UNUSUAL FORMS OF BOREAL TOADS *BUFO BOREAS BOREAS* (AMPHIBIA: BUFONIDAE) IN GLACIER NATIONAL PARK, MONTANA

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During June and July of 1966, I collected four specimens of *Bufo* at 6,700 ft elevation on Logan Pass, Glacier National Park, Montana. All differed in external characteristics from the typical boreal toad (*Bufo boreas boreas*), which is common at high elevations throughout western Montana. The Glacier National Park collection also contains two of these unusual toads from other localities within the Park. The specimens are most similar to Bufo canorus Camp which has been reported only above 6,000 to over 11,000 ft elevation in the central Sierra Nevada of California. Individuals closely resembling *B. canorus* have been collected at 6,700 ft elevation on Logan Pass (JHB 344, 372, 538), one mile below Swiftcurrent Pass toward Granite Park at 6,000 ft elevation (GNP 4223) and three miles below Granite Park at 5,700 ft elevation (GNP 4225).

Specimens collected on Logan Pass were active during the day in the wet alpine meadows. These toads, at Granite Park, occupied open meadow areas and tadpoles were found at the edges of the meadow in pools of shallow water. Numerous tadpoles were aggregated around a dead adult toad floating in the pool. Adult toads were found under surface objects or in rodent burrows. Toads were observed exposed to the sun's rays at the entrance to rodent burrows.

The question arises: is this population in Glacier National Park an example of *B. b. boreas* living at high elevations and approaching the coloration of *B. canorus*, as suggested by Stebbins (1) and described by Karlstrom (2), or is it truly *B. canorus*? *B. b. boreas* from other high elevations within Montana show no tendencies toward the structure or coloration of *B. canorus* as do the toads in certain localities in Glacier National Park. Instances of apparent convergence of *B. b. boreas* with *B. canorus* have been found in several parts of the range of the *boreas* group and were summarized by Karlstrom (2). Stebbins (3) mentions that *B. canorus* is a close relative of *B. boreas* and that *B. canorus* may be a high mountain differentiate of *B. boreas*. Karlstrom (2) suggested that selective factors which have acted to produce a specialized montane form such as *B. canorus* probably have exerted similar influence on related forms which have been exposed to the same or similar environmental agents elsewhere. He proposed that *B. canorus* is a montane differentiate of an ancestral *boreas*-like toad which became isolated in or near its present range in the Sierra Nevada. The same possibility exists for the *canorus*-like toad in Glacier National Park. Areas exist on the bench above Glacier Wall, the bench at Granite Park, and the interlake ridge northwest of Lake McDonald which apparently escaped glaciation. In these areas, the *canorus*-like toad could have survived the Pleistocene glaciation. Calder and Savile (4) have shown an analgous situation for a plant of the variety *septentrionalis* of the *Hueschera cylindrica* complex which seems to have been isolated on the eastern slopes of Glacier National Park during the last stages of Pleistocene glaciation. In this geographic isolation, the *canorus*-like toad could have evolved and later extended its range to where it is now found in Glacier National Park.

I suggest that the *canorus*-like form of *B. b. boreas* may be a Pleistocene isolate of an ancestral *boreas*-like toad which became isolated in or near its present range in Glacier National Park and, as suggested by Karlstrom, is an example of selective environmental factors which exerted some influence at high elevations to producing a specialized mountain form similar to *B. canorus*. The *canorus*-like forms should presently be con-

sidered as *B. b. boreas* until further taxonomic studies are completed.

Dr. Robert C. Stebbins (personal communication), after examination of a female specimen from Logan Pass, reported that it corresponded closely in external characteristics to *B. canorus* from the Sierra Nevada, but also differed from *B. canorus* from the Sierra Nevada in number of dark blotches, width of the vertebral stripe, wider interorbital distance, and a less truncated snout.

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