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NORTH AMERICAN WOOD FROGS.

By REGINALD WEBER HOWE, JR.

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No. 14.—*North American Wood Frogs.*

BY REGINALD HEBER HOWE, JR.

Prof. Spencer F. Baird described (Proc. acad. nat. sci. Phil., April, 1854, vol. 7, p. 62), a wood frog, *Rana cantabrigensis*, "*Hab.* Cambridge, Mass. (Collection of Prof. Agassiz.)" The type has been lost to all intents and purposes, although it may be an old, shrunken, and unlabeled specimen found with a lot from the Saskatchewan, Can., in the collection of the Museum of comparative zoology.

Baird's diagnosis answers to this specimen very well and is as follows:—

"15. *Rana cantabrigensis*, Baird.—Above yellowish brown. A dark vitta through the eye, margined below by whitish. Lateral fold of skin light colored, as is also a median dorsal line extending from the snout to the anus. A narrow light line along the posterior faces of the thigh and leg. Tibia half the length of body. General appearance and size of *R. sylvatica*.

Hab. Cambridge, Mass. (Collection of Prof. Agassiz.)"

The examination of a large series of *Rana sylvatica* from New England does not show a single specimen approaching the supposed type in characteristic measurements or color or corresponding with the diagnosis of it, and the conclusion is reached that Baird's *R. cantabrigensis* never came from Cambridge, but probably from the west or northwest of North America, and Cambridge, Mass., the habitat given, probably arose from the specimen being in the collection of Professor Agassiz. Having a large series of *Rana sylvatica* I give for comparative purposes a detailed description of this closely allied form.

Rana sylvatica Leconte, Ann. lyc. nat. hist., N. Y., 1825, vol. 1, p. 282.

MEASUREMENTS, average:—

Body, snout to anus	4.2 cm.
Femur	2.3 cm.
Tibia	2.5 cm.
Leg and foot	7.8 cm.

FORM.—*Head.* Width equal to the distance from the snout to the axilla. Eyes invisible from ventral view. Nares half way

between anterior corner of the eye and the end of snout. Distance between the nares equal to the interorbital distance. Tongue ovate, notched at the posterior end, and attached anteriorly for about two thirds its length. Groups of vomerine teeth round, close together, and directly between the internal nares. Nares opening internally immediately forward of the eye. Tympanum smaller than eye. A distinct notch on each side of symphysis of the lower jaw.

Body. Slender. Dorso-lateral folds from the posterior corners of the eyes nearly to the cloacal opening. Back, flanks, and lower belly slightly granulate.

Fore legs. Two tubercles on the palm, three on the first, second, and fourth digits and four on the third digit. First toe slightly longer than second and fourth which are equal. Third toe one third longer than second.

Hind legs. Dorsal sides of the femur and dorsal sides of the tarsus and often posterior ventral sides of the femur granulate. Web, including second joint of the fourth digit, deeply incurved on the margins. A large tubercle on the inner side of the foot and another on the under side of the digital joints. *Legs long and slender. Tibia almost one and one half times the length of the body. Distal end of the tibia reaching to the snout.* Length of first toe equal to that of second joint of second toe. Second toe reaching one half way up second joint of third toe. Third toe reaching nearly to third joint of the fourth toe. Fourth toe longest. Fifth toe equal to third.

COLOR. — *Dorsal surfaces.* Very dark brown to pale grayish. Often the color of the dried leaves, among which this frog is found, except during the short breeding period. Head with a dark vitta on each side, behind the eye, including the tympanum and extending forward as a line from the corner of the eye, through the nares to the end of the snout. A light line extends from the end of the snout to a point above the axilla. Other parts of the head obscurely marked with darker. Body between lateral folds indistinctly marked with darker. Lateral folds lighter and more brilliant in color.

Fore legs. A dark mark along anterior edge of humerus. Two indistinct dark transverse bars on the ulna.

Hind legs. From two to four more or less distinct dark transverse bars on each joint.

Ventral surfaces. Pale, light grayish white sometimes tinged with yellow or greenish. Throat mottled with dusky.

