

Field Notes from a Catastrophe: Man, Nature, and Climate Change
Elizabeth Kolbert, Bloomsbury, 2006, 225pp.

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SUMMARY OF CONTENTS

Part I: Nature

Chapter 1: Evidence of Warming in the Arctic

Summary: Kolbert provides anecdotal examples of warming at various locations in the Arctic. In some cases, Kolbert even accompanies scientists in the field.

Topics:

- The Inupiat village of Shishmaref sits on the island Sarichef, Alaska. Changes in the sea left the tiny island vulnerable to storm surges, so the whole village had to be moved to the mainland.
- Severe forest fires in Fairbanks, Alaska, which were linked to the unseasonably dry weather.
- Alaska's permafrost is warming and even melting in some places.
- The *Des Groseilliers'* cruise on the Arctic Ocean to study retreating sea ice. Changes in the ice floes were more dramatic than expected.

Chapter 2: The Science of Global Warming: A Brief History

Summary: Kolbert highlights the major contributors to the theory of global warming. She doesn't bother with contemporary climate scientists, but rather focuses on scientists from the 19th through mid-20th centuries to demonstrate global warming is not a new idea. The unifying element among all of the scientists mentioned is that their work somehow contributed to the understanding that atmospheric CO₂ warms the surface of the planet.

Topics:

- John Tyndall (1850s) and his discovery of the greenhouse effect. He concluded from his experiments that certain constituent (e.g. CO₂ and water vapor) gas species present in the atmosphere were warming the surface of the planet.
- Stefan-Boltzmann Law
- Svante Arrhenius (1890s) theorized that increasing concentrations of atmospheric CO₂ would raise the temperature of the planet.
- Charles David Keeling (1950s) and his observations of CO₂ concentrations taken from Mauna Loa. His result is the famous "Keeling Curve".

Chapter 3: Shrinking Glaciers

Summary: Kolbert describes changes in the ice sheets and glaciers of Greenland and Iceland. In both places, the ice is shrinking at rates unprecedented in the modern era.

Topics:

- Swiss Camp, a research station on the Greenland ice sheet. Accelerating ice melt is being observed.

- Greenland ice sheet and the thermohaline circulation.
- Icelandic Glaciological Society is an effort supported entirely by volunteers. The IGS monitors the nation's glaciers, which are being observed to be retreating.
- Symposium for Arctic nations held in Reykjavík.

Chapter 4: The Impact of Global Warming on Animals and Insects

Summary: Global warming, it seems, will inevitably place pressure on many species around the globe. Kolbert provides examples of species that are already being impacted.

Topics:

- The range of the Comma C butterfly is quickly expanding, illustrating the potential for global warming to force changes in animal/insect habitats.
- The diapause period of *Wyeomyia smithii*, a type of mosquito, is shifting. Scientists want to suggest this is evidence of global warming forcing evolution.
- A golden toad, *Bufo periglenes*, once lived high in the Costa Rican mountains, but is now widely believed to be extinct. This demonstrates that the concern that high-altitude species might be most threatened with extinction because of global warming.

Part II: Man

Chapter 5: Climate Change and the Collapse of Civilizations

Summary: History has demonstrated over and over that civilizations can suddenly collapse for a variety of reasons. The idea behind “the curse of Akkad” is that abrupt changes in the climate can actually force a civilization out of existence, not just wars and disease. Perhaps the most famous downfall cited is the collapse of the ancient Mayan civilization.

Topics:

- Severe, multi-year droughts wiped out the Akkadians somewhere around 2000 B.C. Harvey Weiss extends the theory of climate induced collapses to the Classic Mayans, the Tiwanaku, and the Old Kingdom of Egypt.
- James Hansen
- Climate models, lots of focus on NASA's GISS model (probably because it's the one Hansen uses).

Chapter 6: Adapting to Sea-Level Rise

Summary: Nearly twenty-five percent of the Netherlands is built below sea level. The Netherlands already boasts one of the world's most elaborate water management systems. Rather than building more dikes and dams to keep the water out, efforts are now switching focus towards adapting for a future where water will be an unavoidable part of peoples' lives.

