

also on the flow of the water—the slower the flow the more efficient). This apparatus is therefore four to seven times as efficient as the ordinary air-displacement type of aerator, of which Dr. Pratt, of Haverford College, was so kind as to show me a working model last summer. But this apparatus does not use displaced air, since the siphon keeps the water at a constant level, and there is therefore no air to be displaced by water.

Another advantage which is of great importance is in the constancy of delivery of air. A constant stream of air bubbles without a second's intermission can be sent into an aquarium for weeks with this aerator with no attention whatever, providing the hydrant works well. With the air-displacement type this is of course impossible, since every time the bottle is filled with water, the current of air must be interrupted until the bottle is emptied.

Aside from the simplicity of the apparatus, and its constancy of working, its economy in the use of water will at once commend itself to all directors of laboratories who have limited funds at their disposal for running expenses. This aerator will deliver a constant stream of air, using only from 50 to 100 cubic feet of water per month. At the rate of 28 cents for 500 cubic feet of city water (the rate in Knoxville, an average rate), the monthly cost of operation would be only from 3 to 5 cents.

The writer's apparatus can be exactly duplicated by referring to the following measurements: *p* to *a*, 3 cm.; *p* to *b*, 6 cm.; *p* to *c*, 12 cm.; *c* to *d*, 6 cm.; *d* to *e*, 145 cm.; *f* to *g*, 10 cm.; *f* to *h*, 32 cm.; *j* to *k*, 16 cm.; *r* to *m*, 13 cm.; *l* to *o*, 38 cm.; *l* to *m*, vertical, 25 cm.; *h* to *i*, 5 meters; bore of *a*, 1 mm.; of *b*, 1 mm.; of *c*, 1.5 mm.; of *d*, 1.5 mm.; of *s*, 5 mm.; of *B*, 5 mm.; of *C*, 5 mm.; of *D*, 8 mm.; of *k*, 2 mm.; depth of water in *E* while running, 7 cm.; height of *E*, 38 cm.; contents of *E*, 8,000 c.c.; height of *F*, 24 cm.; contents of *F*, 7.5 liters.

ASA A. SCHAEFFER

UNIVERSITY OF TENNESSEE,
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ARGYROSOMUS JOHANNÆ, A NEW SPECIES OF
CISCO FROM LAKE MICHIGAN

HEAD 4.1 in length to base of caudal; depth 3.8; eye 6.5 in head; depth of caudal peduncle 3.1; snout 3.4; maxillary 2.6; mandible 2.0; height of dorsal fin 1.5; distance from snout to dorsal 1.9 in length; gillrakers 10 + 19; longest 1.0 in eye. D. 10 A. 12; scales 9–80–8.

Body deep, not greatly compressed, back strongly arched, rising rapidly for one half the distance from snout to dorsal, then more gradually. Caudal peduncle high, not greatly compressed. Head small, sharply wedge-shaped, its height at occiput 1.9 in height of body. Eye small. Lower jaw even with upper; maxillary reaching nearly to center of eye. Gillrakers coarse and widely set. Lateral line straight. Scales large and thick, non-deciduous.

Color (in formalin): lips and head pale; body dark above but not nearly to lateral line; quite pale below. Dorsally some indication of stripes, longitudinally. Dorsal and caudal fins with black edges, other fins pale.

Type: No. 372*d*, of the collections of the Wisconsin Geological and Natural History Survey, a male specimen 269 mm. in length, taken in about 25 fathoms some eighteen miles out from Racine, Wisconsin. Nos. 372, *a*, *b*, *c* and *e*, also Nos. 538, *a*, *b*, *c* and *e*, all from the same locality, may be considered as co-types. The specific name has been chosen as a slight token of gratitude for my great indebtedness to my life-companion.

The table on p. 958 gives the principal measurements of the specimens here included.

