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AMPHIBIANS AND REPTILES OF THE UNGAVA PENINSULA[1]

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Knowledge of the herpetofauna of this region has been accumulating for nearly a century, but only a little at a time until the last few years. The contributions of the nineteenth century (Hind, 1863; Packard, 1866, 1891; Stearns, 1883; Turner, 1888) are quite meager. Some of the later ones, likewise, consist of little more than scanty notes on one or two of the species comprising the fauna.

Trapido and Clausen (1938) provide a very useful discussion of all the amphibians and reptiles known from the Ungava Peninsula. Although their own field work barely touched the southwestern border of the peninsula (in the Lake St. John area), they cite records from the literature and list museum specimens from various points along the North Shore of the Gulf of St. Lawrence. Patch (1939; 1949) gives distributional and taxonomic notes on *Rana sylvatica cantabrigensis* from several points in the peninsula. Hildebrand (1949) presents excellent notes on the ecology and development of that species in the Fort Chimo area. Several other recent writers (Patch, 1949; Gabrielson and Wright, 1951; Bleakney, 1955) treat the Wood Frog as a new discovery in that locality, apparently overlooking Turner's report (1888: 82) of "two or three species of frogs," which must have been based upon the Wood Frog alone, and also Polunin's report (1949: 114) of a few "tadpoles" at Fort Chimo in 1946. Backus (1954) provides distributional records and life-history notes for *Bufo* and three species of *Rana*. Bleakney (1955) gives range extensions of eight amphibians in the peninsula. Finally, Logier and Toner (1955) publish an extremely useful summation of distributional records of amphibians and reptiles in all of Canada and Alaska.

The interior of the Ungava Peninsula is still so little known to the general public that it seems desirable to indicate the geographical posi-

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ton and at least the approximate altitude of the localities where my notes and material were secured:

	Latitude	Longitude	Altitude (feet)
Attikamagen Lake, Northwest Bay	54° 59′ N.	66° 41′ W.	1,536
Carol Lake	53° 04′ N.	66° 58′ W.	2,000
Knob Lake	54° 48′ N.	66° 49′ W.	1,645
Lac Aulneau	57° 01′ N.	68° 38′ W.	510
Lac La Cosa	54° 52′ N.	66° 55′ W.	1,590
Mile 224 Airstrip	53° 02′ N.	66° 15′ W.	1,790
Muriel Lake	54° 01′ N.	73° 26′ W.	1,100

Attikamagen and Carol Lakes and Mile 224 Airstrip are in Labrador; the other localities, in Quebec.

For marked courtesies and very substantial assistance in my field work, I am indebted to numerous officials and employees of the Iron Ore Company of Canada. Francis McKenzie kindly supplied the Montagnais Indian names of Cope's Toad and the Northern Wood Frog.

Through the courtesy of Dr. Doris M. Cochran, Associate Curator, Division of Reptiles and Amphibians, United States National Museum, I am enabled to add a number of records from material in that institution. My own specimens will be deposited there. Roger Conant has kindly read the manuscript of this paper.

Accounts of Species

Bufo terrestris copei Yarrow and Henshaw. Cope's Toad; Crapaud (French); Nik (Montagnais).

"Hudson Bay Toad" is not a particularly appropriate name for this subspecies. At the time of its original description (Yarrow and Henshaw, 1878: 207; type locality, "Hudson's Bay; James Bay"), and for a great many years thereafter, it was not recorded from any specific locality on Hudson Bay proper. It is only recently that it has been recorded (Netting and Goin, 1946) at a single point on that bay—Great Whale River, far down on the eastern coast.

Yarrow and Henshaw remark (1878: 207): "A large number of specimens collected by Kennerly in the neighborhood of Hudson's Bay are in the Smithsonian collection." It would appear that this statement is based upon specimens of "*Bufo copei*" (USMN No. 5377) collected by Robert Kennicott (not C. B. R. Kennerly) in 1859 at Selkirk Settlement, southeastern Manitoba. (Only two specimens of this serial number remain; perhaps there were more originally.) This locality is scarcely "in the neighborhood of Hudson's Bay," being about 550 miles from the nearest point on it. There may be a little uncertainty about this locality as entered in the National Museum's catalogue (Doris M. Cochran, *in litt.*, January 11, 1956); but, in any event, Kennicott approached Hudson Bay at no nearer point that Norway House, near the north end of Lake Winnipeg (*cf.* Preble, 1908: 70). Apparently Kennerly never was anywhere in the Hudson Bay drainage (*cf.* Hume, 1942: 243-263). Finally, Logier and Toner (1955: 25, map 24) refer most of the records of *Bufo* from southeastern Manitoba to *americanus*, and none at all to *copei*. Thus "Hudson's Bay," as part of the originally designated type locality, would appear to be completely erroneous.

