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The Distinguished Legacy of DMB: Donald MacPhail Britton (1923–2012)

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In a letter dated 23 May 1995, Donald M. Britton wrote to me, "... things are moving along at a leisurely pace and my lifestyle is changed – No pipe, No coffee, No chocolate peppermints, No stress, No strain. ...Dan [Brunton] and I are still banging away at *Isoetes* ...it is nice to have a hobby project so the old neurons do not completely short-circuit ...I noticed when I passed 70 that mail eased up considerably. I guess workers feel that either you are retired, or should be! One looks a bit furtively at the obits to see who has made the list".

Fortunately for pteridology, Don Britton remained active in research throughout his "retirement" (Brunton, 2012a, 2012b; Brunton and Catling, 2012) and he published nearly 20 more papers after the aforementioned letter (Appendix 1). Most of these were with his longtime friend and collaborator Daniel F. Brunton. From 1995 to 2006 "Brunton and Britton" and "Britton and Brunton" described seven new North American species and hybrids of *Isoetes* (Appendix 2), and also published studies clarifying the distribution, status, and taxonomy of several more in this notoriously difficult genus (Appendix 3).

Donald MacPhail Britton (Fig. 1) was born on March 6, 1923 in Toronto, Canada, the youngest son of Arthur Britton and Marjorie Spence. He attended University of Toronto Schools (UTS) and was awarded a J. S. McLean Scholarship in Science to the University of Toronto in 1942. Britton was a hard-working and successful student, receiving the I. M. Gilchrist Prize in Botany (1944) and graduating with first class honors in science and biology (1946). That fall, he entered the graduate program at the University of Virginia under the auspices of a Philip Francis du Pont Fellowship. His time at UVA involved a semiannual migration, with the academic year spent at the Miller School of Biology (Charlottesville, VA), and the summer working at Blandy Experimental Farm (Boyce, VA). In 1950, Britton completed his Ph.D. with a dissertation entitled "*Cytogenetic studies on the Boraginaceae*" and received an honorable mention from the Virginia Academy of Science. The following year he married Mary Cronyn, whom he had met at the University of Toronto.

With Ph.D. in hand, Britton pursued a postdoctoral fellowship at the Department of Plant Science at the University of Alberta. Following this, he worked several years as an Assistant Professor of Horticulture at the University of Maryland, where he specialized in the cytogenetics and breeding of *Rubus* and other flowering plants. In 1958 he moved to the University of Guelph and, in 1971, became a Full Professor in the Department of Botany and Genetics. He spent the remainder of his academic career at Guelph.

