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RACE TO THE POLAR SEA: THE HEROIC ADVENTURES OF ELISHA KENT KANE. By KEN McGOOGAN. Berkeley, California: Counterpoint Press, 2008. ISBN 978-1-58243-440-7. xii + 381 p., maps, b&w illus., selected bib., index. Hardbound. US\$26.00.

Born in Philadelphia on 3 February 1820, Elisha Kent Kane died in Havana, Cuba, on 16 February 1857, at the young age of 37. From about 1835 onwards, he suffered repeatedly from rheumatic fever and heart disease, but he refused to allow his health problems to constrain his activities. After initially studying geology at the University of Virginia, he switched in 1840 to medical studies at the University of Pennsylvania, graduating in 1843, and soon thereafter passed the exam necessary to become a naval surgeon.

Over the next seven years, Kane traveled to many parts of the world on board U.S. naval vessels—and was invariably partially incapacitated by seasickness. His adventures ranged from descending into the crater of a volcano on Luzon in the Philippines, during which he was almost overcome by the fumes, to contracting malaria while in Dahomey during a voyage to suppress the slave trade, to being wounded in the stomach by a lance-thrust in a skirmish between guerillas supporting the U.S. Army and Mexican troops in 1847.

But then, on 21 May 1850, he joined the USS *Advance* (Captain Edwin J. De Haven) at the Brooklyn Naval Yard, bound for the Arctic in search of the missing Franklin expedition. Funded by the New York shipping magnate, Henry Grinnell, *Advance* headed north, accompanied by the USS *Rescue* (Captain Samuel Griffin). After negotiating the ice of Baffin Bay, the two American ships made rendezvous with a small fleet of British vessels at Beechey Island: Captain Horatio Austin's squadron (HMS *Assistance*, *Resolute*, *Pioneer*, *Intrepid*, and *North Star*, Captain William Penny's two ships, *Lady Franklin* and *Sophia*, and Captain Sir John Ross's *Felix* and yacht *Mary*). While the British ships soon went into secure winter quarters, the two American vessels became beset in the ice of Wellington Channel on 13 September 1850. They first drifted north for almost the full length of that channel, then back south, east through Lancaster Sound and south through Baffin Bay and Davis Strait, and were finally released from the ice

on the west side of Davis Strait on 8 June 1851. *Advance* had been severely damaged by ice pressures, and many of her complement (including Captain de Haven) were suffering acutely from scurvy. The ships reached New York on 30 September 1851.

Kane began writing his account of the expedition (Kane, 1853) and gave numerous lectures on the subject. In November 1852, he first met Margaret (Maggie) Fox and her sister Kate, who were already famous as “spirit rappers,” spiritualists who claimed to be able to converse with the dead. Kane became infatuated with Maggie, and later even became secretly engaged to her.

But in the meantime, Kane had headed back to the Arctic, leading his own expedition. Working on the assumption that Smith Sound might lead to the “Open Polar Sea” where, Kane argued, Franklin's ships, *Erebus* and *Terror* might have become trapped, he proposed pushing north through that sound. He sailed from New York, again in *Advance*, on 31 May 1853, and ran north through Davis Strait, Baffin Bay, and Smith Sound into the basin later named after him. But by 10 September, ice conditions had forced him to go into winter quarters at Renssaeler Harbour (Renssaeler Bugt) on the southeastern shores of Kane Basin. In the fall, sledge parties from the ship explored the Greenland coast eastwards and northwards, discovering the impressive ice-front of the Humboldt Glacier (Gletsjer). In the spring of 1854, Kane and two of his officers explored the Greenland coast even farther north, to the entrance of Kennedy Channel, and in June and July, steward William Morton explored the Ellesmere Island coast to the vicinity of Franklin Island. In the early fall of 1854, with Kane's consent, the surgeon Isaac I. Hayes and eight companions set off south, hoping to reach Upernavik, but in December ice conditions forced them to return to the ship. In May 1855, Kane and his men abandoned *Advance*, and with the help of the Inughuit, with whom they had been in contact since the spring of 1854, set off south on foot and by boat. They reached Upernavik in early August and New York on 11 October 1855.

Kane immediately started writing his account of the expedition (Kane, 1856). Having completed the book and having secretly married Maggie Fox, despite his rapidly deteriorating health Kane traveled to London in 1856, in part to discuss with Lady Franklin the possibility of a further expedition in search of her husband and his missing expedition. Then, in the hope that the more salubrious Caribbean climate would be beneficial, he traveled to Havana. There he suffered two strokes and died.