Six specimens were obtained in 1953 at Seven Islands on the Gulf and at Carol, Knob, and Muriel Lakes in the interior; and another individual was observed near Mile 224 Airstrip.

At dusk on May 25 I heard two individuals trilling at a woodland pool north of Seven Islands. It was a calm and almost cloudless evening, with a nearly full moon about two hours high. I estimated the temperature at 55°. The duration of eight almost consecutive trills ranged from 8 to 11 seconds (average, 8.9). The intervals between these trills ranged from 6 to 10 seconds (average, 8.3). On the following morning I found a toad caught in a mouse trap at the mossy edge of this pool, among willow, spruce, Labrador tea, and grass.

On May 28 half a dozen others were trilling at dusk at a meadow pool close to Seven Islands Bay, and they so continued for the better part of an hour, at least. The temperature was estimated at 55°-57°. The trills seemed to last for 10-11 seconds. On the following cloudy morning at 10.55 (temp. about 60°), in the same locality, one or two toads were trilling and one was found in a mouse trap in a little thicket of alder, sweet gale, bunchberry, and grass. No eggs were found in the pool where the toads had been trilling the previous evening. On May 30 two individuals were taken from mouse traps in the same locality. On the same day, in bright sunshine about 1 p. m. (temp. about 60°), a toad was heard trilling east of Seven Islands, probably in an alder swale.

Eleven days after my arrival at Knob Lake, the first *Bufo* was heard during the evening of June 14, at a pool beside the seaplane base. By August the pool contained a good growth of horsetail (*Equisetum limosum*) and bur-reed (*Sparganium hyperboreum*). This single toad gave several trills of approximately 8 seconds' duration about 10.55 p. m. (temp. 55°); several more up to 10.07 a. m. the next day (temp. 72°); and again during the afternoon and evening of the 15th. That sunny day, with a temperature of 77° at 3.57 p. m., was probably the warmest of the season up to that time. Between 3 and 4 p. m. the duration of 21 calls ranged from 4 to 7 seconds (average, 5.6); the intervals between these calls, from 6 to 38 seconds (average, 17.4). After violent rain during the night of June 15, the toad was calling at 7:30 the next morning (temp. about 56°); and again on the 17th about 11:30 p.m. (temp. about 44°). After intermittent rain on June 18, trills were heard from the same pool during the late evening (temp. about 50°); three of them were timed at 10, 12, and 10 seconds. After 5 on the sunny afternoon of June 21 (temp. 62°), seven trills lasted from 4 to 7 seconds (average, 5.4); the intervals between them, from 12 to 22 seconds (average, 16.3). This individual was calling again about 10:50-11:55 p. m. As I stood practically over it, it appeared to be the most brilliantly colored *Bufo* I had ever seen (figs. 1, 2). The black blotches on its distended vocal sac were very pronounced. Kodachromes of the living toad, taken two days later, show that its bright colors occur principally on certain of the lighter areas that are situated between the dark markings. They appear as a sort of ochraceous red at the anterior insertion of the hind limbs, on the under side of the femora, and on the tarsi and toes. There is a similar but paler coloration on the arms and adjacent parts of the dorsum. The upper jaw, the parotoids, and some of the anterior dorsal tubercles are reddish brown.

After collecting this toad on the 21st, I neither saw nor heard others

about Knob Lake; it may have been the only one at the pool. I noticed no particular quality of the voice that would distinguish *B. t. copei* from *B. t. americanus;* but the duration of the trills apparently tends to be shorter in the former, especially if we consider only those at Knob Lake.

This lake was the northernmost point at which I found the species. Another specimen was collected at Muriel Lake on June 29 by Robert Staulker and brought to me by Jean P. Labrecque, both of the RCAF. At Carol Lake I stumbled upon an individual among shrubbery close to the shore in the dusk on September 8. It uttered a few squeaks and chirrups as I handled it. On September 13 Wilfrid Emond captured another in a dwarf birch thicket about 75 feet from the same lake. The final record of the season was obtained on the rainy afternoon of September 19 (temp. 49°), when I found a brightly colored *Bufo* in a "string bog" near Mile 224 Airstrip. Snow had fallen there two or three days previously. The three September records may be indicative of the sort of habitats preferred at the non-breeding season: more or less open forest borders and bogs, rather than deep coniferous timber.

