basking aggregations in juvenile *B. b. boreas* would result in their utilization of direct sunlight as an extremely important adaptation to life in the cool temperatures of Waterton Lakes National Park. These basking aggregations of juvenile toads probably served the function of raising their body temperatures to permit greater activity and feeding. There were large aggregations early in the day when cooler temperatures existed and then dispersal from the aggregations for feeding later in the day during and after the warmest temperatures.

Color slides were taken of these aggregations, but reproduction in black and white was not feasible. These slides are available upon request to the authors. Our thanks to Francis R. Cook, and J. R. B. Coleman for their help in obtaining a permit to collect in Waterton Lakes National Park, and to Dr. Charles C. Carpenter for reading the manuscript.

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A Reconsideration of the Relationship of *Barbula johansenii* (Musci)

Barbula johansenii is a rare moss known from four widely scattered localities in the North. It was first found by Frits Johansen on Victoria Island (ca. 69°30′ N, 115° W) and described by Williams (1921) in one of the reports of the Canadian Arctic Expedition of 1913-18. Steere (1952) reported it from the Brooks Range of arctic Alaska (68°12′ N, 152°7′ W), and Savicz-Ljubitskaja (1964) recorded its occurrence in the Lena River valley of eastern Siberia (ca. 71°40′ N, 127°10′ E). In 1965 I reported the first collection outside the arctic in the Canadian Rocky Mountains, at Baker Creek, Banff National Park (ca. 51°30′ N, 116° W), Alberta.

The species is similar in gametophytic characteristics to *Barbula acuta* (Brid.) Brid. and its common arctic expression, *B. icmadophila* Schimp., but is easily recognized by long, fleshy, swollen leaf tips which are regularly caducous. Both Williams and Savicz-Ljubitskaja observed proliferations from the ends of fallen leaf tips, indicating an apparent function in vegetative reproduction. Adequate descriptions of the gametophytes may be found in publications by Williams (1921), Steere (1938), and Savicz-Ljubitskaja (1964). Williams' illustrations were reproduced by Steere in Grout's *Moss Flora of North America* (1938), and Savicz-Ljubitskaja (1964) provided excellent drawings. The sporophytes have, until now, been unknown.

Recently, quite by chance, I discovered fruiting material in a Canadian collection made by Thomas Drummond and included as an unmixed tuft with *Didymodon tophaceus* (Brid.) Jur. in his *Musci Americani* (*Rocky Mountains*), no. 120 [distributed as *D. trifarius* (Hedw.) Brid.], at least as represented in the herbarium of the University of Michigan. The specimen was presumably collected "about the Falls of Niagara." Such accidental mixtures are commonly found in Drummond's exsiccati set (1828), and the labels are neither informative nor accurate. For phytogeographic reasons, I am guessing that this collection actually came from western Canada and probably from the calcareous habitats of the Rocky Mountains as most,

though not all of Drummond's collections did. (A recent report by Bird, 1967, gives useful information on Drummond's itinerary up the Hudson River and across Canada to the Rocky Mountains. The title of the exsiccati is misleading, as many of the collections came from the vicinity of Niagara Falls and elsewhere in Upper Canada, as Ontario was then called, and also in various ill-defined parts of the central Canadian prairies.)

The sporophytes indicate a relationship to *Didymodon* rather than to *Barbula* because of short, erect peristome teeth (rather than the long, spirally twisted teeth so highly characteristic of *Barbula*),and a nomenclatural transfer is required: ***Didymodon johansenii*** (Williams) n. comb. *Barbula johansenii* Williams, Report Canad. Arctic Exped. 1913-18, Bot. 4E: 4. 1921. A description of essential features of fruiting plants follows:

Upper and perichaetial leaves conspicuously enlarged (about 2 mm. long as compared with the lower leaves which are 1.5 mm. long or less and narrower at the base), slenderly subulate from a broad, ovate base, the subulae nearly always broken off. Setae 7-8 mm. long, dark-red; capsules 1.2-1.3 mm. long, oblong-cylindric, erect and symmetric, dark-red; annulus differentiated; operculum not seen; peristome teeth short and slender but well developed, about 100 μ high, erect, imperfectly divided into 2 terete forks, pale, finely papillose-roughened. Spores spherical, finely papillose, 11-13 μ in diameter. Calyptrae cucullate, smooth, naked.

Steere (1953), in an interesting and provocative contribution to arctic phytogeography, called attention to a small group of rare bryophytes which are essentially limited to high northern latitudes and may have survived the Pleistocene in unglaciated parts of the High Arctic, in the western Arctic Archipelago of Canada, parts of the Yukon, and the Brooks Range of Alaska. The fact that some of them, such as *Barbula johansenii*, occur sparingly in montane habitats south of the arctic, does not disprove Steere's thesis, as it is possible that such species may have escaped glaciation in some localized niches in the Canadian Rocky Mountains as well as in a northern nunatak of greater extent and greater import. Such disjunctions do present the interesting possibility, however, of a survival farther south in the American Rocky Mountains and a secondary invasion of the North in post-Pleistocene times.

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