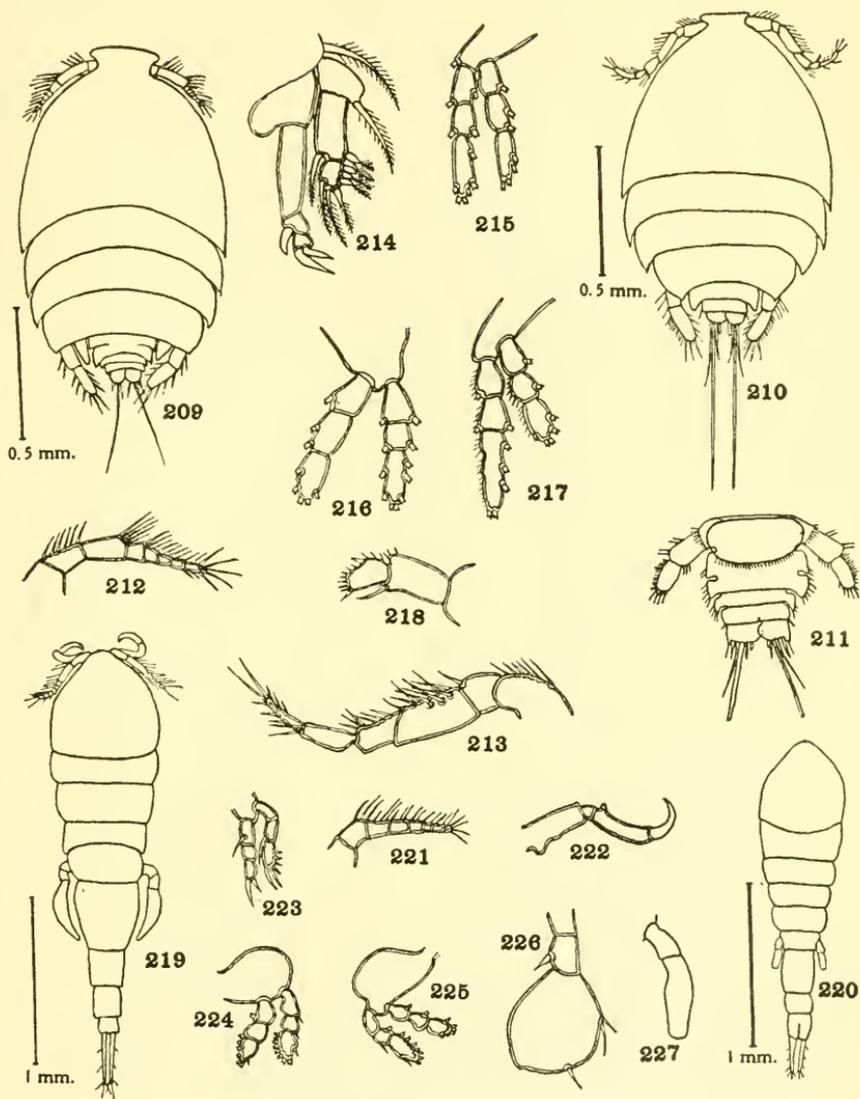
187-189, *Paenonodes exiguus*, new genus and species: 187, Ventral view of female with egg strings; 188, dorsal view of genital segment and abdomen; 189, second antenna.

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SPECIES OF LEPEOPHTHEIRUS AND ACHTHEINUS

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