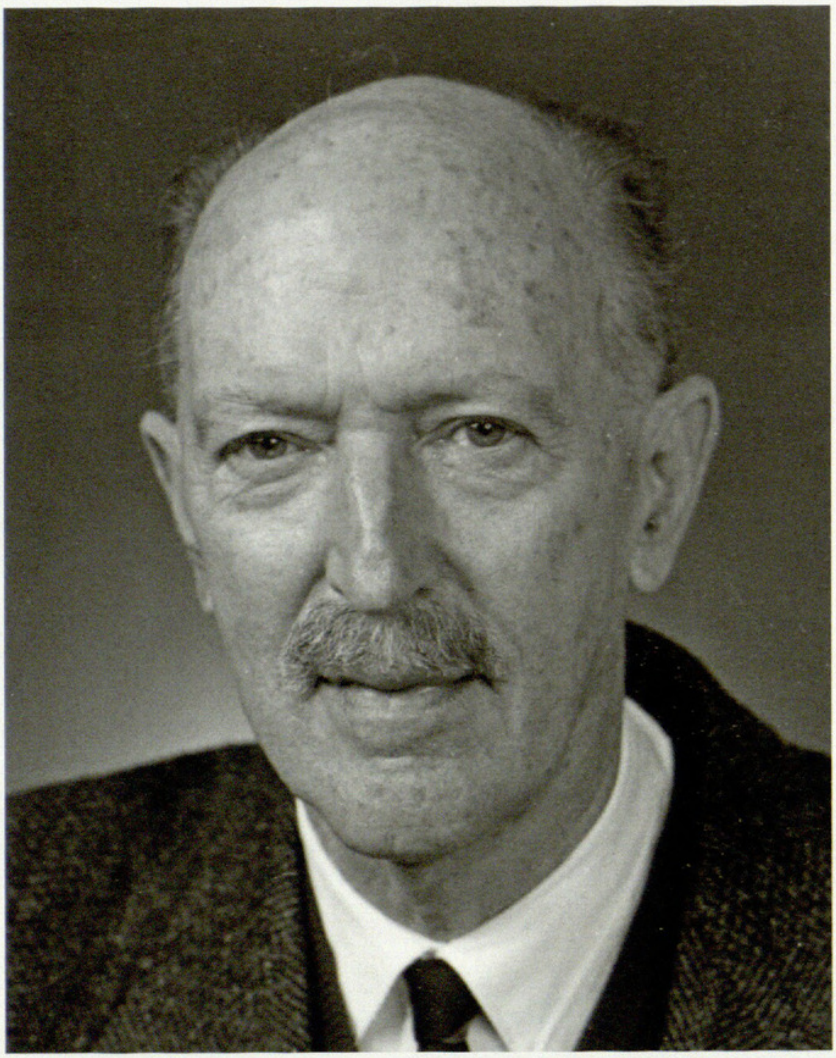

FIG. 1. Photograph of Donald M. Britton taken in 1996 on the occasion of the *Richard and Minnie Windler Award* presented by the Southern Appalachian Botanical Society for the publication: Brunton, D. F., D. M. Britton, and T. F. Wieboldt. 1996. Taxonomy, identity, and status of *Isoetes virginica* (Isoetaceae). Castanea 61:145–160.

Showing an early interest in ferns, Britton became a member of the American Fern Society in 1946. Later in his career, he would be awarded an honorary membership in this Society—a special category for persons who have made outstanding contributions to the study of ferns. Britton's early emphasis on angiosperms eventually gave way to a career-long focus on ferns. Building on his strong interest in cytogenetics, his first fern paper, entitled "*Chromosome studies on ferns*," was published in the *American Journal of Botany* in 1953. This was a landmark paper following up on Manton's (1950, see also 1973) methodological breakthrough combining acetocarmine staining with a squash technique that flattened dividing cells so that their chromosomes could be photographed in one focal plane. Prior to the introduction of this technique, the only method available to count chromosome numbers was to compare camera lucida drawings based on serial microtome sections of paraffin-

embedded material. Britton's paper (1953) provided chromosome numbers for 25 species of ferns collected in southern Ontario. Because many of the species were also native to the British flora studied by Manton (1950), his work provided vital corroboration of Manton's results, along with additional evidence of polyploidy in ferns.

While at Guelph, Britton supervised four graduate students in pteridology: Jane Rigby (M.Sc.1969, *Pellaea*), Laima Kott (M.Sc. 1972, *Polypodium*; Ph.D. 1980, *Isoetes*), Ruth Hersey (M.Sc. 1979, *Lycopodium*), and me, Kathleen Pryer (M.Sc. 1981, *Gymnocarpium*), all of whom published their work with him (Appendix 1). I remember how he would frequently come into the lab to read us letters (while smoking his pipe with tobacco from the local Wiff'n Puff) that he received from scientists all over the world who sought his opinion and shared new information with him. What a great way for students to learn about ferns and the kinds of research questions being asked at the time! This was well before Chris Haufler (who Britton referred to as the "wunderkind in Kansas") took the fern world by storm with isozymes.

Britton also took his students to important fern meetings, including the famous New England Fern Conference that was held in Petersham, Massachusetts at Harvard Forest. These meetings were critical for fostering communication among botanists working on ferns, but in diverse disciplines. One of these trips included an introduction to the herbaria at Harvard and the wonderful hospitality of Alice and Rolla Tryon at their residence within a stone's throw from the herbarium (where we feasted on the best fiddlehead appetizers ever...!).

