

OTHER

Antarctica – Global Science from a Frozen Continent

Edited by David W. H. Walton. 2013. Cambridge University Press, University Printing House, Shaftesbury Road, Cambridge, UK, CB2 8BS. 342 pages, 35.00 GBP, Cloth.

When I was first offered the opportunity to review this new book, I was a bit reluctant as I didn't feel qualified to peer review scientists who are experts in their field, but upon reflection, it became clear that a layperson, who knows something about Antarctica, is exactly the right one to assess this book. Why? Well, because if I can understand these complex concepts then they've done their job well. The book is edited by Professor David H. Walton of the British Antarctic Survey, well-respected for his expertise on Antarctica. He is joined by thirteen co-authors from around the globe, each of whom has added a chapter focussing on their area of expertise.

I wasn't exactly sure what the intended focus of the book was or who the target audience would be, so I read it presuming it was designed for academia AND people generally interested in Antarctica. This presumption served me well for each will have an interest in different parts of the book.

Dr. Walton opens the book with a brief but interesting history of the early exploration of Antarctica, starting with the presumed presence of this unknown land, *Terra Incognita*, as early as 1531 and culminating with the establishment of the International Geophysical Year in the 1950s. It is this latter accomplishment that set the groundwork for the protected status Antarctica enjoys today. This was a very interesting chapter and my only wish was that it could have been more inclusive of the details of some of the wonderful expeditions that visited Antarctica and revealed its wonders to us. The author waxes a bit poetic when he publishes two poems about Antarctica that add little value to the book, from my perspective, but do demonstrate the scope of people's interests, particularly from an artistic perspective.

As the chapters unfold, we first learn much about Antarctica through a surprisingly understandable geological overview of this complex continent. The author provides concise information that explains how Gondwana morphed to become, in part, Antarctica and he delves into the secrets hidden under the ice, such as 200 km long Lake Vostok, hidden mountain ranges and fossilized tropical plants and animals, reflections of the landscape that preceded this icy empire. More hints at what lies below are revealed by emergent nunataks, poking their head above the ice, and by active volcanoes in the north that show the restless foundation on which Antarctica sits. It is with this chapter that the reader is tantalized for what is to come. Much of what ensues in the book is about climate change and that is where the value of the book really lies. In the next chapter, the author looks back in time to see what the ice can tell us. Early data, dating back to 800,000 years ago, reveals the chemistry of the air that blanketed Antarctica and rest of the Earth. Comparison with modern day data shows how things have and are changing. The importance of unlikely factors, such as dust from Patagonia, and expected influential factors, such as the albedo of reflective surfaces, provide clues as to why climate change is occurring and what we might expect in the future. The author defines an era, referred to as the anthropocene, where humans are impacting global climate. This concept is built on by other authors as the book progresses. The next offering focuses on how and why the landscape and climate of Antarctica is impacting world climate. The author explains the climatic significance of the winds at this locale and the origins and climatic impacts of the ozone hole. The following chapter introduces the concepts of

how “bottom water” from the Weddell Sea, icy seas, and gyres (i.e. wind driven currents) are influencing world climate.

So let me pause here for a moment and warn the reader that these first chapters are clearly written by scientists, experts in their field and are not written with the “See Spot Run” crowd in mind. Verbiage is scientific, concepts complex and the vocabulary clearly erudite! Nonetheless, what they have to say is important and valuable and I encourage you to wade through them and glean what you can to better understand what is happening to our great Earth.

Now came the part of the book I liked best – the part that dealt with the flora and fauna, both terrestrial and aquatic (benthic and pelagic). A good biological overview of all life, from the microscopic to the macrofaunal is provided in these pages. In this chapter and throughout the book, the pages are adorned with wonderful photographs of the subjects being discussed. The animals, which live in and near the Antarctic, are particularly well illustrated. A very interesting chart is presented that summarizes the biological colonisation and extinctions in Antarctica from the Paleozoic era to the present. There was one descriptive paragraph that I particularly enjoyed as it answered myriad questions in my mind. Sea ice blocks light which should diminish life itself. Right? No wrong – sea ice also encourages the upwelling of nutrients from the depths, which stimulates life and growth. Only one error jumped out at me – the Light-mantled Albatross was incorrectly called the Light-mantled Sooty Albatross. The chapter closes with evidence of how we negatively impact the ecosystems of this frigid land, from the controlled but subtle influence of tourism to the permanent interference of research bases in fragile coastal areas.

The book now drifts back to the highly scientific as the author discusses such matters as radiation belts in space, cosmic rays and “IceCube” neutrinos ... but don’t get me wrong this is an interesting chapter that reveals much about how the world’s climate can be predicted by studying solar and terrestrial influences and the atmosphere above Antarctica. The following chapter is very interesting and focuses on what it is like to live and work in Antarctica. Insights into the facilities where scientists work, what they eat and do and how they entertain themselves are provided in these pages. Many countries own bases to conduct their research, while some invite other scientists, as renters or guests, to use their facilities. Wanna go bowling? Why not visit McMurdo Station for they have a great bowling alley!

Chapter 9 deals with collaborative scientific research, particularly as it relates to SCAR – The Scientific Committee on Antarctic Research, from its beginnings in 1958 to the present where its roles have morphed to where it is now the authority on Antarctic research. Following this, the next author deals in part with the exploitation of Antarctic resources, from seals to whales

in the early days. The complex land claim structure of the Continent and the implications of who claims what are discussed. As time passes and the world’s resources are further diminished, the riches, real or perceived, of Antarctica become more appealing – be it the fisheries, the krill harvest or mineral exploration – all will tax Antarctica and its wildlife. The chapter closes with a discussion of the evolution of the Antarctic Treaty and what it means to the future of Antarctica. The last chapter deals with various climate-related factors, how they are changing and what that means to the future of Antarctica, its wildlife and even the world. The book closes with an all too short discussion about visiting Antarctica. I was pleased to see that my book (“Antarctica – First Journey”) was recommended as required reading for those wishing to visit Antarctica!

Sometimes I like to tantalize the reader and pose some questions, whose answers may be found in the pages of the book I’m reviewing. So here goes ... How does *Aurora australis* impact communication equipment? Which is bigger the East Antarctic Ice Sheet or the West one? Why are there so few creeping decapods (e.g. lobsters and crabs) in Antarctica? Why is the Antarctic ice melting from above and below? Is it a bad thing or a good one that sea polyps are increasing? Why are modern day Antarctic-based research scientists often smelly? Who, in the 1760s, postulated that millions of people lived in Antarctica? Why is the Antarctic older than the Arctic? Why did early explorers create “castles in the sky”?

And just before I wrap up, here are some scary (and good) facts: The ozone hole will start to self-repair in 2 years and by 2099 it should be gone. The rate of rise of CO₂ today is 50 times faster than at any other time in history. 90% of Patagonian Toothfish (Chilean Seabass) is caught illegally. Seawater acidity has increased by 30% since the 1800s resulting in a “noisy” ocean that is negatively impacting whales and dolphins. Transmitters are being attached to Elephant Seals to gather deep water data useful to studying climate change.

Okay time to wrap this up. I liked the book even though some chapters were a bit too much like a university lecture for this former student. I would have liked to have seen a summary chapter that brought the messages of all the chapters into perspective. Where exactly are we with climate change? Is it as bad as it sounds? What can we do? What will Antarctica look like in 100 years? There is a lot of great information here and I must admit that I am now more of a believer in climate change than I was before I started reading this book. It’s scary, but unless we understand the problem, we can never find the solution. If you truly want to gain an understanding of what is happening and why, I would strongly encourage you to read this book.

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