Topics:

- The “Room for the River” project. Some \$390 million has been set aside to essentially buy people off their land to make way for controlled flooding.
- Vostock ice records.
- Amphibious homes. To accommodate the risk of flooding, building firms are now assembling homes built on hollow concrete pontoons. When the water rises, the

houses will gently rise, too. When the water recedes, the houses will be deposited back on dry land.

Chapter 7: Business as Usual

Summary: Kolbert offers readers a brief glimpse at the idea of “emission scenarios” and then goes into discussions with professional scientists about what can possibly be done to avoid business-as-usual trends. She highlights the concept of stabilization wedges and technologies currently in place that could potentially lower emissions.

Topics:

- Robert Socolow of Princeton and the Carbon Mitigation Initiative.
- “Stabilization wedges”. Utilizing current technologies to lower CO2 emissions wedge-by-wedge, rather than take on the whole effort at once.
- The place of government intervention/assistance in lowering emissions.

Chapter 8: The Kyoto Protocol and America’s Lack of National Policy to Address Global Warming

Summary: Kolbert traces the birth of the Kyoto Protocol and discusses the implications of the United States electing not to sign. She details the failures of the Bush (Herbert), Clinton, and current Bush administrations to enact any effective climate change policies. Kolbert is especially critical of the current Bush administration’s stance on global warming.

Topics:

- Kyoto Protocol and the Framework Convention.
- The Bush administration’s stance on global warming.
- Al Gore and his political dedication to climate change policy.
- EU stance on global warming (eg Tony Blair and Angela Merkel)

Chapter 9: Burlington, Vermont: A Grassroots Effort to Reduce CO2 Emissions

Summary: The people of Burlington, Vermont have taken it upon themselves to reduce their reliance on coal power and reduce their carbon emissions. The lack of global warming policy coming from the White House has inspired this town to take matters into its own hands.

Topics:

- Grassroots efforts
- “Deconstruction” instead of demolition in the building sector.
- Sustainable food practices/markets.
- China and the US: If the US doesn’t act, China can’t be expected to either. However, what the US does, China will follow by example.

Chapter 10: Man in the Anthropocene

Summary: According to Paul Crutzen, we have entered a new era where humans are “altering the planet on a geological scale” (183). Projections about the future of our climate have been made, but there is no way to tell what will actually happen. This chapter concludes the book with a sobering assessment of the uncertainty of our future on this planet and whether or not we’ll be able to preserve life as we know it.

Topics:

- Anthropocene (the era of man)
- The idea of “crossing thresholds” and being unable to turn back.
- Possible impacts of global warming on the future.

COMPELLING EXAMPLES OF IMPACTS

Example: Inupiat seal hunting Alaska. The men used to travel out 20 miles onto the ice on dogsleds, and more recently on snowmobiles, but that isn’t possible anymore. Since the 1990’s, Inupiat hunters have noticed changes in the sea ice. It is forming later in the fall and the ice is too “mushy” for hunting on snowmobiles, they now go by boat.

Page(s): 8, Ch 1

Example: The village of Shismaref is on a remote island that, at its maximum, is only 22 ft above sea level. Sea ice wasn’t forming early enough, leaving the village vulnerable to storm surges. Storms destroyed homes and forced others to relocate. The village eventually voted to move everyone to the mainland.

Page(s): 9, Ch 1

Example: Forest fire in summer 2004 in Fairbanks, Alaska. The fire burned an unusually long time and was associated with record high seasonal temperatures and record low rainfall.

Page(s): 14, Ch 1

Example: Permafrost degradation in Alaska. Holes are appearing in the permafrost, causing serious threats for houses and other structures. In some places where the permafrost has melted, you can see houses slanted at disjointed angles.

Page(s): 16, Ch 1

Example: Permafrost should be warmest at the bottom and coldest the top. This is not what is being seen. Instead, the permafrost is warmest at the bottom and coldest somewhere in the middle, then warming again as you move towards the surface.

Page(s): 19-20, Ch 1

Example: The active layer freezes in the winter and melts in the summer. This surface layer supports plant life in the Arctic. Measurements show that the active layer is getting deeper and deeper.

Page(s): 23, Ch 1

Example: In 1977, the *Des Groseilliers* set off into the Arctic Ocean. The research site was selected based on a 1975 study. They were hoping to find ice floes of approx 9 ft in thickness (which is the thickness decided on from the 1975 data), but could barely find floes that were six ft thick. The crew decided to find the best floe they could and set up research stations there. They found a suitable floe. The floe was expected to thicken while they were on it, but just the opposite happened. So many scientists fell through the

ice a new protocol had to be adopted: if you step one foot off the ship, you have to life vest.