Two males from Seven Islands are a little smaller than one from Knob Lake. (All three exhibit nuptial pads on the first and second fingers.) The throats of the Seven Island specimens, while slightly dusky, are not distinctly spotted. The venter and hind limbs are not so heavily spotted or blotched in these as in speciments from Knob Lake and other interior localities. In color characters the Seven Islands specimens apparently show an approach toward *B. t. americanus* (*cf.* Logier and Toner, 1955: 26-27, map 25). At the time of capture or field observation I made note of the rich coloration (particularly in the groin and on the hind limbs) of specimens at Seven Islands (male, May 26), Knob Lake (male, June 21), Carol Lake (sex?, September 13), and Mile 224 Airstrip (sex?, September 19). After more than two years in preservative, the specimen from Muriel Lake (female, June 29) has a remnant of such coloration. On the other hand, one of the specimens from Carol Lake (male?, September 8) lacked it in life. Thus the reddish coloration is apparently not a secondary sexual character.

Three males (Seven Islands, May 26 and 29, and Knob Lake, June 21) have, respectively, the following measurements: length (snout to vent), 61, 57, 60; elbow to tip of third finger, 31, 29, 33; intergenual extent, 52, 48, 56; tibia, 24.5, 23, 25.5; whole hind foot, 40, 35, 42. A female (Muriel Lake, June 29)—so determined by lack of nuptial pads on the fingers—is the largest specimen of the series, with the following measurements: 74-36-58-28-46. Two specimens have certain fingers that are represented by mere stubs: the second on the left hand in a male from Seven Islands, and the second on the right and the fourth on the left in a male? from Carol Lake.

The vocal season at Knob Lake seemed to commence at least 20 days later than at Seven Islands (where I had been for three days before hearing the first toad on May 25). In each locality the temperature at the time of noticing the first trills was approximately 55°; but at Knob Lake subsequent trilling was heard at temperatures as low as 44° (June 17) and approximately 50° (June 18), and as high as 77° (June 15). This state of affairs is in substantial accord with my experience with *B. t. americanus* in Massachusetts: "Although the American Toad generally does not commence its song season until the temperature has risen

to about 60°, it will nevertheless continue to trill on subsequent days at considerably lower temperatures'' (Harper, 1928: 5).

A few locality records from the Ungava Peninsula, supplementary to those published by Logier and Toner (1955: 27), may be offered here: Natashquan (J. J. Audubon, in M. R. Audubon, 1897: 366, 371; Townsend, 1918: 64); Northwest River (Kindle, 1924: 38); Paradise River (Austin, 1932: 9); Matamek River, Mary River, and Seal River (Trapido and Clausen, 1938: 120); Lake Albanel (Godfrey, 1949: 8); Mile 134 and Menihek Lake (Bleakney, 1955: 165). In the U. S. National Museum there are about 30 *Bufo* tadpoles (No. 129266), approximately 15 mm. in length, that were collected at St. Lewis River on July 14, 1949, by David C. Nutt.

At Knob Lake this species is close to the southern limit of permafrost (*cf.* Thomas, 1953: chart 8-1). Apparently no *Bufo* is able to transcend that barrier.

Rana sylvatica cantabrigensis Baird. Northern Wood Frog; Omatshiskok (Montagnais).

On May 25, at dusk, a Wood Frog was calling at the same woodland pool as some Cope's Toads, near Seven Islands. The note sounded like *ctuck, ctuck, ctuck; ctuck, ctuck* (three and two in a series). Then nine additional consecutive calls consisted of two notes (five times) or three notes (three times) or just a single note (once).

