

2000 expedition photographs to be lodged in the British Antarctic Survey archive. As might be expected in an account of surveying expeditions, the eight maps supporting the text are clear and informative.

Essential logistical support, including transport to and around South Georgia, was provided by the whaling companies then operating around the island, with Salvesen of Leith to the fore. However, once they had been landed on remote beaches the survey teams were very much alone, the excessive weight of the necessary batteries even precluding radio communication. Inland surveying work required triangulation sites on high vantage points that were accessed by man-hauling sledges up and along the principal glaciers to establish base camps. It was difficult, arduous work and dangerous too, with several near disasters. The result was the publication in 1958 by the Directorate of Overseas Surveys of DOS 610: South Georgia at a scale of 1:200 000. This remained the definitive map of the island until superseded in 2004 by an edition based on satellite imagery. Alec Trendall provides a fitting tribute to the men who made it happen, principal amongst whom was Duncan Carse. Woven into the survey story is biographical detail about this complex character, best remembered by older members of the British public as the radio voice of Dick Barton - Special Agent, but probably better known in Antarctic circles for his role in the 1934–37 British Graham Land Expedition. Carse's lifelong ambition, ultimately unrealized, was to emulate his hero, Shackleton, and lead major Antarctic exploration. In 1953 he distributed plans for a Transantarctic expedition, and conceived the South Georgia surveys as a means of improving his credentials for leading such an undertaking. Trendall's assessment is sympathetic but honest: as a leader Carse could be inspirational but also infuriating - and at some crucial moments simply absent, with depression and alcohol both contributing.

Alec Trendall's book can be thoroughly recommended and is an important contribution to the South Georgia literature. It is a delight to read, is superbly illustrated, is candid in its description of events and in passing exposes one or two myths. Quite apart from the detailed accounts of the surveying work and the topography of South Georgia, there are first-hand descriptions of life in the whaling industry and fascinating insights into the backroom manoeuvrings amongst the Antarctic élite as British science and exploration policy evolved through the early 1950s. And perhaps most important of all, *Putting South Georgia on the map* invites long overdue recognition for a remarkable pioneering venture.

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Cold region hazards and risks

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Living (as I do) in a city where it is not particularly unusual to have a daily commute with temperatures in the -40°C s, where snow can be several metres deep, where ice jams on the local river have caused flooding of both industrial and residential areas, and where roads are commonly closed due to avalanches, this book deals with what are realities for many of us. One simply does not drive without survival clothing in the car and we keep adequate cooking equipment and clothing in the house against possible power failures due to ice storms or trees falling on power lines. Of course, the other side of the coin is that we can cool beer quickly by just putting it outside - the "cold region risk" being leave it too long and it may freeze! While cold region risks apply to many of us in association with our fieldwork, it is surprising just how many people do live with such risks as part of their daily (winter) life and for whom much of what is in this book is not exceptional. That said, this is a wonderful text dealing with a broad-based topic that has not been (to the best of my knowledge) dealt with in such an extensive way before. Also it deals with issues for both poles, extensive non-polar regions that experience cold, as well as mountains regions. It is truly all-encompassing. Further, it brings home how cold region events in one part of the world may well affect those of us living in warmer climes - certainly the unseasonable destruction of grapes due to cold in, say, Argentina may well impact the price of my wine in England, coastal flooding of many countries due to melting land ice being at the more serious end of that scale.

The book is divided into 11 chapters plus has extensive references, as well as a most useful glossary and a section on acronyms. The book covers all attributes I could think of except for the hazard (very real to some of us) of car-animal (especially moose) interactions, which can be a major year round risk and one exacerbated in winter by driving conditions (blizzard, icy roads etc), or that of thermal shock weathering to windscreens - on c. 60% of the cars where I live one can see (and I have experienced) large cracks in the windscreen which are parallel to the dashboard and are created by the car's heater impacting a