I never called him Don, always Dr. Britton. But after I graduated with my M.Sc. from Guelph in 1981, I addressed him by his initials in correspondence and that is how I have always referred to him since—DMB. DMB was extremely generous with his time and very patient with everyone (students, colleagues, and amateur enthusiasts, alike), and through his example showed us how to put in the long hours to get those almost-perfect chromosome squashes, and to locate those hard-to-find ferns when doing fieldwork. DMB's connection with those outside the academic world was particularly evident in how he was always so welcoming to anyone interested in his area of study. His quiet encouragement and the confidence it instilled in those working with natural history and regional conservation organizations were both effective and appreciated, as acknowledged when he was awarded an Honorary Membership by the Ottawa Field-Naturalists' Club in recognition of both his scholarly and conservation contributions (Brodo et al., 2001).

Doing fieldwork with DMB was a treat (Fig. 2). It was a natural talent for him—it was as though he had special radar in the field for finding the ferns he was after. One does not learn how to do that from books, but by watching and observing, if you are fortunate to be with someone who has the "know how". Field trips with DMB were meticulously planned—everything happened on schedule, ALWAYS with good humor, and without a hitch.

Except for one trip, a trip that is a favorite memory that still makes me smile, to a special *Gymnocarpium* collecting site in Wellington County, near Guelph,

FIG. 2. DMB in 1979, collecting ferns in northwestern Ontario (near Thunder Bay).

to which we returned a few times to collect chromosome and spore material. It meant driving about 20 minutes from campus, parking on the side of the road, then trudging our way though a few acres of pasture with all our collecting gear in tow, to get to a woodlot that had the patch of ferns we were after. On one occasion, as we were making our way through the pasture, I spotted a bull facing us.... and he seemed to be pawing at the ground. I squinted for a better look, and nervously whispered to DMB "What is one supposed to do when you think a bull might be getting ready to charge?" Not getting an answer, I glanced over my shoulder and there was DMB, in the distance, with his great long legs hightailing it over the fence. I bolted after him at the speed of light, and learned another important lesson; don't waste time asking questions, just watch and learn...

After his official retirement at age 65, DMB was awarded the title of Professor Emeritus by the University of Guelph. For nearly 20 more years, he enjoyed

going to his office every day, socializing with the younger members of his department, and continuing his scientific studies. The year following his retirement from Guelph, DMB coauthored a book with William J. Cody from Agriculture Canada entitled "Ferns and Fern Allies of Canada" (1989). Nearly 25 years later, it still is (and long will be) the definitive reference book on the ferns of Canada. In 1991, DMB was awarded the *Lawson Medal* for "outstanding scientific achievement over the period of a career" from the Canadian Botanical Association. He was awarded the *Richard and Minnie Windler Award* for his publication on *Isoetes virginica* with Brunton et al. (1996) in the journal *Castanea*. In 2007, the Field Botanists of Ontario awarded him the inaugural *John Goldie Award* for his dedicated service to the field of botany. The three fern taxa named in his honor (Appendix 4) provide further tribute to DMB's contribution to our knowledge of ferns.

The last time I saw DMB was when I visited him in Guelph in June 2000 and we spent two days together racing over the countryside collecting as many different species of *Equisetum* as possible. It was a very productive effort—9 of the 15 species of *Equisetum* that are known worldwide can be found within a short distance from Guelph and he led me to all of them. This resulted in a phylogenetic publication in 2003 (Des Marais et al.) that was DMB's first and only publication to include molecular DNA sequence data (or what he would call "the O. J. solution"). A paper presenting a molecular phylogeny of Cystopteridaceae (including *Cystopteris* and *Gymnocarpium*, two of DMB's favorite ferns), and currently in press at *Systematic Botany* (Rothfels et al. 2013), is dedicated to the memory of DMB.

With a "second retirement" at age 80 (see tributes by: Brunton, 2003; Catling, 2003; Ceska and Ceska, 2003; Pryer, 2003; Reznicek, 2003), DMB's world contracted, especially after being diagnosed with Alzheimer's disease in 2008 and the death of his wife Mary in 2010. DMB was hospitalized on May 15, 2012 with pneumonia and died peacefully in hospice on May 18. A private family funeral service was held on May 19, followed by a memorial service to celebrate his life on July 28 at St. George's Anglican Church in Guelph. He leaves behind his son Robert, and two daughters, Anne (Terry Greenlay) and Barbara, as well as two grandsons, Scott and Ben, of whom he was very proud.