The species was next heard on June 5 at a marshy pool beside the seaplane base at Knob Lake, where it was also joined in vocalizing by *Bufo* at a later date (June 14). The guttural notes (mostly single) sounded at 10:35 p. m. (temp. 34°). There was a nearly cloudless sky and a northerly breeze; most of the nearby lakes were still partly covered with ice. It is a hardy frog that will prepare for breeding under such conditions. The calling on the 6th seemed to commence about 1 p. m. in broad sunshine, with a little wind and at a temperature of 52°. A number of frogs were sprawled out singly on the surface of the pool, which was about 6 inches deep; their arms were dangling pretty straight downward, while their legs were widely spread. The clucks were generally uttered singly, but were occasionally extended into a rapid series of seven or eight or more notes. The sound here took on a rolling or rattling character: *c-r-r-uck*. The frog was apt to start swimming ahead as it clucked, at least when it gave more than one note in a series. There were evidently no regular intervals between the calls; these seemed to be given just as the mood happened to strike the frog. The calls continued during the evening, 8 to 11:30 p. m.

On the following balmy, sunny, and comparatively calm day (estimated temp. at 8 a. m. 57°) no voices were heard from this pool until toward evening; then, from about 7 to 11 p. m. (estimated temp. 50°), there was active calling. During the afternoon a Wood Frog had been heard at a little pond on the opposite side of Knob Lake. Again on the 8th the frogs in the pool by the camp were heard only from 9:20 to 10 p. m., when rain was falling (temp. about 45°-50°). During snow and drizzle on the 9th silence prevailed until 10:50 p. m. (temp. 41°), when two or three frogs called desultorily. This time the note sounded like *ct-a-ruck,* as it was uttered either singly or in a series of perhaps half a dozen or so.

Whereas *Rana s. sylvatica* in New Jersey evidently prefers the daylight hours for its vocal efforts during the main breeding season in March, its Ungava relatives seem to have a greater liking for the few hours of darkness in June. Thus, on the sunshiny day of June 10 (temp. about 40°-55°) no frogs were heard until evening; they then called actively from 9:50 to 10:40 p. m. (estimated temp. 42°). On the next day several were in voice at 5:50 p. m. (estimated temp. 60°), and there was a strong chorus at 10:50 p. m. (estimated temp. 40°). On the 12th there was a little calling at 10:40 p. m. (estimated temp. 52°); and likewise on the 13th (a mild, sunny day) at 11:07 p. m. On the 14th there was a moderate chorus at 10:30 p. m. (estimated temp. 55°), followed for the first time in this area by the trilling of *Bufo.*

On June 15 there was a little desultory calling in the camp pool at 10:07 a. m. (temp. 72°), and more at 9:40 p. m.; also on the 17th at 9 p. m. (estimated temp. 48°). After intermittent drizzle on the 18th, the clucking was heard from 9:52 to 11 p. m. (temp. 50°-52°). A Wood Frog was seen in a nearby willow swamp on the 19th. Single frogs were calling in the camp pool on the 20th (9 p. m., temp. about 41°), on the 21st (10:50-10:55 p. m., temp. 54°), and on the 23rd—a mostly cloudy day, with intermittent showers (morning and afternoon, temp. 55°). On this last date a mass of eggs, with developing embryos, was floating in the pool; it was about 4 inches in diameter. Two tadpoles, approximately 11 mm. in length, were collected on this date, and a number of others were seen.

On June 24 the following notes were made upon a live male, captured the day before: dorsum, including side of body and upper side of limbs, olive-drab; a much paler vertebral stripe, snout to vent; slightly buffier or browner stripes on the dorso-lateral folds, bordered on each side by narrow black, more or less broken, stripes; half a dozen low tubercles on each side of vertebral stripe; lower half of rump (from a point halfway down the sacral slope to the vent) largely black; each side of body with about eight or nine small tubercles and with a slightly larger number of black spots; a light stripe (of same color as the vertebral) extending along upper side of femur on its distal half, posterior side of tibia, and outer side of tarsus and fifth toe; iris pale golden; black stripe before the eye virtually limited to a narrow streak just below the canthus rostralis; upper margin of jaw pale grayish; preorbital and tympanic areas slightly darker, with dusky spots; a short black stripe at anterior insertion of arm; upper surface of limbs with small black spots; throat and venter pale creamy; under surface of hind limbs pale flesh color.