Early in July, 1906, the writer made collections of the fishes of Lake Michigan for the Wisconsin Geological and Natural History Survey. On a trip made with Captain C. Hyttel, of Racine, to his gillnets, set some eighteen or twenty miles out from that city, he had a good opportunity to observe and secure specimens of Coregonidæ. These did not, however, fall easily into groups conforming to the then known species. So the specimens were placed into lots according to their most marked external characteristics, and sent

Number	Sex	Length in mm.	Head in Length	Depth in Length	Eye in Head	Maxillary in Head	Dorsal Height in Head	Snout to Dorsal in Length	Caudal Peduncle in Head	Longest Gillraker in Eye	Gillrakers	D.	A.	Scales
372c	♀	229	4.1	3.8	6.2	2.8	1.4	2.0	3.5	0.9	10+17	10	11	9-91-8
372e	♀	232	4.1	3.7	5.6	2.7	1.5	2.0	3.5	1.1	10+18	10	11	9-82-8
372a	♂	248	3.8	3.8	6.5	2.8	1.7	2.0	3.4	1.0	12+19	10	11	9-76-8
372b	♂	250	4.0	3.8	6.2	2.8	1.5	1.9	3.4	1.1	9+18	11	12	10-92-8
372d	♂	269	4.1	3.8	6.5	2.6	1.5	1.9	3.1	1.0	10+19	10	12	9-80-8
538d	♀	217	4.2	3.9	5.8	2.6	1.4	1.9	3.3	1.3	10+19	11	13	8-87-7
538h	♀	223	4.0	4.1	5.1	2.8	1.6	2.0	3.7	1.2	11+20	10	12	10-82-8
538c	♀	224	4.1	4.1	5.4	2.6	1.5	1.9	3.4	1.1	13+23	10	12	9-83-8
538b	♂	228	3.9	4.0	6.4	2.9	1.6	2.0	3.6	1.0	11+17	9	12	9-80-?
538a	♀	236	3.9	3.7	6.7	2.6	?	2.0	3.5	0.9	10+18	10	13	9-90-8
538e	♀	237	4.1	3.8	6.4	2.6	1.5	2.0	3.4	1.1	11+18	10	11	9-80-8

to the laboratory at Madison. Unfortunately, the circumstances of the trip made adequate field notes impossible.

On taking up the study of these forms it immediately developed that lots 372 and 538 (with a few exceptions, not important here) differed from all the others, and indeed from all species of *Argyrosomus* so far known, by the fact that they had thirty or fewer gillrakers on the first gill arch. On further examination they displayed other differential characters, and it is these forms that are included under the new species described above.

Evermann and Smith ("Report U. S. Commissioner of Fish and Fisheries," 1894, p. 311) in 1896 described as aberrant forms of *Argyrosomus hoyi* Gill; eight specimens (five from Lake Michigan and three from Lake Superior) which undoubtedly belong to the species here described, agreeing with it perfectly as to number of gillrakers, the smaller eye, and greater body depth. They certainly are as near *prognathus* as they are to *hoyi*, but are not very close to either except as to lack of pigmentation on the head. *Argyrosomus hoyi*, as I understand that species, has the lower jaw so far included that it really resembles a *Coregonus*, and its upper lip is quite thick. *A. johannæ* has undoubtedly been largely confused with it. As far as my observations go, *A. hoyi* is not nearly so common as *A. johannæ*. However, that is a point on which I hope soon to make more detailed observations.

The form here described comes much closer to *A. prognathus* in its general characteristics,

but is less robust and shows much less of the longitudinal striping of that species, while the number of gillrakers of course makes a wide difference.

In describing this form, after long deliberation, I have hoped to add something toward the elucidation of our North American Coregonidæ. Even the longest known forms of these are none too well understood, and abundant field work in many localities must be done before we can hope fully to clear up the status of most of them.

GEORGE WAGNER

WISCONSIN GEOLOGICAL AND
NATURAL HISTORY SURVEY,
May 1, 1910

FIRST USE OF AMPHIBIA IN ITS MODERN SENSE

IN 1896 I urged the retention of Amphibia for the class then generally called, in the United States, Batrachia.¹ Cope strongly protested against such usage and affirmed that the name was not "introduced to take the place of Batrachia with a definition until a few years ago by Huxley."² Bauer soon proceeded to "show that the opinion of Professor Gill is the only one that can be accepted."³ Several other articles followed in SCIENCE.⁴ In fine, the name Amphibia has been generally accepted in the last few years in the United States as well as in Germany.

¹ SCIENCE, IV., 1896, p. 600.

² Am. Nat., XXX., 1896, p. 1027.

³ SCIENCE, VI., 1897, pp. 170-174.

⁴ SCIENCE, VI., p. 295 (Wilder); VI., p. 446 (Gill); VI., p. 772 (Hay); XII., p. 730 (Gill); XX., p. 924 (Stejneger).