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
372*c*	♀	229	4.1	3.8	6.2	2.8	1.4	2.0	3.5	0.9	10+17	10	11	9–91–8
372*e*	♀	232	4.1	3.7	5.6	2.7	1.5	2.0	3.5	1.1	10+18	10	11	9–82–8
372*a*	♂	248	3.8	3.8	6.5	2.8	1.7	2.0	3.4	1.0	12+19	10	11	9–76–8
372*b*	♂	250	4.0	3.8	6.2	2.8	1.5	1.9	3.4	1.1	9+18	11	12	10–92–8
372*d*	♂	269	4.1	3.8	6.5	2.6	1.5	1.9	3.1	1.0	10+19	10	12	9–80–8
538*d*	♀	217	4.2	3.9	5.8	2.6	1.4	1.9	3.3	1.3	10+19	11	13	8–87–7
538*h*	♀	223	4.0	4.1	5.1	2.8	1.6	2.0	3.7	1.2	11+20	10	12	10–82–8
538*c*	♀	224	4.1	4.1	5.4	2.6	1.5	1.9	3.4	1.1	13+23	10	12	9–83–8
538*b*	♂	228	3.9	4.0	6.4	2.9	1.6	2.0	3.6	1.0	11+17	9	12	9–80–?
538*a*	♀	236	3.9	3.7	6.7	2.6	?	2.0	3.5	0.9	10+18	10	13	9–90–8
538*e*	♀	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).

The original use of the name as a class designation in contradistinction from Reptilia has not been noticed, however. Baur only traced it back to 1822. It will interest herpetologists, therefore, to learn that it was formally used as early as 1806.

In 1806 Latreille published the first volume of his work entitled "Genera Crustaceorum et Insectorum" and in his introduction (I., p. 2–3) enumerated the twelve classes of the animal kingdom then recognized by him.[5] The third and fourth classes were vertebrates with a single ventricle ("cor uniloculare, sanguine frigido"), the third class ("Classis III[a]. Reptilia, Reptiles") having lungs only ("pulmones") and the fourth class ("Classis IV[a]. Amphibia, Amphibies") having both lungs and gills ("pulmones et branchiæ").

Of course these definitions do not represent modern ideas of the really distinctive characters of the classes in question, but neither does any old definition of any class embody modern concepts of the group intended to be diagnosed.

THEO. GILL

SOCIETIES AND ACADEMIES

THE PHILOSOPHICAL SOCIETY OF WASHINGTON

THE 681st meeting was held on May 21, 1910, President Woodward in the chair. Two papers were read.

Methods of Measuring the Modulus of Bending of Flat Metal Springs: Dr. R. S. WOODWARD, of the Carnegie Institution of Washington.

This paper explained three methods for measuring the modulus in question. The first two methods assume that the spring is clamped horizontally and rigidly at one end and permitted to assume the shape due to its own weight. This shape is defined by the following differential equation:

$$d^2\psi/d\sigma^2 \mp = -\alpha\sigma \cos \psi,$$

wherein ψ is the inclination of the neutral surface of the spring at any point, σ is the quotient of the distance of this point from the free end of the spring by its whole length, and α is a number involving the modulus desired. The paper shows how to integrate this equation so as to give ψ, $\cos \psi$ and $\sin \psi$ simultaneously in power series of σ, and hence how to get the coordinates of any point in the elastic curve. When the latter are observed for the free end of the spring two equations result from which α and hence the modulus of bending may be found. Another equation from which α may be found results from equating the internal work of bending the spring to the external work done by gravity on the spring.

The third method of finding this modulus requires the application of a simple device which will bend a spring into a circular curve. The modulus of bending is then equal to the product of the applied bending moment by the radius of this curve.

Solar Radiation Intensities at Washington, D. C.: Professor HERBERT H. KIMBALL, of the U. S. Weather Bureau.

The results given are based on more than 7,350 separate determinations of the intensity of solar radiation made by the author at the Central Office of the Weather Bureau with an Angström pyrheliometer during the five years ending April 30, 1910. The observations were distributed over 272 half-day periods, or rather more than one half day to each week, and the radiation intensities are expressed in gram calories per minute per square centimeter of normal surface according to the Angström standard of pyrheliometry.

The maximum and the mean rates of radiation with a sky free from clouds were determined hourly or half hourly for a day in each month with average declination of the sun for the month. From these rates the daily and the monthly totals received on a surface normal to the solar rays, and also on a horizontal surface, were determined, first, on the supposition that the sky was free from clouds, and second, by taking account of the recorded duration of sunshine.

The maximum observed intensity of solar radiation, 1.44 calories, occurred in April, and the maximum for December, 1.32 calories, is only 8 per cent. less. The greatest monthly noon average, 1.28, occurs in February and the December average, 1.15, is only 10 per cent. less. The greatest daily total of radiation received on a normal surface, 971 calories, occurs in July, the corresponding December total being 60 per cent. as great. The greatest daily total for a horizontal surface, 653 calories, also occurs in July, and the corresponding total for December is only 30 per cent. as great.

[5] In 1804 Latreille adopted the classification of Brongniart (1799) in which the amphibians were ranked as an order of reptiles ("Ordre IV., Batraciens, Batrachii").