These notes may be amplified as follows. In the above-mentioned specimen and in another from Lac La Cosa, the triangular area between the eye and the shoulder, including the tympanum, has a ground color similar to that of the dorsum, and is blotched only in part (especially behind the tympanum) with black. In *R. s. sylvatica,* on the other hand, this whole triangular area is more or less solid black. The fairly prominent dark stripe along the lower jaw in *sylvatica* is practically absent in these specimens of *cantabrigensis.*

One or several Wood Frogs were calling in the camp pool at Knob Lake on June 24 in light rain at 10:45 p. m. (temp. 35°), and one or two on the following day at 10:48 p. m. (temp. 40°) and 11:20 p. m. In

early July, at the Northwest Bay of Attikamagen Lake, Douglas Loring caught a Wood Frog, but lost it. At Lac Aulneau Norman Sliter reported frogs calling in a little pond about the middle of June. In a muskeg in that locality, on July 26, I made a vain effort to capture a very small, bright-colored Wood Frog. Robert Slipp spoke of seeing frogs more than once in bogs several miles south of Lac Aulneau. Gilbert Simard presented me with a specimen taken near Lac La Cosa in July. Its arms are far less robust than those of the male of June 23, the webbing of the toes is much less extensive, and the first finger is not swollen—these characters indicating that the specimen is a female. The left leg is a stump, consisting merely of the femur; this has the appearance of being the result of an accident, rather than a congenital defect (*cf.* Trapido and Clausen, 1938: 123).

Extreme temperatures at which I found the species in voice were: 34° (June 5), 35° (June 24), and 72° (June 15). Other records of actual or estimated temperatures ranged from 40° to 60°, slightly more occurring between 50° and 60° than between 40° and 50°.

The measurements of the adult male and the adult female are, respectively: length, 41, 43.5; width of head (at posterior end of glandular fold along jaw), 17, 17; elbow to tip of third finger, 18, 20; intergenual extent, 44, 45; tibia, 21, 23; whole hind foot, 33, 36. These specimens are definitely more slender and lighter in weight than others from northwestern Canada. The weights of preserved specimens (with light paper labels attached) are: one adult male and two adult females from southwestern Keewatin, 8.1, 11.8, and 11.1 g.; one adult male from Churchill, Manitoba, 9.8; two adult females from southern Yukon, 9.4, 10.9; adult male and female (the latter with one leg missing below the femur) from northern Quebec, 6.1, 5.9. Thus the two last weigh only about two-thirds as much as specimens from northwestern Canada. The width of head shows a corresponding but less pronounced difference: six specimens from northwestern Canada, average 18.8; two specimens from northern Quebec, average 17. Some of the other linear measurements of these last average slightly less than those of northwestern specimens.

The following records from the Ungava Peninsula are merely supplementary to those published by Loger and Toner (1955: 37-38) for *R. sylvatica:* Fort Chimo (Turner, 1888: 82—as "two or three species of frogs," doubtless comprising only the present species); Rapid River (Speck, 1925: 5); Pointe aux Alouettes, Saguenay County, and Val Jalbert, St. John County (Trapido and Clausen, 1938: 123); Tadoussac and Natashquan (Patch, 1939: 235); Fort Chimo (Polunin, 1949: 114—as "tadpoles"); Mud Lake on Hamilton River, and Northwest River (Backus, 1954: 227); Fort McKenzie and Richmond Gulf (Bleakney, 1955: 167).

This is apparently the only amphibian in the peninsula that succeeds in transcending the barrier of permafrost (*cf.* Thomas, 1953: chart 8-1). Noble (1931: 456) would not grant that ability to any amphibian.

It will require only a few lines to list the remaining amphibians and the one reptile known from the Ungava Peninsula (whose southwestern limits I place at the Nottaway and Saguenay Rivers), together with such locality records as have not already been provided by Logier and Toner (1955):

Ambystoma jeffersonianum (Green). Jefferson's Salamander.

Godbout (USNM No. 48055); Seven Islands (Bleakney, 1955: 168, 170). "A lizard five inches long," reported by Hind (1863, 1: 276) from the Ridge Portage in the Moisie River valley, is not likely to have been anything but the present species.

Plethodon cinereus cinereus (Green). Red-backed Salamander.

Eurycea bislineata bislineata (Green). Northern Two-lined Salamander.

Hyla crucifera crucifera Wied. Northern Spring Peeper.

Rana clamitans Latreille. Green Frog.

Seven Islands (Bleakney, 1955: 166).

Rana pipiens pipiens Schreber. Northern Leopard Frog.

Mud Lake (Kindle, 1924: 38); Paradise River (Austin, 1932: 9).

Rana septentrionalis Baird. Mink Frog.

Matamek River (USNM Nos. 73846-73847); Etagaulet Bay, Lake Melville (Backus, 1954: 227).

