

southern and settler perspectives (for example, Harper, 1955; Barr, 1991). It was only much later that I read and began to incorporate perspectives from Indigenous observations and knowledge (e.g. Oskal et al., 2009; Burch, 2012) into my understanding of species dynamics. *Arctic Crashes* is the book I wish had been available 40 years ago, and I highly recommend it to everyone interested in the ecology and management of Arctic wildlife, past, present and future, through an inclusive lens of human-animal relations.

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MOUNT LOGAN & THE ICEFIELDS: YUKON FLYING ADVENTURES. By ANDREW WILLIAMS. Whitehorse, Yukon: MacBride Museum. 2021. ISBN 9780986764943. 142 p., maps, b&w and colour illus., notes. Softbound. Cdn\$45.00.

The aviation history of the high icefields, situated along the Yukon border with Alaska and including Mt. Logan, is among the most intriguing and least documented of Canada's national stories. While this unusual and wonderful book does not purport to be a history, it presents a first-hand account by one of its leading figures. The book came together through a public talk by Andy Williams at the MacBride Museum in Whitehorse and the determination of the museum's director, Patricia Cuning, who edited and augmented the text. Williams, as described in Cuning's preface, is "an Ex Royal Marine Commando, an Antarctic surveyor, a research station manager on two continents, and a mountain climber. He is also one of

the most experienced mountain flyers [who] flew Logan and the Icefields for over forty years." The book has an abundance of colour photographs and the gloss of a coffee table book but is more than that: Williams writes well and has good stories to tell. Some of the photos are exceptional, including many by Lance Goodwin, Williams's late son-in-law. Others are grainy and journalistic, taken by amateur photographers with the cameras and films at hand. These images show early aircraft landings on glaciers, profoundly damaged planes, scientists and climbers at work, and views of camp life. The book is a compendium rather than a linear narrative. Individual sections, sprinkled with anecdotes, can be read at random with little confusion and no loss of enjoyment.

A flight into the St. Elias Mountains is never a lighthearted pleasure trip, but one requiring careful planning and steely nerves. The weather can be fierce and there are few good choices for unplanned landings. For decades the impetus for air travel in these mountains has been to support scientific and mountaineering expeditions. Thus, the aviation history is inextricably linked with the scientific and mountaineering histories. In the early years these histories were unified by the towering figures of Bradford Washburn and Walter Wood. Separately, Washburn and Wood did many first ascents in the Icefield Ranges. Washburn went on to found the Boston Museum of Science and Wood led scientific expeditions, culminating in the Icefield Ranges Research Project, sponsored by the Arctic Institute of North America (AINA) and the American Geographical Society.

Aircraft support for scientific work in the icefields began with Project Snow Cornice (1948–51) organized by Walter Wood and backed by AINA. The field site was on a high snowfield of Seward Glacier, near the flanks of Mt. Vancouver, where ski-equipped aircraft could be safely landed—although not always. Few, nowadays, would think of landing a light plane as an experiment but this was certainly the case for glacier pilots. Mainly it was the planes that received the damage, and the pilots needed all their courage and ingenuity to save their aircraft and limp them back to safety.

The High Altitude Physiology Study (HAPS) lead by Charles Houston, famous for his early climbs on K2 and his contributions to mountain medicine, was the catalyst for most of the flying adventures described in *Mount Logan and the Icefields*. HAPS ran from 1967–80 and was based at AINA's Kluane Lake Research Station (KLRS) on the Alaska Highway near Silver City, Yukon. The project involved moving volunteer "subjects" to a rudimentary camp at 5250 m (17,500 ft) on a high icefield of Mt Logan and, using laboratory-grade medical equipment, measure the effects of elevation on these subjects. This sounds scientifically challenging but the greater challenge was logistic: how safely to move scientists, subjects, and tons of equipment to an elevation that was far above the reach of helicopters of the day and well above the accepted range for fixed-wing aircraft.

For me Williams's account of the HAPS project was the best part of the book. It weaves the story of Philip Upton, a remarkable aircraft, and the metamorphosis of Andy Williams from camp manager at KLRS to Canada's premier high-altitude mountain pilot. Upton was AINA's chief pilot from 1961 until his retirement around 1980. When HAPS was conceived, the Institute's sole aircraft was a short takeoff and landing fixed-wing Helio Courier which "worked well to altitudes up to 10,000 ft" (p. 33). The Helio had a minimum cruising speed of 28 mph (45 km/h), ideal for limiting damage if landings went awry. But landings at a high camp on Mt Logan were completely out-of-reach. Addition of a turbo charger, a backup aircraft with the same capabilities, and a pilot with skills to match Upton's became essential. The latter proved to be a hard nut to crack. A succession of backup pilots accounted for a succession of discouraging and costly mishaps. In the search for a suitable backup, Upton reached the conclusion that it was easier to teach someone with good judgement how to become a pilot than to teach good judgement to a trained pilot. Williams became the obvious candidate. Upton had been an RCAF pilot in WWII and subscribed to the Stefansson credo that adventure is a sign of incompetence. At the time he was regarded as North America's finest mountain and glacier pilot. Under Upton's tutelage, Williams earned his pilot's license in record time and, soon after that, completed his first solo flight to the HAPS camp.

Together Upton and Williams wrote a short guide to *Aircraft and Flying Conditions* (reproduced in this book) that summarized the hard-won lessons they learned while flying Helio Courier aircraft in the icefields. Their guide borders on the hair-raising, but accurately reflects the complexity of the work and the need for full concentration and cool-headedness. Here is an excerpt on page 96 concerning strategies for avoiding landing in crevasses:

Snow-covered glaciers are moving, and movement means crevasses. In many areas they are all too visible and are to be avoided. Even on small glaciers crevasses can be deep and dangerous, but the ones which are most dangerous are those that are snow "bridged" or covered so that they are nearly invisible. Usually, even a well "bridged" crevasse is marked by a slight depression in the surface which is visible from the air as a different shading on the snow surface. Always make a careful inspection of the area as you fly around it, to take advantage of the available light from different directions which will show the "shadows" of the crevasses. If you should have to make a forced landing in a known crevassed area, land across them unless the space between them looks broad enough. Avoid going across on one ski since your aircraft has a lesser "footprint" on both skis. If you do go into a crevasse, care should be taken in any movement in or around the aircraft to prevent it going in deeper.

Mount Logan and Icefields is a generous book that is aimed at a wide readership. Considering the production quality, it is excellent value. It should appeal to Yukon residents and tourists, to those interested in mountains and exploration, and to the scientists, climbers, and wilderness travelers who know this remarkable landscape.

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