Book Reviews

Living in a warmer world. Edited by Jim Salinger. David Bateman Ltd, Auckland, New Zealand. ISBN978-1-86953-840-8 paperback $NZ19.99 and CSIRO Publishing, Collingwood, Victoria, Australia, 2013. ISBN 978-1-48630-028-0 246pp. Paperback $AUS35.

This book is a collection of 17 essays on the consequences of global warming. It includes a Foreword by former prime minister Helen Clark who is currently Administrator of the United Nations Development Programme whilst the editor needs very little introduction to New Zealand readers. Clark recommends the book to "all who are concerned with climate change" because it "requires engaged citizens and bold leadership …to take on entrenched interests".

Following an introduction by Salinger the book is in five parts with 17 chapters: what nature is telling us (3), water (4), food (5), health (2), our future (3). Each chapter includes an abstract as well as further reading 9or end notes or references) and a brief biography of the author(s).

'Nature' is covered in terms of biodiversity, coral reefs and insect responses. The chapter by Root on biodiversity considers range of species and extinction rates using woodland caribou, various butterflies and toad species as examples. The chapter ends with a discussion we might have to apply a triage system (saving some species at the expense of others) in order to prevent mankind's own extinction. Hoegh-Guldberg covers coral bleaching and ocean acidification and the cost of mitigation. It has been estimated that the cost of repairing all the coral reefs in the world would be of the order of hundreds of trillions of dollars. In their chapter on insect responses to a warmer world Andrew and Terblanche are concerned mainly with local climates, niches, possibility or otherwise of migration, and genetic resurgence.

In the 'water' section Chiew provides the reader with a very simple explanation of the water cycle and how it will be influence in a warmer world. Salinger and Chinn consider glaciers and concentrate on New Zealand as a case study but do include useful references for other parts of the world. Their explanation of the consequences of the changing season of run off on sea levels leads into the two subsequent chapters. The first, by Church, discusses the effect of rising sea levels on our coastal society that is twice as dense as the global average. New Zealand and others will have to adapt during the present century with three options: retreat (already occurring), accommodate (storm surge shelters and warnings), protect (Thames barrage, Netherlands dykes). The second by Capon looks at water resources and emphasises management rather than control.

The 'food' section begins with a study of wheat by Howden et al who point out that it is the world's most important cereal. They describe changes in production over the last 60 years due primarily to climate extremes (drought and heatwaves in Australia, Russia, Europe and the USA. In the future CO_2 increase will increase plant growth, temperature increases and seasonal rainfall reductions will reduce yields, as

will heatwaves and droughts. Similarly crop pests and weed species will expand poleward. One answer to this scenario is improved farm management techniques combined with plant breeding. But the latter takes time: 6-12 years for a new variety to reach growers and 15-20 years for a 'novel' trait to be introduced. The world's grasslands are covered by Lane et al who distinguish between grasslands (both C3 (temperate) and C4 (tropical)), rangelands, pasture, as well as weeds. They explain that grasslands can sequester carbon in the soil so they will help to mitigate climate change by capturing about 4% of greenhouse gas emissions. But this is offset by grazing ruminants that produce worse effluents (both liquid and gas). Given the editor's recent interest in viticulture it is not surprising that a chapter (by Jones) is included. But it sits uncomfortably in this section as it separates the grasslands from the livestock. The effect of climate change on the wine producing regions of the world is considered – they will move poleward in the northern hemisphere but they cannot do so in the southern; instead they may have to move upward. The chapter relies heavily on a badly referenced Wine Atlas by Dougherty (2012) to which Jones provided a 20-page paper. This is the only post 2010 reference given, but what is more surprising is the lack of any mention of the current research (financed by a Marsden Fund grant) taking place here in New Zealand at Canterbury. Returning to livestock (chapter by Eckard et al). By 2050 the human population of the world is projected to increase to 9.5 billion with 70% living in urban areas and food demand is projected to increase by 70% with the largest population centres being in South and East Asia. This will require a move from a grain-based diet to an animal protein one, but livestock produce 10% of the global anthropogenic greenhouse gases. Livestock animals are homoeothermic, meaning they can adapt to a wide range of latitudes; but they will still be susceptible to extreme events such as heat waves that will induce thermal stress. In addition extreme droughts and flooding will detrimentally affect their environments. Warmer temperate regions and more humid tropics will also cause an increase in parasites and disease. The other main foodstuff covered in this section is marine fisheries by Hobday. The current situation is outlined together with sustainability based on natural climate shifts caused by ENSO and the PDO. For the first time in the book Garett Hardin's 'the tragedy of the commons' (1968) is mentioned – i.e overexploitation of marine stocks (though this is usually denied by the proponents who plead sustainability is practised – I wonder if the Antarctic toothfish know! But climate change affects fish stocks through physiology phenology, abundances and distributions. Examples are given of the effects of temperature changes in the water column, ocean acidification (ocean pH), dissolved oxygen depletion at depth and predator/prey interactions.