Packard's report (1866: 272; 1891: 405) of a specimen from Okak is distinctly suspect, despite his statement that it was identified by E. D. Cope. Okak is a far more boreal locality (both geographically and faunally) than any other from which the species has been authentically recorded. Under the heading of *R. septentrionalis*, Packard also remarks that "frogs" were heard and seen by inhabitants "at Stag Bay, just north of Cape Harrison, Domino Harbor, Lewis Bay, and Henley Harbor." No subsequent investigator has found this species at any point on the outer east coast, and the frogs mentioned are much more likely to have been *Rana sylvatica cantabrigensis* (which is quite overlooked by Packard). Hildebrand (1949: 169) and Wynne-Edwards (1952: 24) refer Packard's records to the Wood Frog.

Thamnophis sirtalis sirtalis (Linnaeus). Eastern Garter Snake.

Tadoussac, Matamek River, and 27 miles east of mouth of Romaine River (Trapido and Clausen, 1938: 124). The name of the Rivière aux Couleuvres (lat. 50° 06′ to 30′ N., long. 67° 25′ to 29′ W.), whose waters reach the Gulf of St. Lawrence through the Rivière Pentecôte, strongly suggests the occurrence of this snake along its banks.

Each of the above-mentioned ten species (three salamanders, one toad, one tree-frog, four true frogs, and one snake) occurs in the Canadian Zone, and probably more or less throughout its extent in the peninsula, although there are comparatively few records of any of the species over the greater part of its more northerly portions. Apparently *Plethodon c. cinereus, Eurycea b. bislineata, Rana clamitans,* and *Thamnophis s. sirtalis* do not range northward beyond the limits of the Canadian Zone. The same statement may apply to *Rana septentrionalis.*

Among the species of the Hudsonian Zone, *Rana sylvatica cantabrigensis* may be regarded as the hardiest one, for it evidently occurs throughout—and even extends a little distance into the Arctic Zone near Fort Chimo (Gabrielson and Wright, 1951: 128), while *Ambystoma jeffersonianum* barely enters the Hudsonian and *Bufo t. copei* is apparently absent from its more northerly portions. The report of *Hyla c. crucifera* from Menihek Lake (Bleakney 1955: 165) requires confirmation before its acceptance as the only Hudsonian record of that species in the

peninsula. If the lower Hamilton River valley is to be considered an outlier of the Canadian Zone, then the only record of *Rana pipiens pipiens* in the Hudsonian Zone to date is the one from Paradise River.

The boundary between the Canadian and the Hudsonian Zones, as considered in the foregoing discussion, does not coincide with that boundary as fixed by Merriam, Bailey, Nelson, and Preble (1910). I have proposed (MS) extending it eastward from the south end of James Bay, approximately along the 52nd parallel of latitude, nearly to the Strait of Belle Isle. In southeastern Quebec this means advancing the former boundary about 150 miles northward and 400 miles eastward. The proposed shift in life-zone limits results from the marked amelioration of the climate during the past four decades.

