responds to a lacuna of information about caribou herds and calving in the Bathurst Inlet region. Second, it documents and shares information on caribou harvesting within and beyond the community. Third, it seeks to transfer the knowledge of the diminishing number of elders familiar with harvest and uses of the caribou to the next generation of young Qitirmiut. Finally, the documentation of subsistence harvesting has direct implications on planning for exploitation of non-renewable natural resources (for example, mining). Therefore, the audience of this publication ranges from community members, including Qitirmiut youth, to public policy makers and professionals interested in northern indigenous cultures.

Written in a language that is accessible to high school students, community members, and scholars of indigenous cultures, the book also uses maps, drawings by elders and youth, and photographs to convey Inuit oral tradition on paper. Describing the significance of the caribou to the Qitirmiut, *Thunder on the Tundra* examines the human ecology (the cultural values guiding the hunting, traditional use, and preparation of caribou); the various predators of the caribou; migratory patterns and reproduction of the different caribou herds; and the effects of climate change. Unlike many anthropological studies of indigenous communities, this work speaks in the voice of the community rather than from the point of view of an outside expert. Since the work involved collaboration with elders, hunters, and even youth, the voice of the researchers is not distinguished from that of the community at large**.** Images and quotations are well incorporated into the text, producing a seamless narrative flow.

The intellectual property rights rest firmly with the people from whom this knowledge was obtained. While many northern scholars in universities give lip service to participatory research, this publication achieves it in both form and substance. The community set the research agenda to share a corpus of information based on indigenous knowledge of the caribou; it provided researchers as well as informants; it gave advice through a community advisory group; and then it produced the book.

Thunder on the Tundra is a testament to the time-tested knowledge of the Qitirmiut, whose nature can be discerned from the lore of caribou hunting and use. The knowledge is related to and contained within this group of people, who live in a specific geographic region. It informs and is formed by their cosmology or worldview, and thus it is intimately linked to the spiritual and ethical fabric, which manifests itself daily in practical expressions. For example, the etiquette of hunting and the idea of inter-household sharing in the community are closely connected to subsistence harvesting of caribou. Qitirmiut knowledge is cumulative, based on the sacredness of the past or tradition. This does not mean that tradition is fixed in a particular time or age. In fact, it is dynamic and adaptive: the Qitirmiut perceive not only the pastness of the past, but its presence, and new ideas and approaches are quickly adopted if they are seen as beneficial to the group. As a result, neither the knowledge nor its holders are homogeneous. The degree to which an individual within the Qitirmiut may hold this knowledge varies with age, gender, economic condition, and even interest in the subject, creating very permeable boundaries for its generation and transmission. Qitirmiut knowledge arises from closeness to the land and relationships with living things. In this sense, it is performative in nature, being obtained by the labour of living and the experience of subsistence hunting. Qitirmiut knowledge has an empirical trait: it is extensive knowledge of the land on which the caribou live and reproduce.

The value of presenting the knowledge of the Qitirmiut in this format is that it allows the younger generation to integrate the traditional knowledge system with that of modern science, drawing benefit from both. In fact, the best biology course or ecology field school that Qitirmiut youth can take is in their homeland. They learn directly from the seasonal rhythms and the tapestry of biotic and abiotic relationships on the land of their ancestors. *Thunder on the Tundra* can be the introductory text to such an integration of knowledge and experience.

Karim-Aly S. Kassam
Faculty of Communication and Culture
University of Calgary
2500 University Drive NW
Calgary, Alberta, Canada
T2N 1N4

FIFTY MORE YEARS BELOW ZERO: TRIBUTES AND MEDITATIONS FOR THE NAVAL ARCTIC RESEARCH LABORATORY'S FIRST HALF CENTURY. Edited by DAVID W. NORTON. Calgary, Alberta, and Fairbanks, Alaska: The Arctic Institute of North America. 576 p., colour and b&w illus., index. Softbound. US$20.00; Cdn$30.00.

Point Barrow is the farthest north point in Alaska. Sticking out between the Chukchi and Beaufort Seas, it has been a magnet for humans, Native and non-Native alike. Blessed with rich marine and land-based food resources, the area attracted Eskimo settlers who hunted caribou, seal, and whale thousands of years ago. More recently, Westerners came seeking whales for the doubly rich prize of baleen and whale oil. In 1883, a young Charles Brower came north to work in the whaling industry. He stayed more than 50 years, married an Inupiat woman, had many children, and wrote a delightful and well-known book called *Fifty Years Below Zero*. In 1947, the Navy established a laboratory at Barrow (the Naval Arctic Research Laboratory, or NARL) which, in various incarnations, has been the center of research for Arctic Alaska ever since. *Fifty More Years Below Zero* is a tribute to that laboratory and the people who worked there. The book was the product of NARL's 50th anniversary meeting and celebration held in Barrow in 1997 and sponsored by the Arctic Institute of North America.