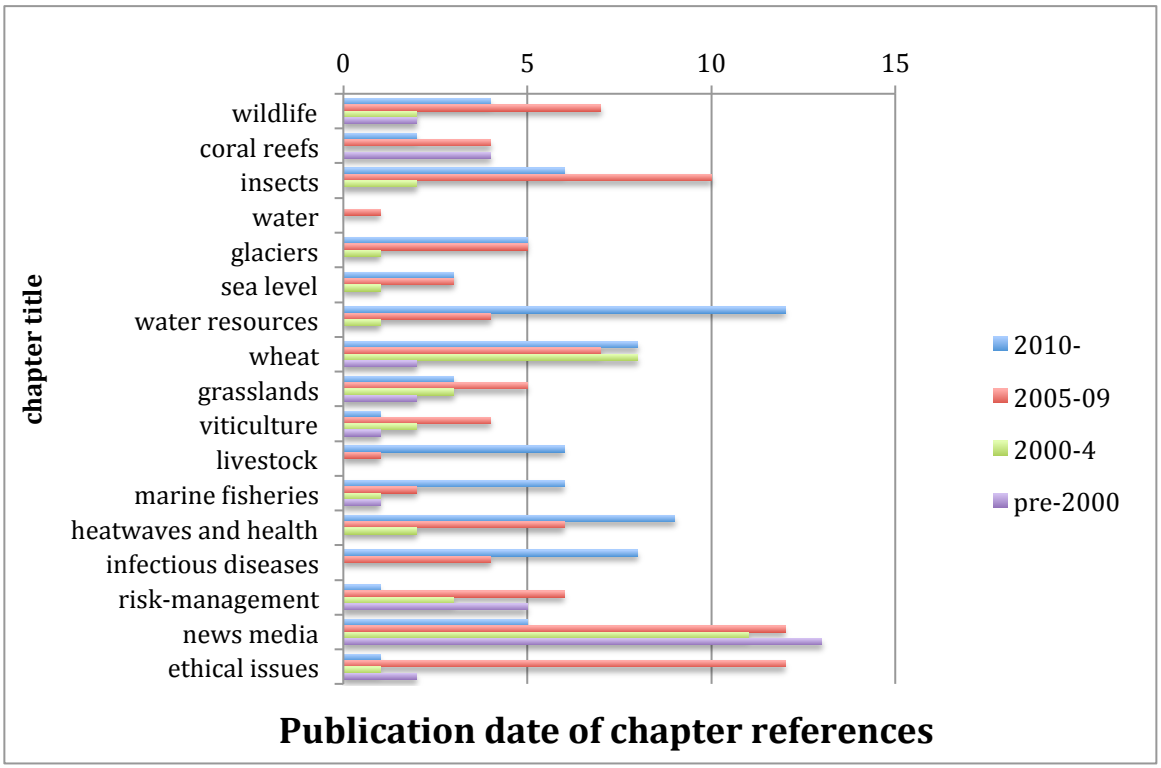
The third section of the book covers 'health'. McGregor discuses the effect of heatwaves – the silent killer. They vary according to location and can be hot and dry (anticyclonic and foehn) or hot and humid (coastal with tropical maritime air). Both induce heat stress in populations whereby the body gains more heat than it loses and ultimately leads to life threatening heat stroke when the body core temperature exceeds 40^{o}C.