McGoogan has written a readable (and at first sight, well-researched) biography of Kane. But a closer perusal will reveal that it leaves much to be desired. In the very first paragraph, he produces a distortion of the facts that inevitably leads one to doubt the reliability of the detail in the remainder of the book. He describes how “a sailor came stumbling over a nearby ridge” to where “Kane stood talking with several naval officers on the icy, snow-covered shores of Beechey Island” (p. 1) to announce that graves from the Franklin expedition had been found. In reality Kane and

Captain De Haven were talking to Captain William Penny on the deck of his ship, *Lady Franklin*, when the sailor came racing out across the sea ice from shore. One wonders what McGoogan's intended purpose was in thus "improving" on the facts.

Another of McGoogan's unacceptable habits is to simply repeat Kane's idiosyncratic terminology for sea-ice features, rather than translating them into the accepted, official terminology. Thus he repeatedly uses the term "ice tables" which appear to be simply floes. Another of his undefined, much-used terms is "ice-belt"; by this, he appears to be referring in some places to the fast ice, i.e., the sea ice attached to the land, but rising and falling with the tide; in other places, "ice-belt" appears to mean the ice foot, i.e., the ledge or shelf of ice firmly frozen to a rocky coast. Elsewhere (e.g., on p. 159) he refers to a "crevasse" in the sea ice, a term that normally refers to a feature of glaciers; one suspects that he meant a narrow lead. These obscure terms do not enhance the clarity of his text.

The same remarks apply to his use of ornithological terminology, in which he again follows Kane quite uncritically. On p. 197, he refers to "snowbirds"; these were snow buntings (*Plectrophenax nivalis*). On p. 203, he refers to "sea swallows," presumably Arctic terns (*Sterna paradisaea*). Two paragraphs later, he mentions "mollemokes," which was the whalers' name for the northern fulmar (*Fulmarus glacialis*). And on p. 290, he mentions "lummes"; this term, sometimes also rendered as "looms," was the name whalers used variously for the black guillemot (*Cepphus grylle*) or the thick-billed murre (*Uria lomvia*). A conscientious author would not leave it to his readers to research these archaic terms.

Another area where there is room for improvement is the use of place-names. The author insists on using the outdated Danish names for settlements in Greenland, most of which have been replaced by indigenous names. Probably the best solution would be to follow the older name with the present official name following in parentheses. Thus the settlement that McGoogan identifies as Lievely, on Disko Ø, also then known as Godhavn, is now Qeqertarsuaq; Fiskerenaes (properly Fiskenaeset) should be rendered as Qeqertarsuaq; Sukkertoppen as Maniitsoq, and Prøven as Kangersutsiaq.

With regard to several aspects of Kane's life, McGoogan has made a deliberate attempt to inflate his achievements, i.e., to make his role appear more important than it was in reality. For example, following Bolles (1999), he claims that Kane's description of the Humboldt Gletsjer "enabled and equipped scientists to conceive of the ice Age" (p. 195). This is a patent exaggeration of Kane's role. As early as 1837, after a sequence of observations by Swiss hunter J.P. Perraudin, engineer I. Venetz, and scientist Jean de Charpentier, each building on his predecessors' conclusions and deducing (largely from terminal moraines and erratics) that the alpine glaciers had once extended farther down-valley, Jean Louis Rodolphe Agassiz had concluded that an ice cap had earlier covered much of Europe as far south as the

Mediterranean, as well as much of North America (Chorley et al., 1964; Imbrie and Imbrie, 1979). By 1840, Agassiz had even convinced such die-hard British diluvialists as William Buckland and Charles Lyell of the reality of the Pleistocene glaciations. Thus, Kane's description of the ice-front of Humboldt Gletsjer and his deduction from it as to the general configuration of the Greenland Ice Sheet simply added weight to what had been logically deduced over a decade earlier.

McGoogan is again guilty of exaggeration in describing the Humboldt Gletsjer variously as "the largest glacier in the northern hemisphere" and "the greatest glacier on earth" (p. 161). Firstly it can be argued that the Humboldt Gletsjer is not a distinct, separate glacier, but rather a particularly long section of the periphery of the Greenland Ice Sheet, reaching the sea in an impressive ice-cliff (100 km long and 91 m high). In fact, the largest glacier on Earth is the Lambert Glacier (96 km wide, 400 km long, and about 2500 m thick) in East Antarctica, flowing down from the Antarctic Ice Sheet to the Amery Ice Shelf. And the Humboldt Gletsjer does not even represent the longest ice-front in the Northern Hemisphere: that distinction belongs to the east and southeast front of the Austfonna on Nordaustlandet, Svalbard, some 185 km long, while there are numerous stretches of ice-cliffs longer than the Humboldt Gletsjer around the periphery of Antarctica.