Hind legs. Faint yellowish.

The distribution of this species does not, as far as known, extend north of Quebec, Can., south of South Carolina, or west of the Great Plains. Prof. E. D. Cope, Bull. 34, U. S. nat. mus., in his table of localities, includes one specimen each from the Selkirk Settlements, Can. (5381), Athabasca River, Can. (9384), Moose River, British Amer. (5922). Although I have not seen these specimens, I doubt very much their being *Rana sylvatica*; they are more probably *Rana cantabrigensis* Baird.

Rana cantabrigensis cantabrigensis Cope, Bull. 34, U. S. nat. mus., 1889, p. 436.

Rana cantabrigensis Baird, Proc. acad. nat. sci. Phil., 1854, vol. 7, p. 62. Boulenger, Bull. soc. zool. France, 1880, vol. 5, p. 209. Boulenger, Cat. Batr. Sal. Brit. mus., 1882, p. 45.

Rana sylvatica DeKay, Nat. hist. N. Y., 1842, vol. 3, p. 64, pl. 20, f. 50, pl. 21, f. 54. Boulenger, Bull. soc. zool. France, 1879, vol. 4, p. 174.

Rana temporaria var. *sylvatica* Günther, Cat. Brit. mus., 1868, p. 7 (part).

Rana temporaria subsp. *cantabrigensis* Cope, Bull. 1, U. S. nat. mus., 1875, p. 32.

MEASUREMENTS, averages:—

Body, snout to anus	3.6 cm.
Femur	1.8+ cm.
Tibia	1.8 cm.
Leg and foot	5.6 cm.

FORM. — *Head.* Width equal to the distance from the snout to the axilla. Eyes invisible from ventral view. Nares half way between the anterior corner of the eye and the end of snout. *Distance between the nares greater than interorbital distances.* *Tongue shorter and more ovate than in R. sylvatica.* Notched at posterior end and attached anteriorly for about two thirds its length. *Groups of vomerine teeth oblong and farther apart than in R. sylvatica,* and directly between internal nares. Nares open internally immediately forward of the eye. Tympanum smaller than the eye and a distinct notch on each side of the symphysis of the lower jaw.

Body. Stout. Dorso-lateral folds *indistinct.* *Back, flanks, and lower belly smooth.*

Fore legs. Two tubercles on the palm. *One prominent tubercle on the first and second digits. Two tubercles on the third and fourth digits.* First finger slightly longer than second and fourth, which are equal. Third finger one third longer than the second.

Hind legs. *Posterior ventral sides of femur only granulated.* Web, including nearly the whole of the second digit, deeply incurved. A large tubercle on the inner side of the foot and on the under sides of the digital joints. *Legs not so long or so slender as in R. silvatica. Tibia one half the length of the body. Distal joint of the tibia reaching not quite to the snout.* First toe equal the first joint of the second. Second toe reaching half way up to the second joint of the third toe. Third reaching nearly to the third joint of the fourth toe. Fourth longest. Fifth reaching to third joint of the third toe.

COLOR. — *Dorsal surfaces.* Dark brown to pale yellowish gray. Head with a dark vitta through the eye, on each side behind the eye including the tympanum and extending forward as a line from the corner of the eye through the nares to the end of the snout. A light line extends from the end of the snout to a point above the axilla. Other parts of the head more or less marked, with darker. *A light median dorsal line from near snout to anus sometimes present.* Body between lateral folds, varying from almost unicolor to distinctly marked with darker. *Lateral folds somewhat lighter and bordered by a dark streak.* Sides in many cases heavily spotted.

Fore legs. A dark mark on anterior edge of humerus. *Spotted more or less with irregular markings.*

Hind legs. Barred, but sometimes irregularly spotted with darker.

Ventral surfaces. *Pale grayish yellow, faintly mottled, except on hind legs.*

Hind legs. Yellowish.

The distribution of this species, so far as known, extends from Illinois and Minnesota northward probably to the region of Great Slave Lake, Can., and eastward to St. James Bay, Can. Professor Cope included four specimens from western Missouri in his locality list of *Rana cantabrigensis* in Bull. 34, U. S. nat. mus. He made an error in his identification, however, for the specimens (3457) are without doubt the western form of *Rana pipiens*.