Risk factors, exposure, and vulnerability are measured by increasingly complex heat stress methods. There is a brief description of recent heatwaves and consequent mortality headed by one in Russia in June-July 2010 when 55.7K people died and the European event of July-August 2003 with deaths of 66.7K in five countries. He then looks into the future via the IPCC special report (2012) on extreme events that expects the unusual events now (Europe 2003) will become the normal by the end of 21st century. The second chapter in this section is on infectious diseases by McMichael. He explains that the relationship between climate changes and disease is very complex; one example being the Irish potato famine of the 1840's and the deaths due to infectious diseases. Another 'simple' causal chain is bubonic plague which begins with good climate conditions that produce an expansion of the wild (flea infected) rat population followed by adverse weather conditions which forces them to interact with human cohabiting rats and then the fleas moving onto human hosts. Malaria,dengue, tick-borne, schistosomiasis, diarrheal, and other diseases are linked to various climate changes on regional and global contexts. He concludes that too little is known about the biological, social and ecological processes involved.

The final section is on 'immediate decisions' which is covered in three chapters. The first is a posthumous one by Schneider based on two papers written in 2009 and 2010 on tackling risk management via a Bayesian approach. Risk management has to be based on value judgments rather than scientific analysis simply because we cannot do experiments on the future. In a chapter on the news media, Sinclair points to the different aims of scientists (process/dynamics) and journalists/news media (audiences) in relation to the general public. She describes Beck's 1992 theory of organised irresponsibility and analyses reports in the New York Times over seventeen years of IPCC reports, 1990-2007. This resulted in a database of 1797 items that were reduced to 519 discrete information items by excluding repeated items. Generally human responsibility, greenhouse gas rises and the long-term nature of the risks were well down on the list of preferences. In fact out of the 1797 only 37 dealt with expected risks in the USA. She concludes that 'distorted social world understandings about physical risk happened because of faulty communication between three key players in the information flow: scientific experts, journalists and policy makers'. The final chapter is concerned with ethical issues. Boston explains these as a responsibility to future generations linked to costs and benefits in relation to consequentialist (utilitarian) and deontological (duties and rights) ethics. He concludes that the natural and social sciences cannot tell us what we should do because this needs a moral judgement which relies on ethical principals.

There are twenty-seven contributors to this book mainly from the New Zealand and Australia but, as one would expect from the peripatetic editor, others come from the USA, Italy and South Africa. Between them they reference 243 articles and books in the further reading (end notes/references) at the end of the respective chapters. About 20% (48) of these are by the chapter authors themselves with 3 chapters having over

50% of the references by them. The references are reasonably up to date (see figure below) with 33% published since 2010 and only 13% before 2000. However this reviewer wonders how many of the general public would be able (or want) to access some of the references. In these days of the internet academic publishers (with a few exceptions) charge for the on-line purchase of an article. The alternative is interlibrary loan from public libraries.



In fairness it should be noted that all the IPCC reports are available for free download. A small quibble: in some chapters the illustrations are referenced in their captions only, but inadequately, so are less easy to trace on the web. Overall however the book does give a useful insight into the way that global warming will affect humankind in the 21st century as viewed in 2011and 2012.

References

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P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp. ISBN 978-1-107-02506-6 Hardback. ISBN 978-1-107-60780-4 Paperback. https://www.ipcc.ch/pdf/special-reports/srex/SREX_Full_Report.pdf

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Faction Comics, 2015. *High Water*. 3 Bad Monkeys, New Zealand. ISBN 978-0-473-30710-3. Hardback $29.99. 96pp.

This is a most unlikely book to receive a review in an academic journal but the reviewer felt that it gave an alternative insight into the concept of global warming that reaches a different audience. It is a comic book anthology and as Covich (2012) points out 'The academic study of comic books…has predominantly focussed on the analysis of these books as texts, as teaching and learning resources'. Comic books in general include graphic novels and these 'tell a story using a comic book style – sequential illustrations… the term was coined in 1978… although some libraries call them "graphics"…to be more inclusive of non-fiction' (National Library of New Zealand, nd). Brenner, R. (2006) suggests that graphic books are an alternative way to tell a story. This is what the book under review does – it tells the story of the consequences of climate change through a series of chapters by New Zealand graphic designers, artists and authors.