Page(s): 25, Ch 1

Example: At Swiss Camp, the ice moved 13 in/day in the summer in 1996, but by 2001 it was moving at 20 in/day. Temperature data was collected and analyzed, revealing that the summer Kolbert was there was the warmest yet on record.

Page(s): 54, 59, Ch 3

Example: The Icelandic Glaciological Society is supported entirely by volunteers who go out at and take measurements of Iceland's 300+ glaciers. In some cases, the responsibility of looking after certain glaciers has been kept in families for generations. Measurements of a glacier called Sólheimajökull indicate the glacier has retreated more than 1000 ft over the last decade.

Page(s): 61, Ch 3

Example: An Inuit hunter from Bank Island, some 500 miles north of the Arctic Circle, started to notice robins appearing from the first time a few years ago. Robins a bird for which the Inuit have no name, if that's any indication.

Page(s): 64, Ch 3

Example: Since the 1980s, British entomologists (both professional and amateur) have been tracking the range of the Comma C butterfly. The Comma C is constantly been found in places were it previously was not and its rate of range expansion is a "remarkable" 50 miles/decade. Once only found in England, it's now popping up in Scotland. In an additional study, the range of 35 European butterfly species were examined and it was found that 22 had moved northward and only 1 southward.

Page(s): 68,70, Ch 4

Example: The *Wyeomyia smithii* is an insect in N America that takes cues from the light about when to go into diapause (like hibernation) and when to "wake up". Two American scientists studying this specimen define the critical photoperiod as "the point at which 50 percent of the mosquitoes in a sample have switch from active development to diapause". These same scientists have found that, in every single case they studied, the critical photoperiod has "declined over time". The argument here is that this is a demonstration of global warming forcing evolution.

Page(s): 73-80, Ch 4

Example: The golden toad is a shocking tangerine-colored toad that lives exclusively in the Monteverdi Cloud Forest located in the Tilaran Mts of Costa Rica. I guess I should say "lived" and not "lives" because the poor little fellow is now extinct. Its extinction has been attributed to changes in precipitation patterns in the cloud forest. High altitude species are speculated to feel the most pressure and be the first to go "out of existence".

Page(s): 80-82, Ch 4

Example: Ancient civilizations collapsing as a result of severe climate changes. As noted by the author, these civilizations predated industrialization by a long shot, but it still illustrates the potential magnitude a serious, multiyear drought could have.

Page(s): 97-98, 119, Ch 5

Example: Nearly twenty-five per cent of the Netherlands lies below sea level and despite being home to “one of the world’s most sophisticated water management systems”, the Netherlands is facing more flooding in the future. In addition to rising sea level, the Netherlands is expected to receive more precipitation as a result of global warming. In an inundation.

Page(s): 124-127, Ch 6

Example: There is a budding market in the Netherlands for “amphibious homes”. These homes are built on massive, hollow concrete floats. The idea behind the amphibious homes is that during times of high water the houses will rise with the water, and when the water recedes the houses will gently settle back down to the ground.

Page(s): 131-132, Ch 6

Example: “I’m not sure we can solve the problem. I hope we can. I think we have a shot. I mean, it may be that we’re not going to solve global warming, the earth is going to become an ecological disaster, and, you know, somebody will visit in a few hundred million years and find there were some intelligent beings who lived here for a while, but they just couldn’t handle the transition from being hunter-gatherers to high technology.” - Marty Hoffert, professor of physics at New York University.

Page(s): 148, Ch 7

Example: The United States still does not have a cohesive, effective strategy to mitigate global warming (i.e. reduce greenhouse emissions), so municipalities are starting to take matters into their own hands. One keen example of this is the city of Burlington, Vermont. The city has adopted the “10% Challenge”, which commits the city to reducing its emissions by 10% (unsure of the baseline date that would establish the “10%”). Rather than demolition, the city advocates “deconstruction”, which allows for the recycling of major fixtures (e.g. doors, stair cases, building material). The city has also built a market, which eliminates some of the need to drive miles away for food shopping. There is a farming district, complete with a compost mill.

Page(s): 173-177, Ch 9