In similar fashion, McGoogan exaggerates or inflates Kane's escape after abandoning *Advance*, "the most extraordinary escape in Arctic history" (p. 361) "that would not be challenged...until six decades later" by Sir Ernest Shackleton's escape from *Endurance*, which was crushed by the ice of the Weddell Sea in 1916. While Kane's escape (covering some 80 km on foot and some 900 km by boat from Kap Alexander to Upernavik) is indeed impressive, there are several other examples that match or outclass it—and all before 1916. One thinks of Willem Barents's crew's escape by boat in 1597 from Ledyanaya Gavan' on northeastern Novaya Zemlya all the way south to Kol'skiy Poluostrov (De Veer, 1876), a distance of some 1200 km. A further impressive example is the escape of Karl Weyprecht and Julius Payer and their men, who traveled by boat from their ship *Tegetthoff*, beset in the ice off the southeast coast of Zemlya Frantsa-Iosifa, to Mys Britvin on the south island of Novaya Zemlya, a distance of some 840 km (Payer, 1876). But in many ways all of these escapes, including Kane's, were eclipsed by that of George Tyson and half of the crew of Charles Hall's ship, *Polaris*, who drifted on an ice floe from Smith Sound for the full length of Baffin Bay, Davis Strait, and most of the Labrador Sea, almost to Battle Harbour, Labrador, a distance of some 1200 km, over the winter of 1872–73 (Blake, 1874). In short Kane's escape was not unique; there are many comparable examples in the history of the Arctic, of which these are only a sample. This is yet another example of McGoogan's attempts to inflate the significance or impressiveness of Kane's achievements—achievements that were certainly impressive enough without McGoogan's exaggerations.

A final criticism concerns the incompleteness of the bibliography. At many places, McGoogan quotes from books by members of Kane's second expedition, including Robert Goodfellow, Hans Hendrick, Christopher Hicky, and Amos Bonsall, but not one of these works appears in the bibliography. Admittedly this is termed a "Select Bibliography," but it certainly ought to contain all the works from which McGoogan has quoted.

In short, while the uncritical reader may perhaps find this "a good read," the discerning reader will soon detect that this biography has been rather carelessly researched.

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RIVER ICE BREAKUP. Edited by SPYROS BELTAOS. Highlands Ranch, Colorado: Water Resources Publications, LLC, 2008. ISBN 978-1-887201-50-6. xvi + 462 p., colour & b&w illus., references, index. Hardbound. US\$85.00.

This publication was sponsored by the Canadian Society for Civil Engineering and Canadian Committee on River Ice Processes and the Environment (Hydrology Section of the Canadian Geophysical Union). The intent of this book was to update an earlier (1995) publication and bring together

a substantial body of knowledge that had been published in a wide assortment of conference proceedings, technical reports, scientific journal articles, and books and to identify key gaps in current knowledge.

The book attempts to bridge the gap between earlier, largely empirical, approaches to studying river ice breakup and more recent theoretical approaches, with emphasis on prediction. The theoretical approach uses quantitative application of the thermodynamics of heat transfer, hydrology, hydraulics, and ice mechanics. Beltaos acknowledges both the complexity of predicting these processes and the typical lack of detailed information on channel geometry, bathymetry, stream bed slope and tortuosity, hydraulics, and hydrology, which require a balance between using quantitative approaches and applying qualitative or empirical relations. Engineers and water resource managers will find many examples of how to apply quantitative approaches using approximations or empirical relations to estimate requisite variables where local data are lacking. In this sense, the book succeeds in its primary objective of providing a framework for obtaining and applying a better understanding of river ice breakup that can be practically applied even when data are incomplete.

This book synthesizes a large body of scientific work on river ice dynamics, with chapters written by experts in their respective disciplines. The book begins with an introduction describing the significance of ice breakup and the potential for flooding and risks to public safety and infrastructure. The following chapters give qualitative descriptions of the river ice cycle on Canadian rivers (Chapter 2), the breakup process (Chapter 3), and heat transfer and ice decay (Chapter 4). Chapters 5 to 8 describe and quantify the processes of pre-breakup, the onset of breakup, ice jamming, and ice jam releases. Particularly informative is Chapter 6 on the onset of breakup, which draws heavily on early Russian literature that would be difficult for most readers to access. The conditions favoring formation of ice jams and subsequent dynamic ice structural failure, breakup, and potential flooding are described in detail and in contrast to the conditions favoring a more gradual thermal decay. The chapters on ice jamming and breakup contain many excellent figures illustrating the physical concepts discussed. Of special significance is the discussion of the potentially very destructive flood waves (javes) that can accompany breakup of major river ice jams.

Chapter 9 deals with the development of ice-affected river stage (water level) frequency curves, or the probability that a given stage will be exceeded. It is noteworthy that the presence of ice can result in stages well above those predicted during open water conditions, and consequently, the presence of ice can greatly increase the risk of flooding. Chapter 10 is a synthesis of the previous chapters towards the ultimate goal of forecasting ice breakup. The final two chapters deal with ecological effects (Chapter 11) and river ice breakup in the context of a changing climate (Chapter 12).

The book contains many useful examples of practical implications of the quantitative relations governing ice