The evolution of NARL is still underway, but briefly, it owes its start to two naval events. First, in 1923, President Harding established Naval Petroleum Reserve No. 4 (now the National Petroleum Reserve-Alaska, or NPRA) encompassing much of the Arctic Slope surrounding Barrow. Second, in 1944, as a result of concerns over oil supplies for WWII, oil exploration in the NPRA began in earnest. This intense activity, which continued for more than a decade, resulted in the development of extensive naval facilities at Barrow and Umiat, which made possible the establishment in 1947 of the Arctic Research Laboratory (ARL), known universally since as NARL. The lab itself was founded and funded by the Office of Naval Research (ONR). The need to understand the Arctic, cold weather adaptation, and particularly the Arctic Ocean, where submarines could operate under the ice, fueled much research during the next 25 years. By 1974, however, the Navy's research interests were shifting to other locations, and the cost of keeping the laboratory going was becoming a burden. A search for a new owner and source of support continued for more than a decade, but ended successfully in 1989 when the Ukpeagvik Inupiat Corporation (UIC) took over operation of the Laboratory facilities. The saga continues today: the U.S. Congress has appropriated funds for the construction of a new research facility in Barrow at the site of NARL.

More than 60 authors have contributed the 44 papers in this compendium volume, each paper recounting a different aspect of the history of NARL and the scientific work that was done (and is still being done) there. An additional 60 people have contributed letters of remembrance, of people, places, and events. Between the papers and the letters, the book fairly bristles with the energy of scientific inquiry, good times past, tried-and-true comrades of days gone by, intense experiences, and a special sense of adventure that seemed to underpin virtually all of the Arctic research that took place at NARL. The book also paints a rich picture of the symbiotic relationship that has existed between NARL's scientists and the Native peoples of Barrow for more than 50 years, a relationship that continues today in even more interesting ways, now that the local Native corporation (UIC) owns and operates the NARL facility. This book is less about an institution than about the deeds and histories of a scientific generation with an Arctic passion, a generation that is now moving on. So many well-known, senior Arctic science names and faces appear within the pages of this book as young, fresh-faced graduate students and workers as to provide a palpable sense of that passing generation. While the book probably holds the most value for those people whose lives were in some way intertwined with NARL and Barrow during the past 50 years, it may in the long run serve its most useful purpose as a bridge between one scientific generation and the next. For new and even not-so-new Arctic researchers with ties to Barrow, here is all the history and anecdotes your thesis advisor never got around to recounting. There is a place for this book on most Arctic researchers' bookshelves.

One thing the book is not, however, is a cohesive linear history of the research activities that took place at Barrow between 1947 and 1997. Such "institutional" histories must exist in various forms in agency and naval archives, where they are probably best left to gather dust until picked up by professional historians. Here instead is a wide mix of papers, some superb, some less interesting, on various aspects of research in and around Barrow. A list of topics illustrates this wide range: a paper on Pete Sovalik, a Barrow Native who worked at NARL and was an essential contributor to the early studies on animals; a paper detailing Howard Feder's year-round sojourn at Barrow as a graduate student in 1949; a paper on the coastal processes on the North Slope of Alaska; one on the bioenvironmental research done at Barrow during the IBP tundra biome project; a paper on marine mammal research and the role it has played in maintaining subsistence hunting of whales; a paper on the oceanography of the Chukchi Sea.

Some of the papers are top-notch scientific reviews that might easily appear in the *Journal of Geophysical Research* or some other scholarly journal. These papers contain extensive reference lists that are an invaluable resource for those doing Arctic research. Some of the papers are organization histories that have interest because they detail how the science was implemented. Other papers are more personal, providing a glimpse of the people of Barrow and NARL and the historical events they lived through. For me, these human stories are the heart and soul of the book. At the risk of alienating some fine authors, it is worth taking note of a few "must-read" papers. There is Ray Dronenburg's humorous account of refitting and operating the shallow-water boat *Alumiak* during the research under the Outer Continental Shelf Program. Captain Leonard LeSchack's account of parachuting onto Soviet ice station NP-8 for the CIA is so tantalizing that I have been attempting to obtain a copy of his book on that daredevil project. Tom Albert's thoughtful discussion of Harry Brower, Sr. (son of Charles Brower) and how he aided the bowhead whale research at Barrow is essential reading for those trying to understand Barrow, Eskimo whaling, and some of the issues involved in cultural subsistence hunting. Finally, Craig George's sidebar on tending Irish, NARL's captive polar bear, is a delightful piece of writing. Among the letters, several stand out. Max Britton's explanation of how the Office of Naval Research "worked" is excellent, while the remembrances of John Kelley and Karl Stone make pleasant and often humorous reading.

There are a few things that could have been done better. First, the order of the papers is confusing. In order to follow the thread of the development of NARL from 1946 to the present, one needs to read the Foreword, Paper 1, Paper 5, Paper 27, Paper 29, Paper 31, Paper 35, and Paper 42. There is very little history related to inland areas south of Barrow, even though much of that research was supported from NARL. In particular, the tremendous efforts that went into exploring the NPRA, while not directly a legacy of NARL, are an essential piece of the scientific

activity that was taking place during the five decades that form the focus of the book. The binding of the book, essentially a thick, softbound report, could be better and longer lasting (some of the pages of my copy had fallen out by the time I was done reading it), though cost constraints undoubtedly forced this choice on the editor, and it has kept the book at an affordable price.