The Introduction is by Lucy Lawless, actress and green campaigner, with a typical mind-grabbing first sentence "*Wow! The artwork contained herein knocked my bloody socks off*" and continues "*These eleven incredible artists have not stinted in imagining the gravest outcomes of man-made Climate Change. Perhaps a visual warning will work better than a written one"*.

The first chapter (by Dylan Horrocks, a cartoonist) is in the form of postcards dated 2050 sent on an expedition across the Pacific on the HMAS Kupe and gifted to the University of Papanui in 2107 by the mother of the sender. Throughout there are subtle Maori links – the name of the airship (reminiscent of the first arrival of Maori in New Zealand), an expedition led by a Professor Cook from a university near Christchurch, and the name of the starting point, Aoteroa. The expedition leaves Taupo in February 2050 and flies first to the land of the Dreaming Desert (Australia) where there is very little water, then crosses Oceania (April 2050) where whole kingdoms were submerged and are now a tourist attraction. They reach the City of Angels (Los Angeles, July 2050) that has been engulfed by giant forests and likened to the New Zealand kauri, and an island called The Frozen River (New York, September 2050) explained by the absence of a Gulf Stream, before finally returning across the Pacific (November 2050) where they glimpse an uncharted landmass (Antarctica).

Sarah Laing (author and illustrator) tells a story of life on houseboats by the survivors of rising sea levels. In "After the Floods" two children reminisce about the swamplands and the landowners of

Maungakiekie who compost their patches of land. In the third chapter Katie O'Neill (New Zealand cartoonist/writer with a following on the internet) looks at a drowned city and wonders why her ancestors didn't fight harder to save it. Cory Mathis (illustrator, animator and digital artist with a penchant for dinosaurs) considers the demise of Neanderthals in Central Europe due to the cold spell about 40,000 years ago that ends with the prophetic words *'Nature is not known for giving second chances'*.

In "Lowest Ebb" we enter the horror genre with a tale by Christian Pearce (a concept artist at Weta Workshops) set in a submerged city with a mad scientist experimenting with monster crustaceans. Ned Wenlock is better known for his animation videos but here he gives us a whimsical tale about a polar bear, another mad scientist (reminiscent of Dr Strangelove) and a weather-changing machine. Toby Morris (Auckland-based cartoonist, illustrator and art director) has a couple of flood survivors finding videos in a sunken city showing cars and "transponders that could fly in the sky' and wonder that if their ancestors were so smart they ended up drowning the world.

Damon King is a graphic designer and editor of Faction Comics. His piece "The Lotus Eaters" looks at Auckland in the present, in 20 years time (drought), after 50 years (local self-sufficient markets), in 100 years (Chinese rice paddies and little rain), +200 years (starving scavengers at Port Chevalier(?), +1000 years (no human life, mangroves reasserting), + 3 million years (return of dinosaurs) and ends with footprints leaving a space capsule on the moon. Chris Slane (a cartoonist) in a short but succinct piece looks at Galileo (the scientist) and the Inquisition (the climate sceptics).

The penultimate chapter is the wordless depiction of the volume's title "High Water" with an inundated city populated by a variety of sea fauna by Ross Murray (a Mount Maunganui illustrator and graphic designer). The final chapter (by Jonathan King, ex-graphic designer, film producer) is about Timmy –The luckiest kid in the world – who lives in a house away from the sea, has two working parents, whose boat arrived a hundred years ago and whose country now keeps immigrants at bay; is this a reflection on today's society I wonder?

These brief descriptions of the chapter content show that the book is based on the concept that climate change is inevitable. Many of the chapters consider the consequences in the form of parables but this enhances the message. For myself I enjoyed the conversation on climate science between Galileo and the Inquisitor. For an alternative review readers should see Hot Topic (2015) that also contains several illustrations.

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