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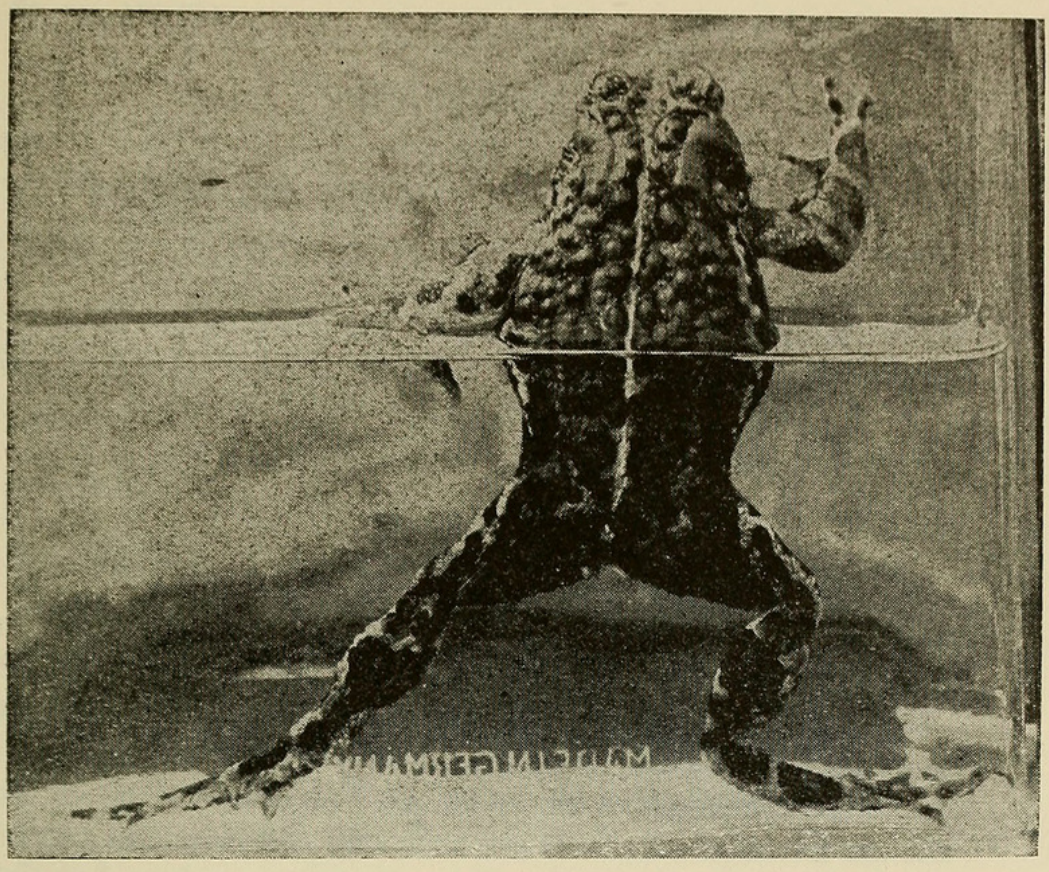

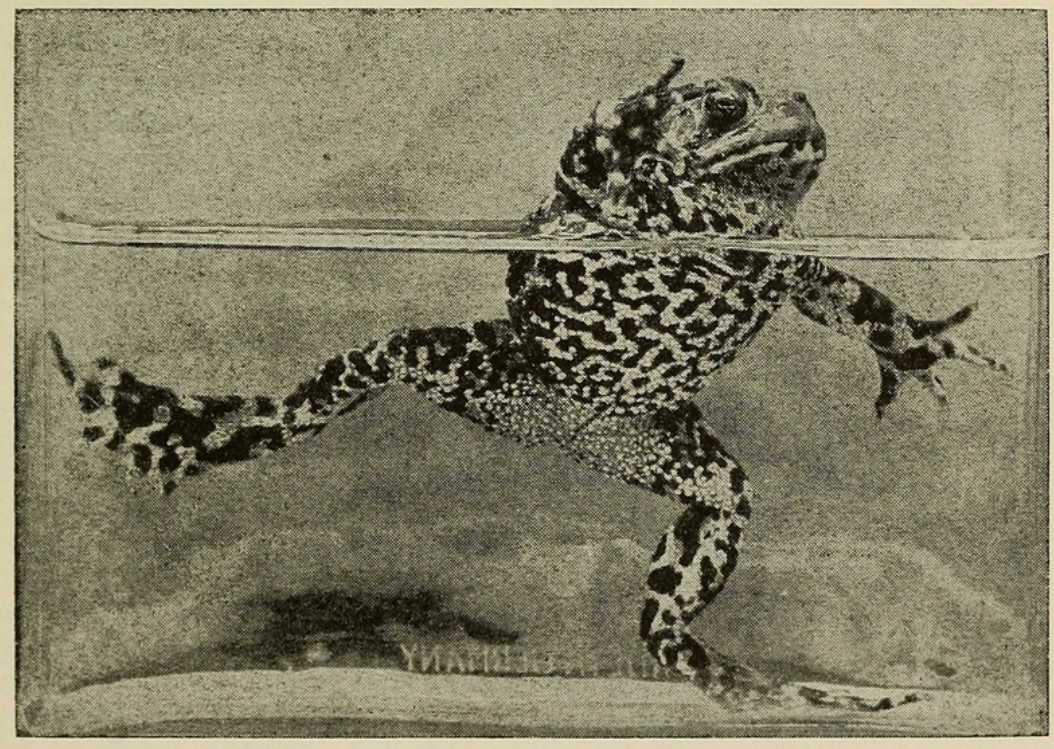

Figs. 1 and 2.—*Bufo terrestris copei*, ♂ ad. (orig. no. 1331); dorsal and ventral views, in aquarium jar. Knob Lake, Quebec; June 23, 1953.