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AN EVER-INQUIRING MIND: A TRIBUTE TO DR. J. SHERMAN BLEAKNEY (1928-2019)

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One of the consequences of the rapid growth and specialization in science in the last half-century or so is the decline in the proportion of scientists who have the training, the time and the inclination to investigate the natural and human worlds from a wide variety of perspectives. A good example of one is Dr. J. Sherman Bleakney of Acadia University. He made significant contributions to our understanding of the natural and anthropogenic history of Nova Scotia and the Bay of Fundy, and left this life on his own terms on October 25th, 2019.

(John) Sherman Bleakney was born in 1928 in Corning, New York, the son of a Baptist minister, and spent his early childhood in Boston. The family's summers, however, were spent at his father's original home in Wolfville, Nova Scotia, and the family moved back to Wolfville permanently when Sherman was a teenager. Here it would appear that he came under the influence of Robie Tufts, at that time the Chief Migratory Birds Officer for the Maritimes. Tufts stimulated several local boys (including Earl Godfrey and Cyril Coldwell) to become passionate ornithologists and conservationists. In Sherman's case, this would only have amplified the influence of his mother, Ruby, who encouraged his interest in the science of the natural world.

Sherman entered Acadia University to study biology in 1945. By that time he was already an accomplished taxidermist and naturalist. He arrived at the university with a large collection of books on nature and a number of specimens, including birds that he had prepared. His friends recall him saying: "If you can't eat it – stuff it". He was apparently an extremely active and popular student, attending all the dances, organized skiing trips and Biology Club meetings, and led his peers on woodland forays on weekends.

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He graduated with a B.Sc. in Biology in 1949. The Yearbook records the following testament from a colleague: " 'Shirmy' […..] grew up in the wilds of Wolfville. To be like him requires a full knowledge of taxidermy, hunting, skiing, dancing, and half of a large volume on 'How to be a wit' ".

At Acadia, he completed an M.Sc. in Biology in 1951. During and afterwards, he undertook contract work, collecting salamanders and frogs for the National Museum in Ottawa. This led him to the position of Curator for Amphibians, Reptiles and Fish at the National Museum. During the next few years, he also worked on his Ph.D. degree through McGill University in Montreal. His thesis, "*A Zoogeographical Study of the Amphibians and Reptiles of Eastern Canada*", was defended in 1956, and republished as a National Museum of Canada Bulletin (Bleakney 1958b). It became the standard reference on the distribution and post-glacial dispersion of reptiles and amphibians in Canada for many years.

Sherman returned to Acadia as a professor in Biology in 1957, and taught there until his 'retirement' in 1988. His primary courses were Introductory Biology, Histology, Embryology, Comparative Chordate Anatomy, Marine Invertebrate Biology and Animal Ecology, although he later told me that he did not consider himself as an ecologist – "merely a naturalist" (!). He was undoubtedly one of the most popular and effective teachers, receiving the Acadia Alumni Award for Teaching Excellence in 1987. It was not just his legendary (sometimes wicked) sense of humour, but his great breadth of knowledge, his ability to link material across disciplines and to make it relevant to his students, that are among the prevailing memories of many of them. The photograph (Fig 1) shows Sherman holding the forelimb of a leatherback turtle that he had found dead on shore, dissected with the class around him, and then buried in his garden (much to his wife Nancy's chagrin, I believe) in order to recover the skeleton. Given his entertaining lecture style, it is easy to envisage him breaking into an 'air-guitar' riff.

At Acadia, he initially continued his research into the distribution and behaviour of amphibians and reptiles. He recognised that, at that time, knowledge of the natural history of these groups in the Maritimes was very limited, and a number of his contributions are first records of occurrence (e.g. Bleakney 1951, 1955, 1963a, 1965a, Bleakney and Cook 1957a,b, Cook and Bleakney 1960).

Fig 1 J. Sherman Bleakney (Photo courtesy of the Acadia Archives, Acadia University).