To me, DMB embodies all that is essential to being a great scientific advisor, including a wry sense of humor and the ability to get students to move beyond their comfort zone. He is the one I have always tried to measure up to in my own scientific interactions, especially with graduate students. Several people contacted me this summer to say how very sorry they were to hear about our loss of DMB. They all described him as "a larger-than-life guy". I will be forever grateful to DMB for the guidance and opportunities that he provided. His influence in my life has been pervasive—I think of him every time I interact with my own graduate students, every time I do fieldwork, and every time I see a bull in a pasture...

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APPENDIX 1. Fern bibliography (including abstracts and reviews) of Donald M. Britton, arranged first by decade, and then alphabetically within each decade.

1950s

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APPENDIX 2. Pteridophyte taxa authored or co-authored by D. M. Britton.

Family	Taxon name	Citation
Dryopteridaceae	*Dryopteris* × *algonquinensis* D. M. Britton	Canad. Field-Naturalist 89: 165. 1975.
Isoetaceae	*Isoetes appalachiana* D. F. Brunt. & D. M. Britton	Rhodora 99: 129. 1997.
Isoetaceae	*Isoetes* × *echtuckeri* D. F. Brunt. & D. M. Britton	Canad. J. Bot. 77: 1667. 2000.
Isoetaceae	*Isoetes hillii* D. M. Britton	Amer. Fern J. 83: 128. 1993.
Isoetaceae	*Isoetes* × *jeffreyi* D. M. Britton & D. F. Brunt.	Canad. J. Bot. 70: 451. 1992.
Isoetaceae	*Isoetes junciformis* D. F. Brunt. & D. M. Britton	Amer. Fern J. 89: 193. 1999.
Isoetaceae	*Isoetes* × *marensis* D. M. Britton & D. F. Brunt.	Canad. J. Bot. 73: 1352–1353. 1995.
Isoetaceae	*Isoetes melanopoda* J. Gay & Durieu subsp. *silvatica* D. F. Brunt. & D. M. Britton	Castanea 7: 26. 2006.
Isoetaceae	*Isoetes* × *novae-angliae* D. F. Brunt. & D. M. Britton	Rhodora 108: 238. 2006.
Isoetaceae	*Isoetes prototypus* D. M. Britton	Canad. J. Bot. 69: 278. 1991.
Isoetaceae	*Isoetes* × *pseudotruncata* D. M. Britton & D. F. Brunt.	Canad. J. Bot. 74: 58. 1996.

APPENDIX 3. Pteridophyte taxa redefined/recircumscribed by D. M. Britton and D. F. Brunton.

Family	Taxon name	Citation
Isoetaceae	*Isoetes* × *dodgei* A. A. Eaton pro sp.	Canad. J. Bot. 67: 3001. 1989.
Isoetaceae	*Isoetes* × *harveyi* A. A. Eaton pro sp.	Canad. J. Bot. 69: 640. 1991.
Isoetaceae	*Isoetes* × *truncata* (A. A. Eaton) Clute pro sp.	Canad. J. Bot. 71: 1024. 1993.
Isoetaceae	*Isoetes hyemalis* D. F. Brunt.	Castanea 59: 13. 1994.
Isoetaceae	*Isoetes microvela* D. F. Brunt.	Rhodora 100: 270. 1998.
Isoetaceae	*Isoetes valida* (Engelm.) Clute	Amer. Fern J. 86: 23. 1996.
Isoetaceae	*Isoetes virginica* Pfeiffer	Castanea 61: 154. 1996.

APPENDIX 4. Pteridophyte taxa named in honor of D. M. Britton.

Family	Taxon name	Citation
Cystopteridaceae	*Gymnocarpium* × *brittonianum* (Sarvela) K. M. Pryer & Haufler	Syst. Bot. 18: 168. 1993.
Dryopteridaceae	*Dryopteris filix-mas* (L.) Schott subsp. *brittonii* Fraser-Jenk. & Widén	Advances Forest. Res. India 29. 2006.
Isoetaceae	*Isoetes* × *brittonii* D. F. Brunt. & W. C. Taylor	Amer. Fern J. 80: 85. 1990.