Rana cantabrigensis latiremis Cope. Proc. Amer. philos. soc., 1886, vol. 23, p. 520.

MEASUREMENTS, averages:—

Body, snout to anus	4.4 cm.
Femur	2.1 cm.
Tibia	2.0 cm.
Leg and foot	6.7 cm.

FORM.—*Head.* Width greater than the distance from snout to axilla. Eyes invisible from ventral view. Nares half way between anterior corner of eye and end of snout. Distance between nares much greater than interorbital width. *Tongue as in R. cantabrigensis.* Group of vomerine teeth small and oblong. Tympanum smaller than eye. A distinct notch on each side of symphysis of the lower jaw.

Body. Stout; dorso-lateral fold-lines *very distinct.* Back, flanks, and lower belly smooth.

Fore legs. One tubercle on the palm. One tubercle each on the first, second, and fourth digits. Two tubercles on the third digit. First, second, and fourth fingers equal. Hind finger about half as long again as others.

Hind legs. Posterior ventral sides of femora only granulated. Web much broader than in *R. cantabrigensis*, in the majority of specimens examined, not curved.

The broader web, perhaps in part a secondary sexual character, is more prominent during the breeding season. A large tubercle on the inner side of the foot, and a small one on the outer side and on the under side of digital joints. *Legs thick and short, much more so than in R. cantabrigensis cantabrigensis.* *Tibia slightly over one third the length of the body.* *Distal joint of tibia reaching orbit.* First toe equal to first joint of the second toe. Second toe reaching one half the way up the second joint of the third toe. *Third toe reaching to the third joint of the fourth toe.* Fourth longest. Fifth nearly equal to the third toe.

COLOR.—*Dorsal surfaces:* Dark brown to pale yellowish gray. Head with a vitta through the eye and on each side behind the eye, including the tympanum and extending forward as a broad line from the corner of the eye through the nares to the snout. A light line extends from the end of the snout to a point above the axilla; other parts of the head faintly marked with darker. A light median dorsal line from snout to anus present in many specimens.

Body between lateral folds varying from almost unicolor to definitely marked with darker. Lateral folds, if present, light and bordered by a line of dark spots, the spots sometimes forming a streak. Sides generally heavily marked.

Fore legs. A dark mark on anterior edge of humerus, and otherwise spotted lightly and irregularly.

Hind legs. Faintly barred, but generally spotted with darker.

Ventral surfaces. Pale white. Faint and almost no dusky markings. The distribution of this species covers the greater part of Alaska, and extends southward to the region of Great Slave Lake, Can.

Cope, Bull. 34, U. S. nat. mus., 1889, recognized a color variety, *Rana cantabrigensis ecittata*, but this owing to the great instability of coloration common to wood frogs cannot stand. The diagnostic character he mentions in addition to coloration, viz: "three phalanges free," I find on looking over a series of specimens does not hold; and Cope could not have had a very clear idea of the form himself when he identified with it a specimen from Moose River, Can. (5366), whereas this specimen is without doubt *Rana septentrionalis* Baird.

In examining a large series of wood frogs it becomes at once evident that the only stable character that can be followed for identification is the comparison of measurements; the most important being the comparison of the length of the tibia to the body. The following table shows how distinctly these measurements separate the two species and subspecies.

Rana sylvatica. Tibia more than half the length of the body.


Rana cantabrigensis. Tibia one half the length of the body.

Rana cantabrigensis latiremis. Tibia less than one half the length of the body.

The distribution also, to a great extent, separates the three.

In preparing these descriptions alcoholic specimens in the case of *R. cantabrigensis* and its subspecies have been used and an allowance for faded coloration should be made, although some consideration was taken of this fact when writing the descriptions.

I take this opportunity to thank Mr. S. Garman and Mr. G. M. Allen for their great kindness in helping me in many ways in the preparation of this paper, and also Mr. F. W. True for his kindness in forwarding me specimens from the United States national museum.



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