In summary, *Fifty More Years Below Zero* is a book that anyone doing research in Arctic Alaska with even the least interest in what went before will want to read. Readers are probably best advised to choose the papers they read judiciously, but there are many good ones to choose from. In the end, the papers they read will give them a better understanding—and appreciation—of the work and spirit of the past five decades.

Matthew Sturm
U.S. Army Cold Regions Research
& Engineering Laboratory-Alaska
P.O. Box 35170
Ft. Wainwright, Alaska, U.S.A.
99703-0170

BY AIRSHIP TO THE NORTH POLE: AN ARCHAEOLOGY OF HUMAN EXPLORATION. By P.J. CAPELOTTI. 1999. New Brunswick, New Jersey: Rutgers University Press. xxiv + 211 p., b&w., illus., notes, bib., index. Hardbound. US$26.00.

ARCTIC MISSION: BY AIRSHIP AND SUBMARINE TO THE FAR NORTH. By WILLIAM ALTHOFF. 1999. Auckland, New Zealand: Lighter-Than-Air Institute. (2nd rev. ed. 2000). xx + 291 p., colour illus., notes, bib., index. Hardbound. US$49.95.

Hasn't virtually every Arctic investigator pinned to the earth's flattish surface dreamt of floating overhead in a balloon or a blimp to get a better look downward? About five years from now (2007), we shall pass the 100th anniversary of the first dirigible flight within the Arctic Circle, and a year later the 50th anniversary of the sixth and last major penetration of the Arctic by lighter-than-air craft—so far. Two books appeared by coincidence in the same year, one describing dawn, the other sunset on dirigibles' role in Arctic exploits. The brief era's 'bookends' are authored by serious scholars; each one refreshes our memories of forgotten events and the periods within which they took place.

Capelotti's *By Airship to the North Pole* raises the curtain on dirigibles operating within the Arctic Circle. He tantalizes readers with his interdisciplinary subtitle. The interdisciplinary tactic of industrial-age archaeology has proven to be fertile ground for one writer addressing controversies surrounding the *Titanic* (Pellegrino, 2000). For cognitive dissonance, Capelotti might have subtitled his book "an archaeology of early aviation." His central character, Walter Wellman, Chicago journalist and polar aeronaut manqué, is a victim of compressed technological revolution sweeping the international fraternity that coveted attainment of the North Pole between 1894 and 1910. Those years when Wellman was part of the polar scene ushered in widespread use of wireless communication, the internal combustion engine, and heavier-than-air flying machines. Wellman's dirigible, *America*, was twice modified in France with funding provided through his employer, the Chicago *Record-Herald*, as if to punctuate his three polar attempts of 1906, 1907, and 1909. Substantial improvements to the "car," the engines, propellers, and size of *America* failed to give her the appearance we associate with the airworthiness of later designs, like Roald Amundsen's *Norge* and Umberto Nobile's *Italia*, airships that successfully attained 90˚N a couple of decades later, in 1926 and 1928, respectively.

America's puny appearance belied the airship's appetite for money from private fundraising. She was the first gasoline-powered heiress to French expertise in balloons to be airborne within the Arctic Circle. Her bills amounted to the equivalent of US$10–15 million today. Wellman was undeniably a world-class fundraiser. His prowess as promoter, fundraiser and author notwithstanding, Wellman's reputation among polar explorers had sunk to somewhere between 'forgotten' and 'discredited' by the 1990s. P.J. Capelotti undertook to give Wellman fair hearing for historical resurrection and validation through archaeological investigations.

Virgo Bay in Svalbard (Spitsbergen) was the same bay from which three Swedish balloonists, led by Salomon August Andrée, had set out to be blown by southerly winds to the pole. In 1897, their "free" hydrogen balloon *Örnen* (*Eagle*) lofted them to oblivion. For 33 years, the trio was assumed to have perished on the pack ice without a trace (except for a couple of messages delivered by carrier pigeons released from the still-airborne balloon), far from land or any hope of return to it. Wellman's pole-hopeful dirigible was barely more than an elongated balloon, powered by gasoline-engine-driven propellers, which the journalist readied for flight less than a decade after Andrée's disappearance. *America* was designed to correct flaws in the configuration of the unpowered balloon that polar commentators blamed for the Swedes' disappearance. The technological innovations between the Andrée launch and the Wellman launches assume pivotal importance, especially in the mind of an investigator qualified to evaluate and compare the "material culture" at the two launch points within sight of each other in Virgo Bay.

Real aficionados of Arctic history could stage a fanciful tournament of "what ifs?" by imagining the consequences of prompt finding of Andrée's survival camp, logbooks, and bodily remains of the trio on White Island. All were found, of course, 33 years after the balloonists' disappearance, by which time Roald Amundsen and Umberto Nobile had each reached 90˚N in their carbon-copy dirigibles. Wellman's feeble attempts to improve on Andrée's