Others deal with behaviour, taxonomy or morphological variations (e.g. Bleakney 1957, 1958a, 1959, Bleakney and Cook 1957b, Cook and Bleakney 1961). Many of his collected specimens are to be found in the National Museum, the Royal Ontario Museum, and the Nova Scotia Museum. He appears to have been the first person to suggest that the occasional appearance of leatherback turtles (*Dermochelys coriacea*) in Maritime waters represented an annual migration similar to those of shorebirds and many marine fish (Bleakney 1965b). He also established that these huge animals fed almost exclusively on jellyfish; the occasional juvenile fish and crustaceans found in the turtle guts were the prey or the commensals of the cnidarians. The very first leatherback turtle that was satellite tagged in Atlantic waters in 2000 was named 'Sherman' in his honour, and a female turtle was later named 'Ruby' after his mother.

In the 1960s, Sherman began to focus on other aspects of Nova Scotia's natural history, exploring the fauna in caves in Hants County (Bleakney 1965c, Calder and Bleakney 1965, 1967). He was also an avid SCUBA diver and conducted what might have been the first underwater exploration of the harbour at Fortress Louisbourg, in preparation for its establishment as a National Historic Site (Hansen and Bleakney 1962).

A feature of his broad talents was his unwillingness to be limited by the absence of established techniques to accomplish his research objectives. This is amply demonstrated by a number of methodology papers over his career (e.g. Bleakney 1967, 1969, 1970a, 1982, Bleakney and DeVenney 1989).

A major shift of focus occurred in the late 1960s and 1970s, when Sherman started to explore the natural history of the Bay of Fundy, particularly the Minas Basin. For that, he had to retrain himself to deal with the invertebrates of mudflats and marshes, and the environmental significance of the large Fundy tides (Bleakney 1972, Bleakney and McAllister 1973). He instantly became fascinated by the rich diversity of molluscs in mudflats, salt marshes and shoreline rocks, particularly the nudibranchs (Nudibranchia), sacoglossans (Sacoglossa), and the 'boring molluscs' (Pholadidae) (Bailey and Bleakney 1966, 1967, Bleakney and Bailey 1967, Frank and Bleakney 1975, 1978, Bleakney and Saunders 1978, Bleakney and Meyer 1979, Bromley and Bleakney 1979, Graves *et al*. 1979, Bleakney *et al*. 1980, Bleakney and Janes 1983, Gibson *et al.* 1986). Shortly before his death, Sherman's foundational work on other, perhaps less known taxa, was recognized by Dale Calder who named a recently discovered species of hydroid, *Eudendrium bleakneyi*, in honour of "Dr. J.S. Bleakney of Acadia University, an esteemed mentor who contributed greatly to the content of this work" (Calder 2017).

In the 1970s, there was once again a renewed interest in Fundy tidal power development, following proposals for construction of large barrages across the Minas Basin, Cumberland Basin, and Shepody Bay. The fact that so little was known about the fauna and flora of the Upper Bay of Fundy – other than the annual migrations of shorebirds from the Arctic and some anadromous fish from the south – meant that a broad and substantial research program had to be carried out in very short order (Daborn and Bleakney 1977). Sherman quickly established a team of students to conduct extensive seasonal collections along transects all around the Minas Basin. These, together with studies in Cumberland Basin and Shepody Bay, constituted the very first systematic surveys of the intertidal and near subtidal environments of the Upper Bay, and produced not only a greater appreciation for the diversity of habitats to be found there, but also a better understanding of why the area attracted so many shorebirds during their southerly migration from the Arctic in summer.

Because the Minas Basin ecosystem had been so poorly studied, Sherman coordinated the preparation of species lists and the first field guide for invertebrates that became essential references for

the many scientists that participated in the research (Bromley and Bleakney 1979, 1985).

Invertebrates that particularly engaged his attention were the sea slugs (Mollusca: Opisthobranchia) that he initially encountered in salt marsh pools, but then pursued throughout the Bay of Fundy, the Gulf of Maine, and the Atlantic shore. His fascination with this poorly-known group was immense, and led him to interact with mollusc specialists around the world. His 1996 book, "*Sea Slugs of Atlantic Canada and the Gulf of Maine*", is at once informative, readable (in spite of the terminological challenges) and highly entertaining. There are few guides or textbooks that can match its appeal to the aspiring young naturalist. Sherman was an accomplished photographer and compiled a fine collection of photographs, using a macrophotography tank of his own design (Bleakney 1970a, 1996). I believe that this photograph collection is in the Bleakney fonds in the Acadia Archives, but these are currently unavailable because of the Covid pandemic.