windscreen that is at -35°C . The chapters (each with many well identified sections) are, in order: Arctic sea ice, Ice sheets, Icebergs, Glaciers, Glacier lake outburst floods, Permafrost, Snow avalanches, River ice, Winter storms, and Conclusions. The book contains a host of useful, clear and pertinent figures, many of which are maps and diagrams that, by and large, are very clear and useable. In addition, the book has a number of 'boxes' dealing with specific cases or examples of information germane to that section. Taken overall, the figures, tables and boxes provide a superb host of information and detail which, by their extensive use, does not clutter or impact the actual text, which is easy to read. Indeed, it is hard to do justice to the sheer amount of information provided in the book. To that end, the book provides a valuable resource for a whole range of data: be it ice thickness versus ice strength (Table 2.1), empirical constants for iceberg life expectancy (Table 4.5), typical avalanche velocity estimates (Table 8.1), avalanche fatalities by age (Table 8.8), or the aggregate impact of snow on one country (Canada) during one year (Table 10.4). There is simply something of interest pretty well for everyone and for a large number of academic disciplines ranging from First Nation studies (see Box 2.1) through to engineers (see Chapter 9 on rivers and ice jams)! Further, not only does it deal with specific risks and hazards but, in so doing, it also provides useful background information on many topics, e.g. how a thermosyphon works (Fig. 7.14) or how river ice develops (e.g. Fig. 9.6). What is also interesting is that at the end of each section there is a useful summary as well as, in most chapters, a section dealing with possible mitigation procedures or approaches. Taken overall, the work provides both an historical basis as well as recent research with references coming up to 2009 (which is excellent for a book published in 2011)!

After a brief introduction noting that the book is about ice and hazards associated with this, there follows a foundational background to the Arctic sea ice which leads in to some of the associated direct and indirect hazards of sea ice and to potential problems associated with its loss as a result of climate change. From sea ice the chapters move to ice sheets (Antarctica and Greenland) and from there to icebergs. Beginning, perhaps not surprisingly, with the sinking of the *Titanic* in 1912 we come up-to-date with this self-same iceberg hazard as it impacted the *MS Explorer* in Antarctic water in 2007. From icebergs, and the many hazards linked to them, the next chapter (5) deals with glaciers - the problems on glaciers themselves (e.g. crevasses), of avalanches from glaciers (as in Peru in 1962 when 4000

people were killed), and surging glaciers as well as retreating glaciers - the latter clearly being the more topical and pertinent concern at this time. There then follows the risks associated with glacial lake outburst floods (GLOFs) - their causes as well as the economic, social and practical (e.g. engineering/mitigation) outcomes. Chapter 7 deals with permafrost, both the hazards associated with it and those with its loss. Here there is also substantial consideration of geotechnical problems associated with permafrost - for buildings and for pipelines - the latter currently a major issue in North America. Chapter 8 deals with snow avalanches, a hazard that claims many lives each year and has economic and social impacts in terms of closing roads and damaging infrastructure in many mountainous areas. Chapter 9 deals with ice jams and ice roads associated with river ice - something of which many of us are now more aware through television programmes such as "Ice Road Truckers" (a programme that certainly highlights risks and hazards of winter driving in the north!). Certainly a possible future problem will, for many isolated communities, be the loss of winter ice roads due to global warming: risks and hazards being a function of perspective. Chapter 10 brings in the ice storms and blizzards - the overall impact of the 1998 ice storm in Canada (Table 10.3) being astounding in its extent: 80 hours of freezing rain producing ice (on everything) up to 100 mm thick, wrecking 1000 power pylons (at \$100 000 each), 2.6 million people unable to get to work, and a financial loss in the order of \$5.1 billion! Finally, Chapter 11 on "The future" paints a somewhat bleak picture that will, like it or not, wherever one may live, have an impact of some kind - probably financial.

So, personally, I found this an enormously engaging book, that was easy to read, filled with fascinating facts and information and a sound foundation for supplementary reading in a whole host of courses. With no other book covering the wide range of topics dealt with here, it is a wonderful resource and, as such, has created a market niche for itself. The universal utility of the book is helped by the cost being very reasonable, especially for the finished quality, the colour illustrations, and its depth of information, the more so given the price of many textbooks today. I suspect this is a text that will be of interest to many outside of academia and that it will be a useful addition to many a personal library. I certainly really enjoyed reading it and learned a great deal - a great job!

KEVIN HALL