When Sherman retired in 1988, he continued to investigate the marshes and mudflats of the Minas Basin. He had already come to recognise that this dynamic ecosystem exists in a permanent state of disequilibrium: not only do the intertidal mudflats get reworked by ice every winter and recolonised by invertebrates and epipelic algae every spring, but there were longer and more progressive changes associated with sea level rise, increasing tidal amplitudes and human interventions. The discovery of fossil trees and oysters *(Crassostrea virginica)*, dating back some 3,800 years but now exposed at low tide, led him to contemplate how the system had changed since the ice age receded, and the influence this might have had on the biota (Bleakney and Davis 1983, Bleakney and Janes 1983). Inevitably, he became more and more interested in tidal dynamics, particularly the longer variations associated with the Nodal and Seros cycles (Bleakney 1986, 2004). This formed an important part of his understanding of the effects of human activities on the ecosystem, and correspondingly, the effects of the ecosystem on human activities.

Sherman had long been intrigued by the various remnants of Acadian dyke structures that he had encountered over the years. The full history of human impact on the natural system began with the Acadians in 1606, when they adapted some European methods for converting coastal marshes into fertile agricultural land. It has

been estimated that over the last 400 years, about 75 to 80% of the Bay of Fundy marshes had been converted, primarily for agriculture. When he retired in 1988, Sherman turned his attention to the archeological history, especially of the Southern Bight of Minas Basin and the area of Grand Pré. He searched all historic records that he could find, interacted with many historians of the Acadian era, and interviewed still-living dykeland owners who could tell him about the traditional techniques of dykeland construction. The result was the book, "*Sods, Soil and Spades: The Acadians at Grand Pré and their Dykeland Legacy*" (Bleakney 2004)**.** This eclectic, informative and insightful work is a celebration of the efforts of dykeland dwellers over some four centuries. Liberally endowed with Sherman's trademark humour and provocative questions for the reader, the work captures a wide variety of documented information about dyking practices, and the complex relationships between the natural history of this changing macrotidal ecosystem and the human history since 1604. It formed an extremely important document in support of the nomination of Grand Pré as a UNESCO World Heritage Site, a designation that was awarded in 2012.

Throughout his life, Sherman looked for scientific, naturalistic explanations for many kinds of human behaviour and ideas, ranging from the common features of human and animal aesthetic awareness (e.g., Bleakney 1970b), to the origins of mythology and religious beliefs. He was particularly intrigued by the extensive development in Inuit communities of shape-shifting stories, since these do not appear to be as prevalent in all indigenous cultures, especially those of lower latitudes. He developed a simple osteological hypothesis: that the dependence of Inuit peoples on several different mammal and bird species for their subsistence led them to recognize the common anatomical basis of vertebrates, especially foetal similarity, and this in turn led to a concept of the potential transmutability of the spirit into different life forms. He developed this idea in an unpublished work, entitled "*Bones and beliefs in hunter-gatherer societies: the Inuit*". The hypothesis led him to consider the potential origins of religious beliefs in general. He discussed this with many of his friends at Acadia University, notably Dr. Bruce Matthews (Professor of Comparative Religion), Chaplain Roger Prentice and myself, and with cinematographer John Houston, and corresponded with other notables such as Jared Diamond and Richard Dawkins.

Unfortunately, he was unable to complete the investigation to his satisfaction. I believe that the Acadia Archives contain much of his correspondence and unpublished writing on this topic that would reward investigation when the present pandemic subsides.

In typical Sherman fashion, his last will and testament specified that after cremation his ashes should be dispersed into the Cornwallis Estuary on the ebb tide so that:

> *"my atoms and molecules will subsequently become incorporated into that unique Minas Basin detritus-driven ecosystem, one which has profoundly influenced my professional life. Given enough time, tides and chance, the probability is high that I shall be recycled through many of my favorite Minas Basin organisms, including* Elysia chlorotica. *A few molecules may even end up in preserve jars in Acadia's Biology Department."*

Each year, when the gaspereau return in the spring and the leatherbacks and shore birds are present in the summer, Sherman Bleakney will be remembered by many with respect, gratitude and affection. Long may he recycle.

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Author's note: Sherman published more than 80 works. What follows represents much of his formal output but is not a complete list. There is an obvious overlap with the Reference section.

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